

THE FIRST SEVENTY VOLUMES OF *ROMANIAN REPORTS IN PHYSICS*:  
A BRIEF SURVEY OF THE ROMANIAN PHYSICS COMMUNITY

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*Received October 6, 2017*

*Abstract.* To mark the publication of the seventieth volume of *Romanian Reports in Physics*, printed before 1992 under the Romanian name *Studii și Cercetări de Fizică*, we briefly review here its history in the broader context of the evolution of Romanian Physics within the past seven decades, and outline some of the research topics that are representative both for the journal and the Romanian physics community at large. Our review takes the form of a historical resource article that references a comprehensive list of papers authored or co-authored by Romanian physicists in the period 1950-2017, selected to be indicative for the research interests of the authors and scientifically significant. Our survey covers theoretical, experimental, and computational physics articles from the main research and academic centers in Romania and sketches the scientific profiles of a series of Romanian physicists.

*Key words:* Romanian physics, physics history, Studii și Cercetări de Fizică, Romanian Reports in Physics.

## 1. HISTORICAL INTRODUCTION

The history of Romanian scientific communities mirrors the history of the modern Romanian nation state, with the first universities appearing shortly after the unification in 1859 of the Principality of Moldavia (in Romanian: *Țara Moldovei*) and the Principality of Wallachia (in Romanian: *Țara Românească*) and then gradually evolving into important educational and research centers recognized at both national and international level [1].

The Romanian universities follow the academic tradition established by the so-called princely academies in Bucharest and Iași in the XVIIth century, such as

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<sup>†</sup> Deceased on December 24th, 2017.

*Academia Vasiliană*, *Academia Mihăileană*, and *Academia Domnească de la București* [2], which were respected institutions of higher education similar in many respects to their European counterparts [3]. Within the large landscape of Romanian Science, the history of Romanian Physics can be largely divided into three distinct periods [4]. The first one, going from 1860 to 1890, is marked by the introduction of physics courses in the academic curricula and sporadic physics research in newly established departments. The second period, going from 1890 to 1940, shows a significant increase in research activities, now in closer relation to the teaching process, with individual research centers being established around Romanian universities [4]. The second period also reflects a stronger interaction of the Romanian scientists with the well-established international research centers, leading to a clear transfer of scientific expertise and modern administrative know-how towards Romanian universities. The scientific biographies of several prominent Romanian physicists who are representative for the first two periods are sketched in Ref. [5] and discussed at large in Ref. [6]. The interested reader will find in Ref. [7] a presentation of the scientific achievements of a series of distinguished Romanian physicists in the context of physics worldwide, while in Refs. [8–10] one finds brief biographies of some of the most important Romanian physicists.

The third period starts after the Second World War, when physics research rekindled and bloomed, both within the newly-established Măgurele Physics Campus, in the outskirts of Bucharest, now a historic site of the European Physical Society, and in the well-established academic centers in Bucharest, Iași, Cluj-Napoca, and Timișoara, which had dedicated physics programs [11–18]. The remarkable achievements recorded after the Second World War are due to the joint efforts of The Romanian Academy (founded on 1/13 April 1866, see Ref. [19] for a detailed historical account), the national universities, The Institute of Atomic Physics, and the institutions that emerged from it. The Institute of Atomic Physics, established initially in 1949 under the Romanian name *Institutul de Fizică al Academiei* (in English: *Institute of Physics of The Romanian Academy*) and known after 1956 under its current name *Institutul de Fizică Atomică* (in English: *The Institute of Atomic Physics*), was the first research institution to catalyze physics research after the Second World War [20–22]. Its role on the Romanian research landscape has always been central, though it has changed substantially over the past seven decades, The Institute of Atomic Physics currently serving as one of the main Romanian research funding agencies. The scientific tradition of The Institute of Atomic Physics was transmitted to the research institutes and the Faculty of Physics of University of Bucharest, which are now active on the Măgurele Physics Campus. At this point let us note the two-folded activities on the Măgurele Physics Campus, with the Faculty of Physics of University of Bucharest and the research institutes jointly contributing to an environment that can be best described by the *teaching through research* paradigm. This allowed the uninterrupted formation of

new generations of physicists that continue to this day the scientific tradition of the Măgurele Physics Campus.

This article is structured in five Sections, the first of which is of introductory nature and consists of four subsections dedicated, in order of appearance in the text, to the Romanian physics community after the Second World War, the appearance of the journal and its change of name, the Editorial Boards of *Studii și Cercetări de Fizică* and *Romanian Reports in Physics*, and, lastly, methodological considerations. Section 2 surveys the articles published in *Studii și Cercetări de Fizică*, thereby covering the publication record of the journal in the period 1950-1992. In Section 3 we overview the papers published by the journal after the name change to *Romanian Reports in Physics* that took place in 1992 and then introduce three distinct subsections. The first one is dedicated to the Technical Design Reports of the *Extreme Light Infrastructure – Nuclear Physics (ELI-NP)*, which were published in 2016 in a Special Number of the journal, while the second subsection is dedicated to the articles published by *Romanian Reports in Physics* on the use of experimental physics methods for the understanding, preservation, and restoration of artifacts belonging to the Romanian cultural heritage. Lastly, the third subsection of Section 3 is devoted to a brief overview of the Special Numbers published by the journal after the change of name in 1992. Section 4 outlines summarily some of the Romanian research infrastructures and a few topics of interest on scientific computing, as these are reflected in the articles published in *Studii și Cercetări de Fizică* and *Romanian Reports in Physics*. Finally, Section 5 of the article starts with a short description of the papers in this Special Number, which is followed by a series of acknowledgements.

### 1.1 The Romanian physics community after the Second World War

The flourishing period of physics research after the Second World War is largely due to the ambitious policies in research and education, as well as to the efforts of a generation of brilliant scientists educated abroad. The roles that research and education played in the post-war society reflect the changes in main development directions of the country in the decades that followed the Second World War. The chief figure of the period is that of Horia Hulubei (born: 1896, deceased: 1972), Titulary Member of The Romanian Academy (in Romanian: *Membre Titular al Academiei Române*), the founding father of the Romanian School of Nuclear Physics, who did his doctoral studies in Paris, at the Sorbonne, in experimental atomic physics, in the laboratory of physical chemistry of Jean Perrin, and defended his thesis in July 1933 in front of a committee presided by Nobel Laureate Marie Curie, with the mention “très honorable” (see Refs. [23–26] for a detailed biography and a discussion of the main scientific achievements of Horia Hulubei). Next to him we have Șerban Țițeica (born: 1908, deceased: 1985), Titulary Member of The Romanian Academy, who is the founding father of the Romanian School of Theoretical Physics [23,27–31]. Șerban Țițeica was a doctoral

student of Nobel Laureate Werner Heisenberg and in 1934 defended his thesis *Über die Widerstandsänderung von Metallen im Magnetfeld*, which was afterwards published in 1935 in *Annalen der Physik (Leipzig)* [29]. We would like to emphasize that Horia Hulubei and Șerban Țițeica were not only outstanding researchers, but also gifted and accomplished professors at University of Bucharest who helped shape numerous young students. These later turned into independent researchers that consolidated the prestige of the Romanian Physics School and opened new research directions, as well as new international collaborations. To get a feeling for the international scientific cooperation and the recognition that the Romanian physics had abroad just before the Second World War and the following decades, it is sufficient to list some of the foreign Honorary Members of The Romanian Academy, all outstanding physicists who marked the 20th century: Enrico Fermi (elected in 1938), Werner Heisenberg (elected in 1938), Frédéric Jean Joliot-Curie and Irène Joliot-Curie (elected in 1948), Louis-Victor Pierre Raymond de Broglie (elected in 1957), Gustav Ludwig Hertz (elected in 1965), and Louis Eugene Félix Néel (elected in 1965).

The Măgurele Physics Campus, where physics research rekindled and bloomed after the Second World War, now hosts the Faculty of Physics of University of Bucharest (FF-UB) [32], the Horia Hulubei National Institute of Physics and Nuclear Engineering (IFIN-HH) [33], the National Institute for Laser, Plasma and Radiation Physics (INFLPR) [34], the National Institute of Material Physics (IFTM) [35], the National Institute for Earth Physics (INFP) [36], the National Research and Development Institute for Optoelectronics (INOE) [37], the Institute of Space Sciences (ISS) [38], and, lastly, The UNESCO International Centre for Advanced Training and Research in Physics [39]. The Măgurele Physics Campus is the main actor in the international collaborations that Romania is part of, the participation at CERN being the most visible one and having the strongest impact on the development of the Romanian physics community [40]. Let us mention that the list of PhD theses defended on the Măgurele Physics Campus within the Institute of Atomic Physics in the period 1962-2006 is publicly available, see Ref. [41], and one consult it to glance at the scientific filiations of the period. Lastly, let us note the historical volumes [42–44] published by the class of 1970 of the Faculty of Physics of University of Bucharest. These extensive volumes give a detailed account of the personal and research profiles, as well as the professional careers of the physicists in the class of 1970, most of whom helped shape the Romanian physics community.

## **1.2 The appearance of *Studii și Cercetări de Fizică* and the change of name to *Romanian Reports in Physics***

Surveying the efforts focused on strengthening the Romanian physics community just after The Second World War, one easily notices the publication of *Studii și Cercetări de Fizică* (in English: *Studies and Researches in Physics*),

whose first volume appeared in 1950. The journal was published initially under the coordination of the newly established Institute of Atomic Physics, whose name is on the front page of the cover, which is typical for many physics journals that started under the coordination of an academic institution before shifting towards a professional society or a commercial publishing house, e.g., *THE PHYSICAL REVIEW. A journal of Experimental and Theoretical Physics* was initially published for Cornell University by The Macmillan Company [45]. *Studii și Cercetări de Fizică* was published without interruption to this day and gradually shifted from articles in Romanian to articles solely in English, a transition that is reflected by the name change of the journal to *Romanian Reports in Physics* in 1992. This journal speaks of an almost uninterrupted intellectual tradition, which started in 1930 with the foundation of King Charles II Research Institute of Romania [46]. The history of the journal covers almost seven decades and a total of seventy volumes, including this one, which we now celebrate through this historical resource article that gives reference to an extensive series of papers that are representative for its publication record and outlines some of the research topics covered by the journal. Looking into the articles published by *Studii și Cercetări de Fizică/Romanian Reports in Physics* over the past decades, we revisit here some important moments in the history of Romanian Physics and recall the work of a series of physicists who helped consolidate the prestige of the Romanian Physics School.

King Charles II Research Institute of Romania, the first research institution formally outside universities and polytechnic schools, published, starting 1940, *Disquisitiones Mathematicae et Physicae (Mathematical and Physical Researches)* [46]. The journal survived the war period up to 1948, when the seventh and last tome of the journal appeared. An analysis of the seven tomes published in the period 1940-1948 shows a preference towards mathematics articles (59 articles in mathematics as opposed to only 17 in physics) and a favor towards articles written in French. Both of these aspects reflect the structure of the governing body of the journal, where only 7 out of a total of 22 members were physicists, most of them with doctoral studies in Paris. The scientific expertise of the Editorial Board was impressive, all but one member being elected to The Romanian Academy during their editorial tenure [46]. After the closing of *Disquisitiones Mathematicae et Physicae* in 1948 the tradition of journal is largely continued by *Studii și Cercetări de Fizică*, whose first issue was published in July-December 1950 [47]. While the first three volumes are marked by the ideology of that period [47], starting with the fourth volume (published in 1953) the quality of the articles is continuously improving and the journal quickly becomes a reference in scientific publishing. Following more than four decades of uninterrupted publication, marked sometimes by delays and joint publication of multiple issues, the journal changes name in 1992 to the current *Romanian Reports in Physics* [48].



Fig. 1 Front pages of *Studii și Cercetări de Fizică* volume I, number 1, 1950, see (a), and volume 44, number 7, 1992, see (b). Front pages of *Romanian Reports in Physics* volume 44, number 8, 1992, see (c), and volume 70, number 1, 2018, see (d). Courtesy of the staff of The National Physics Library in Măgurele.

While it is difficult to do a broad assessment of the impact of *Studii și Cercetări de Fizică/Romanian Reports in Physics* within the international scientific community, as we will detail in Section 1.2, we mention here the Impact Factor (IF), the 5 Year Impact Factor (5YIF), and the Article Influence Score (AIS) provided by Thomson-Reuters/Clarivate Analytics Web of Science database. In 2012, the first year for which the AIS is available for *Romanian Reports in Physics*, we note an IF of 1.123, a 5YIF of 0.726, and an AIS of 0.125. The next year the IF slowly increased to 1.137, the 5YIF went up to 0.788, while the AIS reached 0.133. The ascending trend of these scientometrics indicators was kept in 2014, while for 2015 one finds an IF of 1.367, a 5YIF of 0.928, and an AIS of 0.184. Lastly, for 2016, the last year for which these indicators are available, the IF has a value of 1.467, the 5YIF is equal with 1.102, while the AIS is 0.242.

Starting with the first number of volume 69 of *Romanian Reports in Physics*, published in 2017, a new referencing system was used, the global pagination of the journal being replaced with individual article numbers. To this end, ten distinct topical areas have been introduced, selected to be representative for the research directions worldwide and to have good coverage in the Romanian physics community. The first topical area gathers the editorial materials, while the following nine overview the scientific subfields covered by the journal. These are: *Theoretical, mathematical, and computational physics. History and philosophy of physics; Atomic, molecular, and nuclear physics; Physics of elementary particles and fields; Optics and photonics, plasmas, laser and beam physics; Condensed and soft matter physics; Biophysics and medical physics; Environmental and Earth physics; Applied and interdisciplinary physics; Physics education.* Starting with 2017, articles are identified through the number of volume in which they appear and the three digit article number. This number is structured as follows: the first digit indicates the topical area and runs from 0 to 9, while the last two digits are assigned according to the order of publication of the article within its subject area. The internal pagination within each article has been kept, but it is not used when referring to or searching the paper. The current article, for example, can be referred to as: V.I. Vlad *et al.*, Rom. Rep. Phys. **70**, 101 (2018).

### **1.3 The Editorial Boards of *Studii și Cercetări de Fizică* and *Romanian Reports in Physics***

The first Editorial Board of *Studii și Cercetări de Fizică* (volume I, number 1, July-December 1950) consisted of Horia Hulubei, Gheorghe Atanasiu, Aurel Potop, and Andrei Popovici, who also served as Editor-in-Charge. The Editorial Board remained unchanged up to January-June 1953, volume IV, number 1-2 of the journal, when Tudor Tănăsescu joined the board and became Editor-in-Charge. In July-December 1954, volume V, number 3-4, Valeriu Novacu, Adrian Gelberg, Margareta Giurgea, and Dorel Bally joined the Editorial Board, while in July-September 1955, volume VI, number 3, the board was also joined by Mircea

Oncescu. Next to join the board was Theodor V. Ionescu, who appeared for the first time on the cover of volume VII, number 1, January-March 1956, followed by Eugen Bădărău and Florin Ciorăscu, who joined the Editorial Board starting with volume VIII, number 1, January-March 1957. Volume X, number 3, published in 1959, marks the inclusion of Șerban Țițeica, Ion I. Agârbiceanu, and Paul Drăghicescu in the board of the journal. The Editorial Board remained unchanged up to 1964, volume XV, number 1, when Alexandru Cișman, Radu Grigorovici, Ioan Ursu, and Vasile Petrescu were included as new members of the board. This modification of the Editorial Board is followed by the inclusion of Ștefan Procopiu and Gheorghe Vasiliu starting with volume XV, number 4, 1964. In 1966, tome 18, number 4, the Editorial Board was joined by Aretin Corciovei and it then remained unchanged until 1972, tome 24, number 3, when Mihai Gavrilă joined the board as Scientific Secretary of the journal. The same year, starting with number 8 of tome 24, Aureliu Săndulescu appears as a new board member, while in tome 25, number 5, published in 1973, we find Șerban Țițeica as Editor-in-Charge, Mihai Gavrilă as Deputy Editor-in-Charge, Marius Petrașcu as Scientific Secretary of the journal, and Gheorghe Brătescu as a new regular member of the board. The Editorial Board remained unchanged for a decade, up to 1983, when Marin Ivașcu and Ioan-Ioviț Popescu appear as new board members starting with tome 35, number 1, of the journal. In 1985, tome 37, number 9, we find Ioan Ursu as Editor-in-Charge of the journal and Marius Petrașcu as its Scientific Secretary. The Editorial Board was kept unchanged up to tome 44, number 8, published in 1992, when the official name of the journal became *Romanian Reports in Physics*. The new board consisted of Ioan-Ioviț Popescu, who served as Editor-in-Chief, Ionel Valentin Vlad, who served as Deputy Editor-in-Chief, and Theodor Ionescu-Bujor, who served as Chief Scientific Advisor. The regular members of the Editorial Board were Emil Burzo, Viorica Florescu, Cornel Hațegan, Marin Ivașcu, Rodica Mănăilă, Mircea Oncescu, Marius Peculea, and Athanasie Truția, who were all affiliated with Romanian institutions. The aforementioned members of the Editorial Board were helped by an International Advisory Editorial Board consisting of: A. Andriesh (Republic of Moldova), P.B. Barna (Hungary), R. Bălescu (Belgium), M. Bertolotti (Italy), P. von Brentano (Germany), C.B. Collins (USA), G. Comșa (Germany), J.C. Dainty (UK), T.P. Das (USA), F.K. Kneubühl (Germany), S. Martellucci (Italy), B.R. Orton (UK), R.H. Pratt (USA), R.A. Ricci (Italy), and J. Tsujiuchi (Japan).

The next important change in the Editorial Board of the journal takes place in 1999 when, starting with volume 51, numbers 7-8-9-10, the board was headed by Ionel Valentin Vlad, as Editor-in-Chief, and Rodica Mănăilă as Deputy Editor-in-Chief. They were helped by the following regular board members, both from Romania and abroad: A. Andrieș, P.B. Barna, R. Bălescu, M. Bertolotti, P. von Brentano, E. Burzo, C.B. Collins, G. Comșa, J.C. Dainty, T.P. Das, Viorica Florescu, C. Hațegan, I. Iova, M. Ivașcu, F.K. Kneubühl, S. Martellucci,

M. Oncescu, B.R. Orton, M. Peculea, R.H. Pratt, I.-I. Popescu, A.I. Popescu, R.A. Ricci, Y. Sakai, H. Scutaru, Ath. Truția, J. Tsujiuchi, and H. Walther. Ionel Valentin Vlad remained Editor-in-Chief of the journal up to the end of 2017, the modifications to the editorial board covering the position of Deputy Editor-in-Chief, the current one being Cornel Hațegan, and the inclusion of new regular board members such as: Ș. Antohe, S. Aștilean, A. Bejan, V. Ciupină, Stefan W. Hell (Laurate of the 2014 Nobel Prize in Chemistry), N. Kroo, A. Isar, N. Ionescu-Pallas, D. Mihalache, S. Nistor, A. Petriș, N.S. Sariciftci, I. Tiginyanu, L. Vékás, M. Vișinescu, and N.V. Zamfir. Along the years, the Editorial Board was helped at a technical and editorial level by Rodica Calboreanu and Marinela Dumitriu, while the current support team consists of Margareta Oancea, Technical Editor of the journal, Irina Filip, Editorial Assistant, Magda Jindiceanu, Computer Operator, and Mariana Mocanu, who is in charge of the graphical design of the journal. Lastly, we note that the journal is currently published by The Editorial House of The Romanian Academy, with technical support from the Horia Hulubei National Institute for Physics and Nuclear Engineering (IFIN-HH), Măgurele, Romania, where the journal also holds a Technical and Editorial Office managed by Margareta Oancea.

#### 1.4 Methodological considerations

A survey of the articles published by *Studii și Cercetări de Fizică* and then by *Romanian Reports in Physics* is indicative for the research interests and international collaborations of the entire community of Romanian physicists. In our survey of the articles published by the journal we have had in mind the words of David Eugene Smith, author of the classical reference *A source book in mathematics* [49], who stated that “by knowing the beginnings [...] the reader is encouraged to follow the growth of the science, to see how it has developed, to appreciate more clearly its present status, and thus to see its future possibilities.” Our approach is similar to the editorial top picks of some journals (see, e.g., the *Editor-in-Chief Top Picks* of the *Journal of the American College of Cardiology* in Ref. [50]), albeit with a considerably larger timespan.

Given the wide lifespan of the journal, 69 years and 70 volumes, including the current one, it is difficult to propose a unitary set of criteria for assessing the quality and impact of the published articles. Scientometrics indicators, on one hand, are a relatively recent innovation in the assessment of research output, so their relevance is secondary for articles published several decades ago, while on the other hand the subjects covered by the journal address a very broad set of research topics, which cannot be assessed in the same manner. As shown in the case of *The Physical Review* [51], the number of citations per year increased almost exponentially by some five orders of magnitude over the course of a century, thereby consolidating the idea that the impact and quality of old papers cannot be assessed correctly using the current scientometrics indicators [52,53]. Moreover, in

the particular case of *Studii și Cercetări de Fizică* and then by *Romanian Reports in Physics* the database of Thomson-Reuters Web of Science covers only the articles published after 2007, so for the majority of papers surveyed in this resource article a quantitative scientometrics assessment is extremely difficult. Let us also add that up to the early 90s of the 20th century many articles were still published in Romanian, not English, which limited significantly their impact in the international scientific literature. On the side of the subjects covered by the articles let us note here that they span a very broad spectrum that goes from purely theoretical articles, some of them being heavy on the mathematics, to articles with a clear engineering focus reporting developments or innovations that concerned the research infrastructures, most of them located on the Măgurele Physics Campus.

By sketching the scientific profiles of some of the authors who published in the journal, we intended to give a brief account of the large Romanian physics community, with no bias towards particular research topics. Unlike thematic historical surveys, our focus is neither on the development of specific research directions, nor on the evolution of distinct professional communities. By discarding thematic biases we intended to provide a global perspective on the community of physicists and engineers who helped consolidate the prestige of Romanian Physics.

In the following sections we present a selection of articles published by *Studii și Cercetări de Fizică* and then by *Romanian Reports in Physics* that are representative, in our opinion, both for the evolution of the journal and the Romanian physics community at large. We have opted for a chronological perspective, to avoid arbitrary qualitative assessments with two exceptions that concern the Technical Design Reports of the *Extreme Light Infrastructure – Nuclear Physics (ELI-NP)* experimental facility and the articles published in *Romanian Reports in Physics* on the use of physics methods for a better understanding, conservation, and restoration of our cultural heritage. By grouping these latter articles in a single subsection and not present them within the individual journal numbers where they were published, we hope to convey to the reader in an undiluted form the importance of this research direction.

To prepare this article we have surveyed a few thousands papers published by *Studii și Cercetări de Fizică* and *Romanian Reports in Physics* over the past seven decades. The resulting selection of articles is implicitly subjective, as is any review paper or resource article, but we are confident nonetheless that it gives an overall accurate picture of the research areas covered by the journal and the scientists who published in it. We are aware that a series of prominent Romanian physicists have not published in *Studii și Cercetări de Fizică/Romanian Reports in Physics* and therefore do not appear in the text of our historical survey, even though some of them have co-authored articles that we cited in the brief scientific profiles spread throughout this resource article. These omissions from our article reflect the preference of some authors to publish mostly in *Revue Roumaine de Physique*, established in 1956, published since 1992 under the name *Romanian*

*Journal of Physics* [54]. The first volume of *Revue Roumaine de Physique* appeared seven years after that of *Studii și Cercetări de Fizică* and had initially a broader exposure to the scientific community, as the articles were published mainly in French, Russian, and English. Moreover, *Revue Roumaine de Physique* published almost exclusively original scientific contributions, while *Studii și Cercetări de Fizică* had a pronounced formative aim, which is reflected by the publication of articles in Romanian up to the early 90s of the 20th century.

In the list of references we have cited the articles using the following style: name(s) of the author(s), original title of the article in italics, standard abbreviation of the journal (namely Rom. Rep. Phys. for *Romanian Reports in Physics* and Stud. Cercet. Fiz. for *Studii și Cercetări de Fizică*), volume number in bold, issue number in italics (where available), first page-last page (though sometimes the latter is omitted), and publication year. Where the list of authors is very long, more than a dozen authors or so, in particular for experimental articles and for the Technical Design Reports of the *Extreme Light Infrastructure – Nuclear Physics (ELI-NP)* experimental facility, we have used the *et al.* reference style, but have explicitly listed the Romanian authors. The titles of the articles are left in their original form and, except for obvious typos that we implicitly corrected, the names of the authors are left as they appear in print. As the readers will note, some of the authors who published in *Studii și Cercetări de Fizică/Romanian Reports in Physics* used different variants of their names throughout the years. The inconsistencies with respect to the spelling of the names, either the given name(s) or the family name(s), reflect the influence of the French culture, as well as personal preferences. While at this point, let us also note that we have noticed many inconsistencies with respect to the use of the diacritic signs, which are used in the Romanian language.

## 2. SURVEY OF *STUDII ȘI CERCETĂRI DE FIZICĂ*

The first volume of *Studii și Cercetări de Fizică*, published in July-December 1950 by The Institute of Physics of The Romanian Academy, included a few introductory articles dedicated to the research policies typical for that period and, more importantly, a couple of contributions from the most important physicists of that time. In order of appearance, let us first mention the article of Grigore C. Moisil on the integration of the Maxwell-like equations of L. de Broglie for particles of spin 1 [55] and that of Șerban Țițeica on the radiation of electric and magnetic multipoles of higher order [56]. Grigore C. Moisil (born: 1906, deceased: 1972), Titulary Member of The Romanian Academy, was a leading Romanian applied mathematician with broad interests that included the mathematical foundations of computer sciences. Due to his efforts in this direction, which catalyzed over the years the Romanian School of Computational Sciences, he was awarded posthumously the 1996 Computer Pioneer Award “for the development of polyvalent logic switching circuits, the Romanian School of

Computing, and support of the first Romanian computers” by IEEE Computer Society. Alongside with Horia Hulubei, who did not publish in the first number, Șerban Țițeica and Grigore C. Moisil represented the pinnacle of the Romanian scientific community in the years that followed the Second World War. Also in the first number there was a longer paper, of approximately fifty pages, dedicated to the impedance of ionized gases [57] by Theodor V. Ionescu (born: 1899, deceased: 1988), Titulary Member of The Romanian Academy, an outstanding experimental physicist and inventor with contributions on magnetrons and masers. The number ends with a series of Short Notes (in Romanian: *Dări de seamă*) and brief reviews of recent literature. Finally, we note that all articles were published in Romanian and were addressed to the local physics community.

The second volume of *Studii și Cercetări de Fizică*, published in January-June 1951, in a tome containing numbers 1 and 2, included a short paper of Eugen Bădărău and M. Hagiescu-Miriște on the loss of energy of positive ions in hydrogen [58]. Eugen Bădărău (born: 1887, deceased: 1975), Titulary Member of The Romanian Academy, the founder of the Romanian School of plasma physics, did his studies at the Technische Hochschule, Graz, Austria, and at the University of Pisa, Italy, where he graduated with a PhD on “Constanta dielectrica dei gasi” coordinated by Prof. Angello Battelli. Following the completion of his PhD studies, Eugen Bădărău was employed at a series of institutions in Sankt Petersburg, Russia, culminating with a position of Full Professor at the Photo-Technical Institute of Sankt Petersburg. In 1935 Eugen Bădărău moved to University of Bucharest and then to the Institute of Physics of the Romanian Academy, where he mentored young researchers who later turned into accomplished scientists, thereby consolidating the international stature of the Romanian Physics School. The scientific legacy of Eugen Bădărău comprises of numerous articles, review papers, and books, in the field of electrical discharges in gases and plasma physics, acoustics, optics, and spectroscopy [59–66]. We continue the selection of articles with that on electrical circuits [67] by Edmond Nicolau (born: 1922, deceased: 1996), a prominent and extremely versatile engineer who is among the founding fathers of cybernetics in Romania, and two articles by Ștefan Procopiu (one co-authored jointly with R. Vasiliu) on the speed of ions during electrolytic depositions [68,69]. Ștefan Procopiu (born: 1890, deceased: 1972), Titulary Member of The Romanian Academy, was a prominent figure in Romanian Physics, best remembered now for the Procopiu effect on the depolarization of light (1929) and Bohr-Procopiu magneton (1919) [23].

From the third volume of *Studii și Cercetări de Fizică* we mention here the article of Viorel Sergiescu [70], a noted solid-state physicist [71], on the computation of energy levels in heavy atoms using the Thomas-Fermi model, and that of Th. Ionescu and V.P. Mișu on new results on the presence of negative ions of deuterium in hydrogen [72].

The first two numbers of volume IV of *Studii și Cercetări de Fizică* are published jointly in January-June of 1953 and start with an article on statistical physics, authored by Ș. Țițeica, focused on the third principle of thermodynamics [73]. Among the other contributions we mention that of D.D. Procopiu on the variation of atomic radii and ionization potentials [74], and that of Horia Hulubei and Nicolae Martalogu on the improvement of a spectrographic technique [75]. Nicolae Martalogu was a pioneer in research on nuclear reactions with charged particles and neutrons and served as the coordinator, between 1970 and 1984, of the Nuclear Training Center (in Romanian: *Centrul de Pregătire și Specializare în Domeniul Nuclear*) on the Măgurele Physics Campus.

Number 1-2 of the fifth volume of *Studii și Cercetări de Fizică*, published in January-June 1954, shows a broad thematic coverage that includes one article dedicated to the Physics of the Earth of Gh. Atanasiu and T. Neșțianu on regional magnetic research in Transylvania (Ardeal) and Banat regions, performed in 1952 [76], a theoretical one published by R. Răduleț and Ș. Țițeica on intensity and induction in force fields [77], and one with a clear applied focus by E. Katz on the passing of radio pulses through diodes [78]. In the same volume we note two significant papers, one by A. Grigoriu and G. Giurgea on the determination of kinetic and radiative temperatures in atmosphere [79] and another one by E. Nicolau on the generalization of some reciprocity and conservation relations in electricity [80].

The first number of the seventh volume of *Studii și Cercetări de Fizică*, published in January-February-March 1956, brings forward substantial contributions on the side of Theoretical Physics. The first one is authored by Șerban Țițeica and is focused on the statistical behavior of a group of charged particles under the action of either internal or external electromagnetic fields [81], while the second one is authored by Valeriu Novacu and refers to the classical theory of the electron [82]. Valeriu Novacu (born: 1909, deceased: 1992), Corresponding Member of The Romanian Academy (in Romanian: *Membru Corespondent al Academiei Române*) elected in 1948, was one of the leading figures in Theoretical Physics at the University of Bucharest, whose classical textbooks covered a broad set of topics that includes quantum mechanics, electrodynamics, and particle physics, to name only a few (see, for example, Refs. [83,84]). In the same series of theoretical papers we mention here that co-authored by F. Ciorăscu, A. Dévényi, M. Nachman, and M. Oncescu, on the variation of resistivity with the thickness of thin layers of lead [85], and one by A. Corciovei, whose paper discusses an improved treatment for the study of ferromagnetism of a single domain [86]. Aretin Corciovei (born: 1930, deceased: 1992), Corresponding Member of The Romanian Academy elected in 1974, is one of the founding fathers of the Romanian School of Solid-State Theory. Looking into the publication record of Aretin Corciovei one immediately notices a wide spectrum of theoretical physics themes, mostly focused on solid-state physics and related fields. His research

contributions go from the effects of long- and short-range order on residual resistivity and the energy bands of binary alloys to the theory of spontaneous and saturation magnetization of ferromagnetic thin films, as well as the spin-wave theory of ferromagnetic thin films, a topic for which he received a wide international recognition [87].

From the ninth volume of the journal we mention here the second number in which we find one article authored by Ioan Ursu on the variation of viscosity of mixtures of gases with oxygen in the presence of a magnetic field [88]. Ioan Ursu (born: 1928, deceased: 2007), Titulary Member of The Romanian Academy, elected in 1974, is one of the founding fathers of the Romanian Nuclear Physics School (see Refs. [89–91] for some of his main monographs). A graduate of the University in Cluj-Napoca, he went to Princeton University, USA, for postdoctoral studies, and after returning to Romania was instrumental in the development of the Romanian Nuclear Program. He also served as the fourth President of The European Physical Society in the period 1976-1978. Also in the ninth volume of *Studii și Cercetări de Fizică* let us note the article authored by Aretin Corciovei on the magnetic susceptibility of an antiferromagnet [92]. Among the other articles published in the ninth volume, we mention here that of V. Labău and M. Nicolae on nuclear emulsions with boron and lithium [93], that of I. Brânduș on the variational principle in the optic model of nuclear reactions with neutrons [94], that of E. Balea and E. Friedländer on the study of nuclear interactions around  $4 \cdot 10^{11}$  eV [95], that of I. Cucurezeanu on Raman spectra [96], and, lastly, that of V. Mercea and I. Ursu on the viscosity of oxygen [97].

The tenth volume of *Studii și Cercetări de Fizică* shows a well-established national journal of physics with contributions on a broad thematic area, though all published in Romanian. A quick inspection of the first number illustrates immediately the wide scientific coverage: I. Purica publishes an article on the behavior of the 2000 kW nuclear reactor of the Institute of Atomic Physics in transient regimes [98], V. Mercea *et al.* discuss the automatic regulation of low gas debits by electric means [99], N.J. Ionescu-Pallas contributes with a paper dedicated to the theory of Debye crystals [100], N. Croitoru, A. Dévényi, and G. Ciobanu discuss the temperature dependence of granular phenomena in thin layers of gold [101], H. Țoția, P. Timiș, and C. Lazarovici detail some new results on the neutron spectrometer [102], I. Brânduș and A. Săndulescu present some new results on the generalized Racah coefficient [103], A. Corciovei reports the influence of ordering effects on the electric resistivity of binary alloys [104], while G. Comșa discusses the photoelectric effect for nickel [105]. Among the previously cited scientists, we note here: Ionel Purica (born: 1925, deceased: 1990), a graduate of the Polytechnic University of Bucharest, who helped initiate the Romanian Nuclear Program in the early sixties of the past century; Nathan Croitoru (currently Emeritus Professor at Tel Aviv University) whose main research interests cover thin films, optical fibers and wave guides for infrared radiation, and semiconductor

devices; Andrei Dévényi (born: 1932, deceased: 2015) an outstanding solid state physicist, native of Cluj-Napoca, Romania, where he graduated from high-school and university; Gheorghe Ciobanu (currently Emeritus Physics Professor at University of Bucharest) specialized in statistical physics and condensed matter theory; George Comşa, a graduate of University of Bucharest, worked initially as a Researcher at the Institute of Atomic Physics, Măgurele, Romania, then as Professor of Physics at University of Bonn and (starting 1974) became Director of the newly created Institute for Surface and Vacuum Physics at the KFA Julich, Germany. Lastly, let us mention N.J. Ionescu-Pallas (born: 1932, deceased: 2017), Honorary Member of The Romanian Academy (elected in 2016), one of the most reputed and respected Romanian theoretical physicists who worked at the Măgurele Physics Campus. His work covers a very broad area that goes from atomic to laser physics and from gravitation to nuclear fusion. We note here his articles on the relativistic Schrödinger equation for a particle with arbitrary spin and that on the radiation of the double quantized cubic cavities [106,107], as well as his monograph on general relativity and cosmology [108]. From the fourth issue of volume X we mention here the article of Mircea Micu and Aureliu Săndulescu on the emission of nucleons in the Nilsson model [109], that of L. Grigorescu and I. Teodorescu on the diffraction of electrons on a Cu-Sn alloy [110], and lastly that of G. Văşaru on measuring the thickness of thin films using the absorption of beta radiation [111].

The 1960 volume of *Studii și Cercetări de Fizică* starts with a series of articles by Aureliu Săndulescu, Titulary Member of The Romanian Academy elected in 1992, who contributed to the first number with an article on the fine structure of the  $\alpha$  lines [112] and another one on the reduced widths for the emission of helion-3 [113]. The outstanding contribution of Aureliu Săndulescu to heavy ion radioactivity (also known as cluster decay), see Refs. [114,115] jointly with D.N. Poenaru and W. Greiner, is well known worldwide and is summarized in *Encyclopaedia Britannica*, in an entry by J.O. Rasmussen and E.P. Steinberg, as follows: “In 1980 A. Sandulescu, D.N. Poenaru, and W. Greiner described calculations indicating the possibility of a new type of decay of heavy nuclei intermediate between alpha decay and spontaneous fission. The first observation of heavy-ion radioactivity was that of a 30-MeV, carbon-14 emission from radium-223 by H.J. Rose and G.A. Jones in 1984. The ratio of carbon-14 decay to alpha decay is about  $5 \cdot 10^{-10}$ . Observations also have been made of carbon-14 from radium-222, radium-224, and radium-226, as well as neon-24 from thorium-230, protactinium-231, and uranium-232. Such heavy-ion radioactivity, like alpha decay and spontaneous fission, involves quantum-mechanical tunneling through the potential-energy barrier.” Also from the first number of the journal in 1960 we mention the article of D. Bîrcă-Gălăţeanu focused on vibrational spectra [116] and that of Mihai Gavrilă, who discussed the relativistic photoelectric effect [117]. Mihai Gavrilă, Corresponding Member of The Romanian Academy (elected in

1974), is an outstanding Romanian quantum physicist, well known for his contributions to quantum theories of electromagnetic interactions with atoms [118–120]. We continue our survey with the article co-authored by D. Bally, E. Țarină, S. Todireanu, and I. Olteanu on the spectrometer of the Institute of Atomic Physics [121], and that of D. Dragomirescu, Șt. Apostolescu, V. Mateiciuc, and M. Beșliu on the total cross-section for neutrons of arsenic in the energy regime of 0.01-1.1 eV [122]. From the same issue we draw attention to the article of Margareta Giurgea, S. Haragea, and Vladimir Țopa on the diffusion of light in monodispersive suspensions [123]. Margareta Giurgea (born: 1915, deceased: 2011), Titular Member of The Romanian Academy (elected in 1992), was an outstanding physicist with broad research interests, which covered electric discharges in gases, absorption spectroscopy, liquid crystals, and light scattering in liquids [124,125]. Vladimir Țopa (born: 1929, deceased 2006), Corresponding Member of The Romanian Academy (elected in 1993), was an outstanding experimental materials scientist, with special focus on optical materials and spectroscopic and opto-electronic studies [126]. We continue our selection of articles with that of Mircea I. Cristu, V.P. Cojocaru, and D.I. Dorcioman on the calibration of spectrometers [127]. Mircea Cristu (born: 1932, deceased: 2013), a distinguished nuclear physicist specialized in neutron physics and gamma spectroscopy, was part of the first generation of Romanian nuclear physicists who helped establish the Institute of Atomic Physics in Măgurele as a point of reference in physics worldwide. We also note here, from the third number of the volume, the article of M. Zăgănescu on some new properties of Dirac's bilinear forms [128], that of E. Ruckenstein on droplet and layer condensation [129], that of E. Bădărău and C. Popovici on the spectral properties of methane under the action of high-frequency discharges [130], and, lastly, that of Eugen Bădărău, Iovițu Popescu, and Iancu Iova on the luminescent anomalous discharge in helium [131]. Iancu Iova is an Emeritus Professor at the Faculty of Physics of University of Bucharest, as well as a distinguished researcher specialized in plasma physics, optics, and laser physics and engineering [132–135].

The following volume of *Studii și Cercetări de Fizică*, published in 1961, brings forward the same community of theoretical and experimental physicists. We note, however, from number three of the volume, the article of Mircea Micu on the disintegration of deuteron in nuclear collisions [136]. Mircea Micu (born: 1932, deceased: 2010) was an outstanding theoretical physicist [137] whose contributions on (the now dubbed) Micu-type invariants for Lie algebras [138] are well acknowledged (see, for example, Ref. [139]). From the same volume we also mention here the article of I. Agârbiceanu, N. Comaniciu, V. Drăgănescu, and V. Tatu, on the isotopic constant of Hg [140].

Surveying the 1962 volume of the journal we note, from the first number, the article of Marius Peculea on the thermodynamic behavior of the main cooling cycles with cold gases [141], that of M. Drăgănescu on the diffusion capacity of a

PN junction [142], that of R. Grigorovici, A. Dévényi, and T. Boțilă on the determination of the concentration of free electrons in aluminum [143], that of Alexandru Ștefănescu on the determination of neutron fluxes in the active area of the VVR-S reactor [144], the study of I. Ursu, I. Pop, A. Nicula, and D. Barb on the magnetic properties of the nickel-chrome trioxide catalyzers [145], and, lastly, that of F. Ciorăscu, G. Baci, M. Grecescu, S. Haltrich, C. Iliescu, and I. Leibovici on the commencement of the operational phase and tuning of the betatron of the Institute of Atomic Physics in Măgurele [146]. From the second number of the volume we note here the article of Radu Grigorovici and A. Dévény on the electrical properties of evaporated cadmium layers [147]. Radu Grigorovici (born: 1911, deceased: 2008), Corresponding Member of The Romanian Academy elected in 1963 and then Titulary Member of The Romanian Academy, elected in 1990, see Refs. [148,149] for a biographical account, was an outstanding Romanian physicist with contribution ranging from electric discharges in gases to amorphous semiconductors. Among his numerous significant papers, we mention here that with J. Tauc and A. Vancu, one of the most cited articles published by Romanian physicists, namely *Optical properties and electronic structure of amorphous germanium* [150], as well as his influential articles on optical constants of amorphous silicon films near the main absorption edge [151], short-range order in amorphous semiconductors [152], amorphous semiconducting thin films [153], and structure of amorphous semiconductors [154]. We continue our survey with the article of A. Dévény and Rodica Mănăilă on the influence of thickness inhomogeneities on the electric conductivity of thin metallic layers [155]. Rodica Mănăilă (born: 1935, deceased: 2002), Corresponding Member of The Romanian Academy (elected in 1992), was an internationally recognized materials scientist with contributions on fields as diverse as amorphous and liquid semiconductors and superconductors with high critical temperature [156,157]. We continue the survey with the article co-authored jointly by Th. Roșescu and M. Sabău on some new experimental investigations with the VVR-S reactor [158], and that of N. Martalogu, I. Neamu, and Marin Ivașcu on the elastic and inelastic diffusion of 4.6 MeV neutrons on  $S^{32}$  [159]. Marin Ivașcu (born: 1931, deceased: 2013) is one of the founding fathers of the experimental nuclear physics school [160], prominent both as an experimental physicist and as a mentor of numerous young scientists who later turned into reputed researchers [161-166]. His contributions range from investigations into nucleon-induced nuclear reaction mechanisms in light and medium-mass nuclei, elastic and inelastic scattering of alpha particles and ( $\alpha,p$ ) reactions, investigations into ( $d,\alpha$ ) reactions for spectroscopy of excited states and lifetime measurements using Doppler shift techniques, to his work on cluster radioactivity, jointly with Dorin Poenaru and Aureliu Săndulescu [167-169]. From the third number we mention here the article of D. Bally, L. Beneș, N. Iliescu, and Șt. Iorgulescu on the K absorption spectra of Zn, As, Se, Zr, and Mo irradiated with neutrons [170] and the article of Iovițu Popescu on the mobility of positive charges

in dense ionized gases [171]. Ioan-Iovitz Popescu, elected Corresponding Member of The Romanian Academy in 1974 and Titulary Member of the Romanian Academy since 1990, is one of the most important Romanian physicists after the Second World War, with contributions ranging from plasma physics and laser spectroscopy [172,173] to quantitative linguistics [174–176]. The broad scientific work of Ioan-Iovitz Popescu includes significant contributions in the field of electrical gas discharges and plasma physics, hollow-cathode effect, plasma diodes, resonant charge transfer, and photoionization [177,178]. The comprehensive review published in 1985 in *Reviews of Modern Physics* on the quantum effects of electromagnetic fluxes [179], jointly with Silviu Olariu (born: 1955, deceased: 2013), an esteemed theoretical physicist, is now a standard reference in the field. Let us also note that Ioan-Iovitz Popescu is also Emeritus Professor at the Faculty of Physics of University of Bucharest where mentored numerous students for whom he wrote a well-known three-volume textbook on general physics, jointly with Radu Țițeica [180–182], as well as monograph on geometrical optics [183]. We continue our survey with the article of M. Giurgea, C. Ghiță, and L. Ghiță on the molecular diffusion of light in binary liquid mixtures [184]. In number four of the volume published in 1962 we find a series of articles of significant historical interest, namely that of D. Grecu on the spatial distribution of defects in a solid subject to irradiation [185], that of E. Ivanov, N. Martalogu, D. Ploștinaru, A. Alevra, and R. Dumitrescu on the cascade de-excitation of  $\text{Sn}^{115}$  [186], that of Cornelia Moțoc on the influence of irradiation on the optic reflection [187], and, lastly, the laboratory note of G. Baciuc on the injector of electrons of the betatron of Institute of Atomic Physics [188]. From the fifth number we find of particular interest the articles of N. Vîlcov on the characteristics of semiconductor detectors [189] and that of Alexandru Glodeanu and I. Popescu on the impurity conduction in semiconductors at low temperatures [190]. Alexandru Glodeanu is a distinguished condensed matter physicist with broad scientific interests ranging from studies of fast-neutron irradiation on nickel thin films [191], theory of disordered solids [192–194], calculation of shallow and deep donor states in silicon [195], and to studies of shallow donor states in germanium [196]. We continue the survey of the fifth number with the paper of L. Schächter on the measurement of a large electrical resistivity of semiconductors [197] and that of G. Comșa and Beatrice Iosifescu on absorption and desorption processes in high- and ultra-high vacuum [198]. We end our survey of this volume with three articles from number six, namely that of L. Bányai and L. Brînduș on the single-electron density matrix and the exclusion principle [199], that of P. Croitoru on electrostatic generators [200], and that of Athanasie Truția on a new method for determining the temperature of spectral sources [201]. Athanasie Truția is a distinguished experimental physicist and gifted professor specialized chiefly in optical spectroscopy, a topic on which he published extensively, see Refs. [202–204] for a selection of his scientific results.

From the following two volumes of *Studii și Cercetări de Fizică*, volume XIV published in 1963 and volume XV published in 1964, we note here the article of C. Moțoc on the corrosion of the materials used in nuclear techniques [205] and that of Petre T. Frangopol on the use of organic substances as cooling agents for nuclear reactors [206]. Petre T. Frangopol, Honorary Member of The Romanian Academy, elected in 2012, is a highly reputed chemical engineer [207] with a distinguished activity that includes the design and early operation phases of the Radiochemical Production Center of The Institute of Atomic Physics, the radioisotope production technology for Iodine-131, and various biophysics research topics [208,209]. We continue the survey with the article by L. Schächter on the measurement of the distribution of the  $\gamma$  dose debit in the vertical channels of the VVR-S reactor [210], and that of Aureliu Săndulescu and Ovidiu Dumitrescu on reactions involving tritons [211]. Ovidiu Dumitrescu (born: 1938, deceased: 1997) was an outstanding nuclear scientist, well known in the physics community for his studies on alpha decay, parity-violating nuclear reactions, four-fermion condensates, and cluster decay, see Refs. [212–214] for some of his most important contributions. We end our survey of the articles published in 1963 with those of A. Berinde on the scattering of nuclei at low energies [215,216].

From the 1965 volume of *Studii și Cercetări de Fizică* we select for our historical survey the article of C. Popovici and M. Someșan on the ignition phenomena within electric discharges [217], the monographic study (in two parts) of D. Poenaru and N. Vîlcov on detectors of nuclear radiations using semiconductor devices [218,219], the article of M. Molea, A. Calboreanu, and I. Mînzatu on a spectrometric system [220], that of El. Mihul and D.B. Ion on the photo-production of two mesons per nucleon at high energies [221], the dissertation of G. Ciobanu on the kinetic theory of transport phenomena at the surface of semiconductors and metals [222], the article of A. Corciovei and G. Ciobanu on the use of Green functions for ferromagnetic thin films [223], and the research note of M.S. Popa and M.I. Cristu on the precise determination of absolute intensities of gamma rays from the capture of thermal neutrons [224].

The 1966 volume of *Studii și Cercetări de Fizică* has a broad thematic coverage, which includes original research articles, monographic studies, dissertations, and laboratory notes. From the articles in this volume, we select here that co-authored by Coletta de Sabata and V. Petrescu on the magnetic anisotropy of thin electrolytic layers of Ni-Fe [225] and that of A. Corciovei and E. Rădescu on irreversible processes and their fundamental equation [226]. This latter article is representative for the research directions catalyzed by Aretin Corciovei and members of his group, who produced a series of classical papers, such as the well-known work on the spin-wave theory of ferromagnetic thin films [227], authored by Aretin Corciovei, and the comprehensive review, co-authored jointly with Gheorghe Costache (born: 1942, deceased: 2002) and Dan Vamanu, published in the Solid State Physics book series [228]. From number five of the 1966 volume

we refer here to the article of I. Teodorescu on the ionic bombardment of solids [229] and that of Th. Roşescu on the matrix calculus for nuclear reactors [230], while from number six we mention the article of Zoltán Gábos and Florea Uliu on the polarization effects at the dezintegration of the  $\mu^-$  meson [231] and the work on Jost functions, Levinson theorem, and multichannel problems in the relativistic theory of the S matrix co-authored by M. Stihl and Mihai Vişinescu [232]. Mihai Vişinescu is an outstanding theoretical physicist, whose early research interests cover quantum field theory and particle physics, while his more recent articles are focused on the theory of gravitation, cosmology, and mathematical physics; see Refs. [233–235] for some of his most relevant results. Finally, from number seven, we note the dissertation of A. Glodeanu dedicated to some contributions on the theory of impurity states in semiconductors [236], the study of I.M. Popescu on the intersection and counter-intersection of atomic levels [237], and that of G. Baci, D. Catană, C. Deberth, and I. Răileanu on the determination of the flux of rapid neutrons around the betatron of the Institute of Atomic Physics in Măgurele [238]. From the 1967 volume of *Studii și Cercetări de Fizică* we note here the article of Apolodor Aristotel Răduță on nuclear collective states in the random phase approximation [239]. Apolodor Aristotel Răduță is one of the chief figures of Romanian theoretical nuclear physics school [240], widely recognized [241] for his phenomenological boson coherent states and extensions [242], as well as a gifted mentor of numerous theoretical and computational nuclear physicists. We continue our survey with the article of M. Croitoru and Dan Grecu on the movement of a primary atom through a solid [243]. Dan Grecu is an outstanding theoretical physicist, specialized in condensed matter physics, widely acknowledged for his work on the plasma frequency of electron gases in layered structures [244]. Next on our list of selected papers are the dissertation of V. Drăgănescu on the hyperfine structure of spectral lines [245] and the PhD thesis of Alexandru Berinde on the mechanism of non-elastic scattering of protons on  $^{40}\text{A}$  and  $^{48}\text{Ti}$  [246]. Alexandru Berinde is a distinguished nuclear scientist with contributions spanning multichannel effects in isobaric analogue resonances, high-spin states in  $^{52}\text{Cr}$  populated *via*  $^{50}\text{Ti}(\alpha, 2n\gamma)$  reaction, and multiple ionisation in heavy-elements [247–249].

From the first number of the twentieth volume of *Studii și Cercetări de Fizică*, published in 1968, we have first selected the article by Dan Dascălu on the behavior of the dielectric diode as detector of small signals [250]. Dan Dascălu, Corresponding Member of The Romanian Academy elected in 1990 and Titulary Member of The Romanian Academy since 1993, is an outstanding research engineer specialized in metal-semiconductor contacts in microelectronics and unipolar semiconductor devices [251–253], as well as an accomplished professor at University POLITEHNICA of Bucharest. We continue our survey with the article containing extracts from the PhD thesis of Ioan M. Popescu [254] on the study of some atomic levels of Hg using the optic methods of Hertzian spectroscopy. Ioan

M. Popescu is well known for his works on lasers and optics at large, a topic on which he published extensively. He is a respected professor and author of several textbooks [255,256] and monographs [257,258] who helped numerous students enter scientific research in the broad areas of laser physics and engineering. Among the many contributions of Ion M. Popescu we mention here his work on nuclear magnetic resonance of  $^{201}\text{Hg}$  [259]. From the following number of the journal we note here the article of Coletta de Sabata on thin electrolytes of Ni-Fe [260] and that of V. Velculescu on the population inversion of atomic levels [261]. One article of special historical interest is that of M. Pavelescu on the numerical methods used to solve the transport equation of neutrons [262], which can be considered as the first computational physics article published by *Studii și Cercetări de Fizică*. This article reflects a constant research interest of Mărgărit Pavelescu, a distinguished nuclear physicist, who also published a monograph, in Romanian, on numerical analysis for nuclear reactors [263]. From number eight of the journal we note the article of R.V. Deutsch and C. Ciubotariu on the propagation of magneto-hydrodynamics waves in plasmas [264], the lengthy review (in Romanian: *Studii monografice de ansamblu*) of M. Someșan on plasma diagnosis methods [265], and the paper of F. Constantinescu, D. Demco, S. Dumitru, and A. Weissman, from the Faculty of Physics of Babeș-Bolyai University of Cluj-Napoca [266], on the quantum theory of relaxation for magnetic resonance phenomena [267]. Lastly, from number 9 of the volume, we note the article of R.V. Deutsch and Gh. Zet on the propagation of Alfvén and magneto-acoustic waves [268], the somewhat didactic article of N.J. Ionescu-Pallas on the complete solution of the Gibbs paradox [269], that of C. Hațegan on direct interaction with coupled channels [270], and that of Z. Gheorghiu, N. Duțescu, A. Gelberg, and D. Bally on the neutron diffractometer of the Institute of Atomic Physics [271].

Volume 21 of *Studii și Cercetări de Fizică* opens with an extremely important article on the laser radiation yielded by a continuous luminescent discharge within an Al hollow cathode [272], from the group of Ion I. Agârbiceanu. Ion I. Agârbiceanu (born: 1907, deceased: 1971), Corresponding Member of The Romanian Academy (elected in 1963), is the founding father of the Romanian laser community [273–277] and the coordinator of the team who designed and realized the first Romanian laser, shortly after its invention by Theodore Maiman. A graduate of the Electro-Technical Institute in 1929, Ion I. Agârbiceanu continued his studies at the Faculty of Sciences of Sorbonne University in Paris, where he earned his PhD in 1934 with a thesis on “Researches on the fluorescence and absorption spectra of  $\text{I}_2$  vapors” supervised by Aimé Auguste Cotton. In addition to his outstanding laser research on the Măgurele Physics Campus, Ion I. Agârbiceanu also served as Professor at the Faculty of Physics and Mathematics of University of Bucharest, between 1952 and 1956, and then, up to 1964, as Professor at the Polytechnic Institute in Bucharest (currently University POLITEHNICA of

Bucharest) [278]. Also from the first number we note here the articles of V. Dolocan on the damping and amplification of ultrasounds in semiconductors [279] and that of Irina Curelaru on the origins of resonances in high-energy physics [280]. From the next two numbers of *Studii și Cercetări de Fizică* we select here the article of Viorica Gheorghe on dispersion relations in plasmas [281], that of N. Grama on internucleonic potentials that do not conserve parity [282], that of Gh. Vlăducă (in two parts) on the direct interaction in nuclear reactions [283,284], and that from University of Craiova, co-authored jointly by Oliviu Gherman, E. Magyari, L. Tătaru, and F. Uliu, on elementary and composite particles in the framework of the models of quantum field theory [285]. Oliviu Gherman is a distinguished theoretical physicist and founder of the Theoretical Physics School at University of Craiova, with contributions to mathematical physics [286], superstring theories [287], and statistical physics [288]. The 1969 volume of *Studii și Cercetări de Fizică* also coincides with the 20th celebration of Institute of Atomic Physics (in Romanian: *Institutul de Fizică Atomică*) and the 13th celebration of Bucharest Institute of Physics (in Romanian: *Institutul de Fizică București*). On this occasion Horia Hulubei writes a detailed review on the evolution of the Institute of Atomic Physics over the past two decades [289] and Eugen Bădărău writes a brief overview on the establishment and subsequent evolution of Bucharest Institute of Physics [290], the other major institute of physics that was established in the Bucharest area. Finally, we note from the same volume the article of L. Bányai on models with particle exchange for low energy amplitudes [291] and the introductory article on the theory of optical coherence [292] of I.A. Dorobanțu, who later became a prominent scientific communicator.

The numbers published by *Studii și Cercetări de Fizică* in 1970 show the same broad thematic diversity and include both brief research notes and full-length research articles and topical small-scale reviews. We start our survey with the article of Mircea Crișan on the magnetic behavior of europium oxide [293]. Mircea Crișan is a distinguished solid-state physicist with contributions on superconductivity [294] and localized magnetic states in Rashba dots [295]. We continue our survey with the article of Dumitru Barbu Ion on the classical theory of the mesonic Cherenkov effect in nuclear systems [296]. Dumitru Barbu Ion is a distinguished theoretical physicist with pioneering research results in pure mathematics, whose contributions cover, among other topics, the spontaneous pion emission as a new natural radioactivity [297] and Jordan algebras and superalgebras, see Refs. [298–300], published in Romanian. We continue the survey with the experimental article of A. Agafitei, A. Chetroiu, and V. Vasiliu on the He-Ne laser of  $\lambda=6330 \text{ \AA}$  [301], the article of F. Scarlat on emittance and admittance in particle accelerators [302], that of I.I. Purica on new theoretical methods for the thermalization of neutrons [303], that of N. Gherbanovschi (who later became a popular author of textbooks and problem books for high school physics) on a new method for gauging Helmholtz-Gauguin system of coils [304],

that of M. Ivaşcu on the scattering of low-energy alpha particles on nuclei [305], that of L. Blănaru, A. Chetroiu, and V. Vasiliu on some aspects of gas lasers [306], that of E. Balea, O. Balea, A. Mihul, and M. Sabău on  $\pi^+p$  interaction [307], and, lastly, that of Nicolae Angelescu on local quantum theory applicable to particle collision [308]. Nicolae Angelescu (born: 1943, deceased: 2012) was an outstanding representative of the Romanian theoretical physics school specialized in statistical physics, well known for his work, jointly with Mircea Bundaru, Gheorghe Costache, and Gheorghe Nenciu, on a series of research topics such as molecular field theory and phase transitions in partially finite systems, ground state of Ising chains with finite range interactions, perturbations of Gibbs semigroups, and Landau diamagnetism [309–313].

Volume 23, published in 1971, contains a series of articles of particular historical interest, such as that of G. Nemeş on new results in nonlinear optics [314] and that of Eugen E. Rădescu on the applications of the current algebra [315]. Eugen E. Rădescu (born: 1941, deceased: 2007) was an outstanding theoretical physicist, who made important contributions to the elementary particle physics and scattering theory, electromagnetic properties of Majorana fermions, nucleon polarizabilities, dispersion relations, and toroidal polarizabilities [316–318]. We continue our survey of this volume with the article of Sergiu V. Nistor on the determination of local imperfections in ionic crystals [319]. Sergiu V. Nistor is an internationally recognized experimental solid-state physicist specialized in semiconductor and dielectric nanocrystals, electron spin resonance spectroscopy, and atomic defects in crystals [320,321]. Lastly, we mention the article by V. Zoran and Gh. Popescu on the use of plastic detectors in nuclear reactions [322]. Valeriu Zoran (born: 1944, deceased: 1997) was an outstanding atomic and nuclear scientist well known for his works on the relativistic correction of the scaling parameter for K-shell Coulomb ionization and enhanced double ionization in the  $3d\sigma$  molecular orbital at small impact parameters [323,324].

From the first two numbers of volume 24, published in 1972, we mention here the article of A. Lupei on the effects of covalence on electron spin resonance [325], that of H. Hafner on some linear theory of gravitation [326], that of Th. Ionescu-Bujor on the radial distribution of temperature in the argon plasma jet [327], and that of M.L. Pascu on the significance of equations of Stokes parameters [328]. Surveying the following two numbers of the journal, namely number 3 and 4, one notices the article of V. Gheorghe on the electric interaction in muscle contraction [329], that of N. Rezlescu on the electric and magnetic properties of spinel ferrites [330], and that of Vladimir Protopopescu on some results in theory of thermal neutrons [331]. Vladimir Protopopescu, currently a Chief Scientist at Oak Ridge National Laboratory (ORNL), USA, is an outstanding theoretical physicist and applied mathematician with important scientific contributions in statistical physics, nonlinear dynamics, and nanosciences, see Refs. [332,333] for two of his relevant publications. Lastly we mention the article of V. Drăgănescu,

C. Axinte, N. Comaniciu, and D. Duțu on the high-power carbon dioxide laser [334], that on precompressed concrete recipients for nuclear reactors [335] by Mihail Bălănescu, Honorary Member of The Romanian Academy elected in 2011, and that of Vasile Cuculeanu on multigroup cross sections [336]. Vasile Cuculeanu is a distinguished nuclear scientist with research interests in computational physics, who authored a reference monograph on nuclear reactors with fast neutrons [337] and later on in his career shifted to environment and climate research [338,339]. We continue our survey with the article of Theodor Ionescu-Bujor, G. Ionescu, and L. Katona on the spectroscopic determination of plasma temperature at a low-power MHD generator [340]. Theodor Ionescu-Bujor (born: 1945, deceased: 2011) was a distinguished plasma physicist with important contributions to plasma diagnostics through optical spectroscopy, see Refs. [341–343] for some of his main contributions. From numbers 5 and 6 we mention here the extracts from the PhD thesis of L. Singurel [344] and the contribution of Alexandru Preda to the theory of stimulated emission [345]. Alexandru M. Preda is a distinguished laser scientist, who helped catalyze research in laser physics and optical engineering at the Bucharest Polytechnic School, currently University POLITEHNICA of Bucharest. The research activity of Alexandru M. Preda resulted in numerous articles, from which we cite that on the He-Cd hollow-cathode oscillations in an axial magnetic field [346], that on the coupling between the discharge plasma instability and the laser oscillation in a He-Cd laser [347], and, lastly, that on the fractal discharge on the surface of an electrolytic solution [348]. We continue our survey with the article of George Nemeș on the detection and measurement of optical pulses in the picosecond range [349]. George Nemeș is an outstanding laser scientist and engineer whose work covers the realization of the first solid state laser in Romania, jointly with V.I. Vlad [350], as well as a series of results on the measurement of moments of an astigmatic beam [351] and the decoupling of coherent Gaussian beams with general astigmatism [352], to name only two of his research contributions. Finally, from number ten we first refer to the article of Dorel Bucurescu, M. Ivașcu, D. Popescu, G. Semenescu, and M. Titirici on the scattering of fast neutrons on Cr and Fe [353]. Dorel Bucurescu, Corresponding Member of The Romanian Academy (elected in 2016) is an outstanding experimental nuclear physicist as well as a gifted mentor of numerous generations of physicists. His scientific contributions are broad, but we would like to mention here his joint papers with T. von Egidy on systematics of nuclear level density parameters [354] and experimental energy-dependent nuclear spin distributions [355], which had considerable impact within the scientific community. On the side of collaborative research, we refer here to the articles that came from the group coordinated by Dorel Bucurescu at the Tandem Laboratory on the Măgurele Physics Campus, in particular that on the measurements of the lifetimes of high-spin states and those on the interacting boson and boson-fermion models [356–358]. We continue the selection with the article of C. Deberth and B. Cîrstoiu on computing photonuclear

cross sections from experimental data [359], and that of Valentin I. Vlad, J. Maurer, and D. Popa on some experimental contributions to holography [360]. Ionel Valentin Vlad (born: 1943, deceased: 2017), Corresponding Member of The Romanian Academy (elected in 1991) and then Titulary Member (elected in 2009), was an internationally recognized laser physicist and engineer with substantial contributions in nonlinear optics, nanophotonics, optical information processing, holography and imaging, and optical instruments with lasers, see Refs. [361–365] for his main results. We end our selection of articles from number 10 of the same volume with that of D. Duțu, C. Georgescu, and R. Medianu on the deposition of antireflective layers in high vacuum [366].

The 1973 volume exhibits the same broad thematic coverage seen in the previous volumes with numerous articles reporting impressive results. From the first three numbers we select here the article of Dănilă Barb, M. Morariu, D. Țarină, I. Bibicu, Ș. Constantinescu, and L. Diamandescu on how to use the Mössbauer effect in the study of industrial steels [367]. Dănilă Barb was a distinguished experimental solid-state physicist well known for his contributions to material sciences [368,369] and his monograph on the Mössbauer effect and its applications [370]. Our selection continues with the article of O. Fărcașiu and M. Sahagia on the electrolytic deposition on extended sources of  $^{90}(\text{Sr}+\text{Y})$  [371], that of L. Saliu and L. Tătaru, which discusses the consistence conditions in the theory of spontaneous chiral symmetry breaking [372], and that of A.I. Ciura, Ion N. Mihăilescu, and I.M. Popescu on plasmas produced by lasers on solid targets [373]. Ion N. Mihăilescu is an outstanding laser physicist and materials scientist well known for his works on laser heating of metals, laser ablation and pulsed laser deposition [374–376]. We continue the survey with the article of V.I. Vlad, Z. Mariș, J. Maurer, and D. Popa, on the fundamentals of holography [377]. From numbers 4 and 5 we mention here the article of D. Ploștinaru, Eugeniu A. Ivanov, A. Iordăchescu, S. Vajda, and G. Pascovici on cross-section studies for fast neutrons [378]. Eugeniu A. Ivanov, Corresponding Member of The Romanian Academy, elected in 1996, is a reputed experimental nuclear scientist with broad contributions from which we mention here his works on two high-spin isomeric states in  $^{112}\text{In}$  [379] and the nuclear scanning method used to estimate wear level nonuniformities [380]. We continue the survey with the article of E. Burzo on the structural and magnetic properties of alloys consisting of rare earths [381], that of C. Simoi, P. Crăciun, and I. Cotăescu on exoelectron emission [382], and, lastly that of Emil Burzo on permanent magnets consisting of rare earths [383]. Emil Burzo, Titulary Member of the Romanian Academy (elected in 2009), is an internationally acclaimed solid-state physicist specialized in magnetism, especially in permanent magnets based on alloys containing rare-earth elements [384–390]; see also his highly cited comprehensive review paper, published in *Reports on Progress in Physics*, on permanent magnets based on R-Fe-B and R-Fe-C alloys, where R stands for a rare-earth chemical element [391]. From the other numbers of

the volume we point out the article of D. Demco and R. Baican on spin lattices [392] and that of A.I. Ciura, Ion N. Mihăilescu, and I.M. Popescu on the irradiation of solid targets with laser beams [393]. We continue our survey with the article of B. Cârstoiu and C. Deberth which presents a computer code for computing the effective photonuclear cross-sections [394], that of V. Drăgănescu, N. Comaniciu, R. Alexandrescu, and C. Georgescu on the laser deposition of thin layers [395], that of A.I. Ciura and I.M. Popescu on electron temperature and density measurements in a Cd-He laser [396], and, lastly, that of D. Bucurescu on the reactions with ions of helium ( $\alpha$ ,  $\alpha'$ ) and ( ${}^3\text{He}$ ,  $\alpha$ ) [397].

From the 1974 volume of *Studii și Cercetări de Fizică* we start our survey with the article of H. Hafner [398] on the expanding universe and that of Irinel Caprini on the determination of the optimal scattering amplitude from the analysis of experimental data [399]. Irinel Caprini is an outstanding theoretical physicist with impressive contributions to particle physics. Her pioneering paper on mass and width of the lowest resonance in quantum chromodynamics is a standard reference in this research area [400]. We also mention here the article on a new method for deriving rigorous results on  $\pi\pi$  scattering [401], coauthored with Petre Diță, and the relevant works by Irinel Caprini on finding the sigma pole by analytic extrapolation of the  $\pi\pi$  scattering data [402] and on Regge analysis of the  $\pi\pi$  scattering amplitude [403]. From the same volume of *Studii și Cercetări de Fizică* we mention the article of Gheorghe Nenciu on stable analytic extrapolation in the theory of strong interactions [404]. Gheorghe Nenciu is an outstanding theoretical physicist with relevant contributions in statistical mechanics, spectral theory for Schrödinger and Dirac operators, adiabatic invariants in classical and quantum mechanics, and rigorous results in quantum theory of solids [405–409]. His article published in 1991 in *Reviews of Modern Physics* on the dynamics of band electrons in electric and magnetic fields, focused on a rigorous justification of the effective Hamiltonians, became a standard reference in the literature [410]. We continue our survey of volume 26 of the journal with the article on the Josephson effect and its applications [411] of Voicu Dolocan (born: 1939, deceased: 2017), who was an expert in the physics of solid-state devices and a very gifted professor [412]. Finally, we mention the article of C. Hațegan on multichannel phenomena in nuclear reactions at low energies [413], that of Șerban Țițeica on the development of the Romanian physics community [414], that of V.I. Vlad on information processing in conventional and real-time holography [415], and, lastly, that of D. Apostol, V. Blaj, A. Ionescu, M. Ristici, and S. Tutelea on a He-Ne laser [416].

From our survey of the 1975 volume of *Studii și Cercetări de Fizică* we mention here the article of N. Angelescu, N. Marinescu, and V. Protopopescu on the spectrum of linear transport operators [417], that of I.D. Apostol, D. Drăgulinescu, C. Grigoriu, I.N. Mihăilescu, I. Morjan, Al. Nițoi, I.M. Popescu, and V.S. Tatu on the air crack produced by TEA-CO<sub>2</sub> lasers at atmospheric pressure [418], that of G. Semencescu on nuclear reactions with three-nucleon

transfer [419], that of A.I. Ciura, Eva Cojocaru, and I.M. Popescu on the He-Cd laser [420], and that of George Filoti on Mössbauer studies on Jahn-Teller compounds [421]. George Filoti is an outstanding condensed-matter physicist specialized in Mössbauer spectroscopy, magnetism and magnetic materials, doped polymers, and oxidic materials, to name only a few subjects, see Refs. [422–424] for some of his most prominent results. We continue our survey with the article of N.I. Ionescu-Pallas on the isotopic shift in atomic spectra [425] and that of Maria Zoran, P. Pechiu, C. Simionescu, and V. Zoran on some peculiarities in diurnal variation of atmospheric radioactivity and pollutant concentration in Petroșani, Romania [426]. Maria Zoran is a distinguished physicist, highly appreciated for her work on radon levels assessment in relation with seismic events in Vrancea region [427]. We end our survey with the article of L. Grigorescu, M. Sahagia, G. Lateș, and A. Țopa on the production and gauging of radioactive solutions of  $^{198}\text{Au}$ ,  $^{51}\text{Cr}$ ,  $^{24}\text{Na}$ ,  $^{95}\text{Nb}$ ,  $^{65}\text{Zn}$  [428].

After a scrutiny of the articles published in 1976 we mention here the article of Ana Daniș and M. Oncescu on the neutron fluency [429], that of D. Apostol on the holographic testing of an optical surface [430], and that of Dan C. Dumitraș on relaxation processes in  $\text{CO}_2$  [431]. Dan C. Dumitraș is a distinguished laser physicist and engineer with contributions on laser photoacoustic spectroscopy, see the review in Ref. [432], and the physics and engineering of  $\text{CO}_2$  lasers [433–435]. We continue our selection with the article of C.N. Plăvițu on the effect of phonons on the electron transport coefficients [436], and, lastly, with that of O.G. Dului on electron spin resonance [437].

From the 1977 volume of *Studii și Cercetări de Fizică* we have selected the article of Cecil Pompiliu Grünfeld and Tudor A. Marian on the response function in relaxation processes [438]. Cecil Pompiliu Grünfeld is a noted theoretical physicist whose research is focused on statistical mechanics, kinetic theory, quantum mechanics, dynamical systems, and nonlinear evolution equations [439,440]. Tudor A. Marian is a distinguished theoretical physicist, who worked, jointly with Paulina Marian, on quantum information and quantum technologies at large, a topic on which they had important scientific results, such as the properties of squeezed states with thermal noise [441,442], entanglement of formation for an arbitrary two-mode Gaussian state [443], and that on the Uhlmann fidelity between two-mode Gaussian states [444]. We continue our survey with the article of Gabriela Cone on the two-boson laser [445], that of C. Ciortea, B. Constantinescu, S. Dobrescu, and M. Petrașcu on the calibration of the Tandem accelerator of the Institute of Atomic Physics [446], that of M.L. Pascu on the optic study of molecular ions in plasmas [447], and that of Dan E. Demco on the dynamics of nuclear spin systems [448]. Dan Eugen Demco, Corresponding Member of The Romanian Academy, elected in 2011, is an outstanding solid-state physicist whose research is focused on the applications of nuclear magnetic resonance to a variety of physical systems, with emphasis on polymers and biomaterials [449–451]. We

continue the survey with the article of Vlad Avrigeanu on the systematic classification of nuclear processes for fusion with heavy ions [452]. Vlad Avrigeanu is a distinguished nuclear physics scientist whose research is focused on the description of nuclear reactions for testing some models for reaction mechanisms and for the evaluation of nuclear data [453–456]. We continue our survey of volume 29, number 10, with the paper of M. Ivaşcu and D.N. Poenaru on some extension on the droplet model for heavy ion collisions [457] and, finally, with that of Marilena Avrigeanu on the experimental information gathered through gamma spectroscopy in reactions induced by heavy ions [458]. Marilena Avrigeanu is a distinguished nuclear physicist with important contributions on neutron induced nuclear reactions, study of nuclear-level densities, determination of the optical potential for  $\alpha$ -particles at low energies, and the optical-potential analysis of  $\alpha$ -particle elastic scattering and induced reactions at low energies [459–464].

After a close inspection of the first two numbers of volume 30 of *Studii și Cercetări de Fizică* published in 1978 we start the survey with the article of Cornelia Grama on experimental methods for the identification of charged particles that resulted from nuclear reactions [465]. Cornelia Grama is a distinguished nuclear scientist with interests in both theoretical and experimental problems, most noted for her work, jointly with Nicolae Grama and Ioan Zamfirescu, on a new class of resonant states, the so-called quasimolecular states [466–470]. Our survey continues with the article of Gh. Adam on thin ferromagnetic films [471]. Gheorghe Adam is a distinguished solid-state physicist whose research is largely dedicated to the theory of superconductivity, with distinct contributions on the exchange and spin-fluctuation mechanisms of superconductivity in cuprates [472], high- $T_c$  superconducting phase transitions in cuprates [473], and the derivation of the mean-field Green functions of the two-band Hubbard model of superconductivity [474]. Gheorghe Adam later specialized in numerical methods and one of his articles, coauthored jointly with Liviu Gr. Ixaru and Aretin Corciovei, on a first-order perturbative numerical method for the solution of the radial Schrödinger equation is now a classical reference in the field [475]. We continue our survey with the article of N. Angelescu on some problems in quantum statistical mechanics [476], and that of Constantin Vrejoiu, Adrian Costescu, and Lucian Burlacu on the computations of coefficients for asymptotic series using the method of steepest descent [477]. Constantin Vrejoiu is a distinguished theoretical physicist who mentored numerous students of the Faculty of Physics of University of Bucharest, with contributions on electromagnetic multipoles [478,479] and, jointly with Nadia Mezincescu, on the free-bound dipole transition in H-like atoms [480,481]. Adrian Costescu and Lucian Burlacu were distinguished theoretical physicists and accomplished professors and mentors who worked at the Faculty of Physics of University of Bucharest, well known for their work on the averaged Bremsstrahlung spectral distribution and energy-loss in fully ionized plasmas

[482]. On the side of the research profile of Adrian Costescu let us note as well the article on retardation and multipole effects in Rayleigh scattering by hydrogenlike ions at low and X-ray photon energies [483], while for the research profile of Lucian Burlacu let us mention the article on new analytic forms for the classical Bremsstrahlung angular distribution in the Coulomb case [484]. We continue the survey with the article of I. Gârlea, C. Miron, P. Ilie, and F. Popa on the measurement of the fission density distribution [485], that of D.P. Lazăr on some magnetic properties of iron and cobalt alloys [486], that of Ioan Ursu on the tenth anniversary of the European Physical Society [487], and that of J. Cohen and Mircea Oncescu on the design of a radiometric system through mathematical modeling of the relevant physical processes [488]. Mircea Oncescu (born: 1925, deceased: 2005) was a distinguished nuclear scientist [489] with particular contributions to neutron fluence measurements [490], alpha radionuclides monitoring [491], and computational nuclear physics [492,493], as well as a gifted and appreciated mentor. In addition to his numerous articles, Mircea Oncescu also wrote a series of research monographs, such as that co-authored with Florin Ciorăscu (born: 1914, deceased: 1977) on the detection and measurement of nuclear radiation [494], and that co-authored with Emilian Gașpar (born: 1932, deceased: 1999) on radiohydrology [495]. We end our survey with the article of Alexandru Calboreanu and S. Mancaș on the single particle nuclear states for the Woods-Saxon potential [496]. Alexandru Calboreanu is an experimental nuclear physicist with contributions on nuclear single-particle states and the effects of gamma de-excitation [497,498], to give just two examples. He also served as the first President of The Romanian Physical Society after it was re-organized in 1990, as part of a joint effort of the physics community to continue a one-century-long scientific tradition that started in 1890 when The Romanian Society for Sciences (in Romanian: *Societatea Română de Științe*) was established. In addition to his scientific contributions, Alexandru Calboreanu also wrote extensively on the history of the Romanian physics community, as can be seen from his articles on the life and works of Alexandru Proca (born: 1897, deceased: 1955) [499,500], admittedly the most important Romanian theoretical physicist.

From volume 31 of *Studii și Cercetări de Fizică*, published in 1979, we mention the article of E. Balea, S. Berceanu, C. Coca, A. Săraru, A.L.M. Mihul, O. Balea, V.M. Karnauhov, and V.I. Moroz on the methodology of identifying elastic  $\pi$ -p interaction at 16 GeV/c [501], that of T. Angelescu, N. Bălțățeanu, A. Mihul, and R. Mișu on the production of neutrons with electron accelerators of up to 10 MeV [502], that of A. Calboreanu, C. Pencea, and O. Sălăgean on the determination of some reaction cross-sections [503], and that of Răzvan Dabu on the ruby laser operated in the regime of short pulses [504]. Răzvan Dabu is an outstanding Romanian laser physicist and engineer with broad international recognition and contributions on a wide variety of research topics [505–508]. He is also an accomplished mentor for young researchers in the field of high power

lasers [509]. Lastly, we mention the article of I. Bunget and Minola R. Leonovici on the contribution of the impurity-hole pairs to the dielectric relaxation [510]. Ion Bunget is an expert in solid-state physics (see, for instance, Ref. [511]) and a very gifted professor who authored and coordinated books at both high school and university levels [512].

After inspecting volume 32 of *Studii și Cercetări de Fizică*, published in 1980, we present here the lengthy study (in three parts) co-authored by Marilena Avrigeanu and Marin Ivașcu on the interaction processes that involve fusion neutrons [513–515], that of N. Grama and S. Stoica on the inelastic scattering of alpha particles [516], and, lastly, that of V. Corcalciuc on the interaction of fast neutrons with  $^9\text{Be}$ ,  $^{19}\text{F}$ ,  $^{56}\text{Fe}$ , and  $^{59}\text{Co}$  nuclei [517].

From volume 33 we have selected the article of V.L. Fara, R. Grigorescu, D. Cecan, V. Bădescu, and R. Chișleag, which is focused on some criteria for testing solar panels [518], that of Victor Ciupină on the metal-semiconductor contact resistance [519]. Victor Ciupină is a distinguished researcher and accomplished professor from Ovidius University of Constanța, whose professional interests are focused on nanocrystals [520] and polycrystalline thin films [521], to name just two topics on which his results received considerable interest within the scientific community. We continue our survey of volume 33 with the article of L.C. Nistor and S.V. Nistor on ionic materials with color centers as activators for tunable lasers [522], that of P. Sterian on a statistic model of the optic receiver [523], and, lastly, that of D. Bucurescu, G. Constantinescu, D. Cutoiu, M. Ivașcu, N.V. Zamfir, and Marilena Avrigeanu on nuclear structure in the regime  $A \sim 90$  [524].

Following a survey of volume 34, published in 1982, we mention here the article of Lucică Miu, S. Popa, and E. Cruceanu on the optimization of some superconducting properties of Nb-Ti alloys [525]. Lucică Miu is a distinguished solid-state physicist whose research contributions include vortex unbinding and layer decoupling in cuprates [526], vortex-liquid entanglement in cuprates [527], and vortices in high-temperature superconductors [528,529]. We continue the survey with the article of I. Mastan, V. Znamirovski, and C. Cosma on the composition and origin of the gases emanated from Mehadica Valley geothermal sources [530] and the article of I. Brânduș and V. Lupei on some physics experiments relevant for the orbital flight of the first Romanian cosmonaut Dumitru-Dorin Prunariu (elected Honorary Member of The Romanian Academy in 2011) [531]. We continue our survey of volume 34 with the article of Dan Galeriu on the experimental determination of fission barriers in heavy nuclei [532]. Dan Galeriu (born: 1947, deceased: 2017) was a gifted experimental and computational physicist specialized in radiation protection, radioecology, life and environmental physics, as well as environmental modeling for radiation safety and nuclear physics [533,534]. Finally, we end our survey of the articles published in 1982 with that of I. Mastan, C. Cosma, and V. Znamirovski which reports new data on the

composition and origin of the natural gases emanated from the Cerna valley and Mehadica valley geothermal sources [535]. Vladimir Znamirovski (born: 1933, deceased: 2004) was a distinguished physicist from Babeş-Bolyai University of Cluj-Napoca with significant research contributions to radioecology and electron spin resonance [536,537].

From the first four numbers of volume 35, published in 1983, we select the article on the Landau-Lifshitz theory of structural transformations in solids [538] of Victor Bârsan, a distinguished solid-state theoretical physicist [539,540], and that of M. Micu on a field theory formalism with high-order derivatives [541]. From the fifth issue we mention the article of D. Bucurescu, G. Constantinescu, D. Cutoiu, M. Ivaşcu, Nicolae Victor Zamfir, and G. Căta on the description of even isotopes of Sr and Zr within the interacting boson model [542]. Nicolae Victor Zamfir, Titulary Member of The Romanian Academy (elected in 2015), co-author of the article mentioned above, is an outstanding nuclear physicist with expertise in both experimental nuclear physics and in the theoretical description of atomic nuclei (see Refs. [543–546] for some of his most relevant publications). Let us note that Nicolae Victor Zamfir is the Director of *Extreme Light Infrastructure – Nuclear Physics (ELI-NP)* project that will endow the Măgurele Physics Campus with the “most advanced research facility in the world focusing on the study of photonuclear physics and its applications, comprising a very high intensity laser of two 10 PW ultra-short pulse lasers and the most brilliant tunable gamma-ray beam” [547]. From the other numbers of the journal published in 1983 we mention a substantial study, in two parts, published by Sanda Adam on crystal field theory for ionic and metallic compounds [548,549]. Sanda Adam is a distinguished solid-state physicist with contributions on research topics such as the effective one-particle crystal field potentials [550], the effective interatomic forces from one-particle crystal field parameters [551], and the study of crystal fields at rare earth sites in magnetic compounds [552]. We continue the survey with the study of M. Apostol on polyacetylene [553] and that of S. Răpeanu, I. Pădureanu, Gh. Rotărescu, C. Crăciun, M. Ion, and I. Bâscoveanu on microdynamics studies in zirconium hydride [554].

Volume 36 of *Studii și Cercetări de Fizică* was published in 1984, in ten numbers that are balanced in terms of experimental and theoretical articles. After surveying the published articles, we mention here that of I.M. Popescu, P.E. Sterian, and N.N. Puşcaş on the computation of nonlinear susceptibilities of order seven and nine by neglecting the fine structure [555], that of F.D. Buzatu on soliton solution and quantification in the sine-Gordon theory [556], that of F. Toró on the use of Cartan differential forms in the Onicescu invariant theory and the „ECSK” theory of gravitation [557], that co-authored by L. Năstase, N. Niculescu, C.P. Lungu, A.M. Oancea, and G. Musa on properties of a plasma display [558], and that of Ion V. Popescu on electromagnetic properties of some rare-earth nuclei [559]. Ion V. Popescu is an Emeritus Professor at Valahia University of Târgovişte

[560], as well as an accomplished researcher specialized initially in experimental nuclear physics. The recent research interests of Ion V. Popescu are focused mainly around spectrometric studies and related areas, with applications on a broad set of physical systems, including river water, perennial medicinal plants, pollen samples, crude oil contaminated soils, etc. [561]. We continue our survey with the article of Marilena Avrigeanu on the mechanisms of nuclear reactions induced by heavy ions on medium nuclei [562], that of F.S. Uliu and Rodica Stroe on the rainbow polarization using the Stokes parameters [563], and, lastly, that of C. Vrejoiu on Cartesian tensors [564].

Volume 37 is published in 1985 in 10 numbers, which show the same thematic coverage as that of the volumes published in the previous years. From the first number of volume 37 we mention here the article of Horia V. Alexandru and C. Plăvițu on the growth of monocrystals [565]. Horia V. Alexandru, Emeritus Professor at University of Bucharest and a gifted mentor of numerous physicists is well known internationally for his studies on crystal growth mechanisms from solutions, for his results on the growth and characterization of non-linear optical crystals and those on the use of pure and doped ferroelectric crystals for the detection of infrared radiation, and for his work on the growth and kinetic measurements of several crystals such as KDP, ADP, TGS, and  $\text{LiIO}_3$  [566–569]. From the second number of volume 37 we mention the article of B. Constantinescu, E. Ivanov, D. Ploștinaru, A. Popa-Nemoiu, and Gh. Pascovici on an analysis of azote that can be used to determine the protein content of cereals [570]. From number three of volume 37 we mention the article of I.M. Popescu, A.Gh. Podoleanu, M.A. Dumitru, and P.E. Sterian on experimental results on the self-coupling of the oscillation modes of a He-Ne laser with coupled cavity [571], and that of V.M. Cătuneanu, A.Gh. Podoleanu, and P.E. Sterian on experimental results on a He-Ne mode-locked laser with phase modulation in the coupled cavity [572]. From the following three numbers we mention the article of Elena Apostol and Marian Apostol, which gives some perspective in the physics and chemistry of synthetic quasi-one-dimensional materials [573], and the article of I. Ursu, Leona C. Nistor, Valentin S. Teodorescu and colleagues that reports some new results in the study of the interaction between a laser and a metallic surface [574]. Leona C. Nistor and Valentin S. Teodorescu are two distinguished experimental solid-state physicists whose research contributions are recognized internationally, as is the case of the papers on nanocrystalline diamond films [575] and laser-induced crystallization processes [576], as well as their studies on electron microscopy [577,578]. We continue the survey with the article of Livius Trache discussing octupolar excitations in some odd nuclei around  $N=82$  [579]. Livius Trache is a distinguished experimental nuclear physicist with wide international recognition whose research is focused on optical model potentials involving loosely bound p-shell nuclei around 10 MeV/nucleon [580] and asymptotic normalization coefficient of  $^8\text{B}$  from breakup reactions and the  $S_{17}$  astrophysical

factor [581], to cite two of his most significant publications. From the remaining numbers we mention the article of Mircea Penția on the study of the cumulative effect in the production of mesons and nucleonic systems [582]. Mircea Penția is a distinguished particle physicist with contributions on a broad set of research topics, from which we mention the preshower detector for  $\pi^+\pi^-$  hadronic atom studies [583] and a preshower detector for the DIRAC experiment [584]. We continue our survey with the article of Marius Peculea on the assessment of the processes used to produce heavy water [585]. Marius Sabin Peculea, Titulary Member of The Romanian Academy elected in 1993, is the founding father of the Romanian heavy water research and engineering national program whose research interests cover, among numerous other subjects, isotopic distillation with a heat-pump [586], gaseous purges from ammonia synthesis for hydrogen recovery and argon and helium separation [587], and deuterium separation from a binary mixture by continuous distillation [588]. We end our survey of this volume with the article of Cleopatra Căbuz and D. Dascălu on the effect of non-uniform doping and that of interfacial layer on the characteristics of the Schottky diode [589].

Surveying volume 38, published in 1986, one notices the article of Octav C. Gheorghiu and Cipriana Mandache on atomic frequency-time-length standards [590], and the article of Dan Radu Grigore on gauge theories [591]. Dan Radu Grigore is a distinguished mathematical physicist with important contributions to the projective unitary irreducible representations of the Galilei group in (1+2) dimensions [592], the nonrelativistic limit of the Dirac Hamiltonian [593], and the standard model and its generalizations in the Epstein-Glaser approach to renormalization theory [594]. We continue our survey with the article of C. Ciucu, M. Apostol, and A. Corciovei on physical properties of a potassium-based compound [595], that of V. Sofonea on the models of optical bistability [596], the article of Magda Stavinschi on new time scales [597], the article of D.N. Poenaru and M. Ivașcu on new modes of radioactive decays [598], and that of Irinel Caprini and Liliana Micu on parity-non-conserving potentials in atomic and nuclear physics [599]. Irinel Caprini and Liliana Micu published a series of relevant papers on parity-nonconserving nuclear potential, parity violating mechanisms in nuclei, and bound state effects on the parity-violating nuclear potential [600–602]. Liliana Micu, an outstanding theoretical physicist with important scientific contributions in particle physics, published in 1969 a classical paper on decay rates of meson resonances in a quark model [603]. We also mention here two of her important works on relativistic quark models applied to the study of particle decays [604,605]. Lastly, we conclude the overview of volume 38 with the article of A. Corciovei and A. Isar on the gauge theory of electroweak interactions [606].

Our selection of the articles published in volume 39 starts with the philosophical one of E.I. Toader on *Matter, the universe and plasmas. The hypothesis of the impossibility of identifying individuals* [607]. We then notice the article of O. Sima on improving the precision of the neutron activation analysis

[608], that of Alexandrina Nenciu on the spectrum of Bloch electrons in the presence of weak and non-uniform external perturbations [609], and that of Dumitru Mihalache on the physics and applications of nonlinear optical waveguides [610]. Dumitru Mihalache, Corresponding Member of The Romanian Academy (elected in 2014), is a theoretical physicist with contributions in research areas as diverse as nonlinear surface polaritons and nonlinear guided waves in optical structures [611–614], spatiotemporal solitons in atomic, molecular, and optical physics settings [615–618], Bose-Einstein condensates [619–621], and rogue waves in diverse physical settings [622,623]; for a comprehensive review paper on rogue waves in scalar, vector, and multidimensional nonlinear systems, see Ref. [624]. We end our selection of papers with that of N. Ionescu-Pallas and I. Gottlieb on the cosmology of the observer [625] and that of M. Apostol on the fermion interaction in low-dimensional systems [626].

For volume 40, published in 1988, we have selected the article of E.I. Toader and V.E. Kuncser on some plasma instabilities [627], that of V.I. Vlad, N. Ionescu-Pallas, D. Popa, and I. Apostol on the optical processing of information and holography [628], that of M.L. Pascu and A. Pascu on some applications of tunable lasers [629], and, lastly, the article of D.E.N. Brîncuș and I.A. Dorobanțu, on long-wavelength collective electromagnetic excitation in solids [630].

Our selection for the articles published in volume 41 of *Studii și Cercetări de Fizică* starts with that of D.S. Delion on quark models for nucleon-nucleon collisions [631]. Doru-Sabin Delion is a reputed theoretical nuclear physicist with broad international recognition whose review published in *Physics Reports* [632], jointly with R.J. Liotta and R. Wyss, on the theory of proton emission has become a classic reference. Our selection continues with the article on optical and transport phenomena in aperiodic deterministic systems [633] of Mihnea Dulea, a noted solid-state physicist [634–636] who later shifted to scientific computing. Next on our survey is the article of Paul Gartner on the equivalence of some hopping models used to describe dispersive transport [637]. Paul Gartner is a distinguished theoretical solid-state physicist with significant contributions to quantum kinetics, quantum wells, quantum dots, and two-level laser theory [638–640]. Next on our selection are the articles of Maria Fiti and M. Drăgușin on the influence of the absorption medium on the properties of some polymeric hydrogels obtained through irradiation [641] and of O. Cozar, V. Znamirovski, and V.V. Grecu on electron spin resonance studies on the exchange interactions in metallic polynuclear compounds [642]. Onuc Cozar, Voicu Vlad Grecu, and Vladimir Znamirovski published in 2001 a comprehensive book on electron spin resonance in metallic complexes [643]. Onuc Cozar is a distinguished condensed matter physicist as well as a gifted mentor of numerous generations of physicists. He is specialized in electron paramagnetic resonance spectroscopy and in infrared, Raman, and surface-enhanced Raman spectroscopy of solid-state materials and biostructures [644–648]. Voicu Vlad Grecu, currently an Emeritus Professor at

University of Bucharest, is a gifted professor highly appreciated by numerous generations of physicists. We gathered in Refs. [649–651] a few of his relevant works on electron paramagnetic resonance and related physical effects. We continue our list of selected papers with that of D. Barb and I. Bibicu on the Mössbauer spectrometer [652], that of L. Tătaru and D. Băleanu on the quantification of systems with local reducible symmetries [653], and, lastly, that of D. Mihalache, Ruo-Peng Wang, and A. Corciovei, on the nonlinear propagation of transverse-electric electromagnetic waves in layered structures [654].

Volume 42 of *Studii și Cercetări de Fizică*, published in 1990, starts with the article of Virgil Băran on the use of Wigner transformation to describe the classical aspects of quantum systems [655]. Virgil Băran is a nuclear scientist with contributions to the dynamics of nuclear fragmentation [656] and dipole collective modes [657–659], as well as broad interests in nonlinear and complex systems. His review on reaction dynamics with exotic nuclei published in *Physics Reports*, see Ref. [660], is a classic reference on the topic. Next on our list of selected papers is that of Aurelian Isar on classical solution in gauge theories [661]. Aurelian Isar is an internationally recognized expert in quantum systems at large, a topic on which he published extensively, see, for example, Ref. [662] on open quantum systems. Finally, we mention the article of Ș. Antohe and I. Dima on photovoltaic effect in structures consisting of thin layers of organic semiconductors [663], that of V. Florea, T. Dascălu, A. Lupei, and V. Lupei on investigation of laser emission of F<sub>2</sub> centers in LiF [664], that of M. Mirea, D. Mazilu, I. Căta, M. Ivașcu, D.N. Poenaru, K. Depta, and W. Greiner on the study of fission trajectories of <sup>234</sup>U in configuration space [665], and the article of Sabina Ștefan and D. Borșa on the numerical simulation of microphysical processes in fog [666].

Our selection of articles from volume 43 of *Studii și Cercetări de Fizică*, published in 1991, consists of four articles, namely that of Speranța Coldea on parametric instabilities of plasmas [667], that of Silvia Mateescu and Marcela Stanciu on the activity of <sup>16</sup>N in the primary cooling circuit of a CANDU reactor [668], that of V.I. Vlad and S. Țibuleac on the instabilities that occur in a laser with injected signal [669], and, lastly, the article of Tudor Tiberiu on a macroscopic theory of coherence [670]. Tiberiu Tudor, currently an Emeritus Professor at University of Bucharest, is a gifted professor and mentor highly appreciated by numerous generations of physicists specialized in optical physics, a topic on which he published a series of significant papers in the field of polarization optics [671–675].

From the articles that have been published in 1992, volume 44, number 2, we mention here that of Voicu Lupei, Aurelia Lupei, S. Georgescu, and I. Ursu on fundamental processes in the laser emission of several solid state active crystals [676] and that of V. Ioniță-Mânzatu, N. Pavel, and Voicu Lupei on solid-state lasers with a thermal induced lens in the dynamical stability zones [677]. Voicu Lupei, elected Corresponding Member of The Romanian Academy in 2009, is an

outstanding experimental physicist specialized in solid-state quantum electronics and photonics, as well as atomic physics, solid state physics, interaction of radiation with matter, and solid-state laser materials [678–684]; see also a comprehensive book on ceramic lasers co-authored by Akio Ikesue, Yan Lin Aung, and Voicu Lupei, published in 2013 by Cambridge University Press [685].

In 1992, starting with volume 44, number 8, the name of the journal changed from *Studii și Cercetări de Fizică* to *Romanian Reports in Physics*. From the articles that appeared in volume 44, after the change of name to *Romanian Reports in Physics*, we first refer to that of W. Greiner and Dorin N. Poenaru on nuclear and atomic molecules [686]. Dorin N. Poenaru, Honorary Member of The Romanian Academy, elected in 2017, is an outstanding theoretical nuclear scientist, as well as a gifted nuclear engineer, with substantial contributions on a series of research topics largely connected to the concept of cluster radioactivity that he introduced jointly with Aureliu Săndulescu and Walter Greiner [114]. The list of research and engineering topics addressed by Dorin N. Poenaru is impressive, but we mention here two of his monographs, one jointly with Nicolae Vilcov, on the measurement of nuclear radiation using semiconductor devices [687,688], as well as his theoretical works on atomic nuclei decay modes by spontaneous emission of heavy ions [689], cluster preformation as barrier penetrability [690], nuclear lifetimes for cluster radioactivity [691], new islands of cluster emitters [692], systematics of cluster decay modes [693], and heavy-particle radioactivity of superheavy nuclei [694]. We continue our survey of volume 44 with the article co-authored by Mădălina Vlad and Florin Spineanu on the quantum potential description of quantum mechanics [695]. Mădălina Vlad and Florin Spineanu are two distinguished theoretical physicists specialized in plasma physics and the general theory of turbulence with broad research contributions from which we cite here their works on the “tokamap”, a Hamiltonian twist map for magnetic field lines in a toroidal geometry [696], diffusion in stochastic velocity fields [697], collisional effects in electrostatic turbulence [698], and diffusion in biased turbulence [699]. The aforementioned articles are the results of the fruitful collaboration of Mădălina Vlad and Florin Spineanu with the outstanding Romanian physicist Radu Bălescu (born: 1932, deceased: 2006), well known for the Bălescu-Lenard collision operator. Alongside with Alexandru Proca (born: 1897, deceased: 1955), Elie Carafoli (born: 1901, deceased: 1983), and Șerban Țițeica (born: 1908, deceased: 1985), Radu Bălescu is one of the four Romanian scientists mentioned in the classical *Theoretical Physics Course* of L.D. Landau and E.M. Lifshitz [28]. We end our survey of the articles published in *Studii și Cercetări de Fizică* with that of Rodica Mănăilă, which reports an analysis of diffraction line profiles that can be used to separate lattice distortions from size effects [700], that of Gabriela Ochiană and Mircea Oncescu on photon backscattering [701], and, lastly, that of V.I. Vlad and I. Apostol on the use of

dynamic light gratings for the determination of photorefractive crystal parameters [702].

### 3. SURVEY OF ROMANIAN REPORTS IN PHYSICS

The analysis of the articles published in *Romanian Reports in Physics* after the change of name in 1992 uncovers a broad spectrum of research subjects that go from nuclear, laser, and condensed matter physics, on the experimental side, to mathematical and computational physics, nonlinear optics and photonics, and solid state and condensed matter physics, on the theoretical side. Seen from a different perspective, the articles published in *Romanian Reports in Physics* go from educational physics articles to purely research contributions in the form of short notes, regular articles, and topical reviews focused on recent results.

We have collected in this section some representative articles published by *Romanian Reports in Physics* in the period 1992-2017, grouping them by volume of appearance, with the notable exception of the articles that address the Romanian cultural heritage using the methods of modern physics. These are gathered in the distinct subsection placed at the end of the current survey. In doing so we would like to emphasize the importance of the methods of modern experimental physics for the understanding, preservation, and restoration of artifacts found on Romanian territory, such as gold, silver, and glass bracelets, religious icons, and ancient coins. This subsection implicitly speaks of the fruitful collaborations between experimental physics groups and prominent representatives of the humanities to the benefit of the Romanian society at large. As 2018 marks the anniversary of 100 years since the unification of all Romanian provinces within a single nation state, we survey in detail the articles that address the Romanian cultural heritage to illustrate the contribution of the Romanian physics community to the consolidation of the Romanian identity.

From the first two numbers of volume 45 of *Romanian Reports of Physics*, published in 1993, we have selected for this historical overview the manuscript of D. Bucurescu *et al.* [703] on the recoil mass spectrometer of the Institute of Atomic Physics and the questions that can be addressed by using low-energy secondary beams, that of I. Ursu, Al. I. Bădescu-Singureanu, and L. Schächter on developments and prospects in direct nuclear fission energy conversion [704], that of Marius Peculea on the science and technology of heavy water [705] and, lastly, the article of Andrei Manolescu on the electrostatic response of two-dimensional electron systems in a strong perpendicular magnetic field [706]. Andrei Manolescu is a distinguished solid-state physicist whose research contributions cover, among many topics, two-dimensional electron systems [707], quantum transport in electric and magnetic fields [708], and nonlinear transport through many-levels quantum dots [709]. From numbers 5 and 6, published jointly in the same tome, we start our selection with the article of Mircea Sanduloviciu on the origin of ordered and disordered phenomena in plasma [710]. Mircea Sanduloviciu is a distinguished

professor from the Faculty of Physics of Alexandru Ioan Cuza University of Iași [711], where he mentored numerous young physicists, as well as an accomplished researcher with substantial contributions to plasma physics [712–714]. We continue our survey with the article of Andreea Dinca, Mirela Ionita-Manzatu, and V. Lupei on thin film polarizers for  $1.064 \mu\text{m}$  [715], that of Floriana Iova, Viorela Raducu, and Athanasie Truția on spectroscopy studies of chemisorption on nickel-catalyst [716], and the paper of Horia Chiriac, Maria Neagu, I. Ciobotaru, and M. Peptanariu, which discusses the magnetoelastic properties of some nickel-based magnetostrictive alloys [717]. Horia Chiriac is a distinguished solid-state physicist and materials scientist with relevant scientific contributions to preparation, properties, and diverse applications of magnetic materials [718–721]. The remaining four numbers published in 1993 include an article coauthored jointly by B. Constantinescu, C. Dumitru, and Mirela Puscalau on some aspects concerning the relationship environmental radioactivity-population in Romania after the Chernobyl nuclear disaster in 1986 [722], that of M. Grigorescu dedicated to physical framework of quantization problem [723], the article of A.I. Ciura on far infrared lasers [724], and the paper of Ștefan Antohe on organic-on-inorganic semiconductor diodes [725]. Ștefan Antohe is a distinguished experimental solid-state physicist and gifted professor whose work on fabrication and characterization of thin films, organic semiconductors, nanomaterials and nanoscale optoelectronic devices is widely acknowledged [726–729]. We end our survey of this volume with a contribution to the knowledge of the genesis of the Vrancea (Romania) earthquakes co-authored by D. Enescu and B.D. Enescu [730].

The first number of volume 46 of *Romanian Reports in Physics*, published in 1994, starts with a contribution co-authored by H. Comisel, V. Dorobantu, and Cornel Hațegan on two-step processes according to the R-matrix theory [731]. Cornel Hațegan, Corresponding Member of The Romanian Academy elected in 1992, is an outstanding nuclear scientist with contributions to reaction studies of states near the proton threshold and hydrogen burning, threshold phenomena in R-matrix theory and (p,n) threshold anomaly in proton elastic scattering [732,733]. We continue our selection with two significant contributions from Amilcar Ionescu on geometric one-dimensional potentials and the SO(1,2) potential group [734] and P.C. Logofătu *et al.* on the determination of the complex refractive index using reflectivity measurements [735]. The following two numbers were published jointly and include numerous contributions on solid state physics from which we have selected here that of Gh. Adam *et al.* on resolving the Fermi surface of  $\text{YBa}_2\text{Cu}_3\text{O}_{7-\delta}$  from positron annihilation data [736], that of A.V. Pop *et al.* on magnetic and electrical studies on Mn substituted Y-Ba-Cu-O [737], that of R. Ballou *et al.* on anisotropic exchange interactions in  $\text{Tb}(\text{Co}_{1-x}\text{Ni}_x)_5$  intermetallic compounds [738], that of M. Valeanu *et al.* on magnetic behavior of iron in nitrogenated 2:17 compounds [739], that of N. Plugaru *et al.* on magnetic behavior of iron in  $\text{Gd}_2\text{Fe}_{14-x}\text{M}_x\text{C}$  compounds, where  $\text{M}=\text{Ni, Si, Cu, V or Ga}$  [740], the

article of W. Kappel and coworkers on the effect of iron substitution on the magnetic behavior of  $\text{Nd}_2\text{Fe}_{14-x}\text{M}_x\text{C}$  alloys, where  $\text{M}=\text{Ni, Ga, and Al}$  [741], the article of E. Burzo *et al.* on magnetic properties of  $\text{Y}(\text{Fe}_x\text{Al}_{1-x})_3$  compounds [742] and, lastly, that of I. Ardelean *et al.* on EPR and magnetic susceptibility studies of  $\text{Bi}_2\text{O}_3\text{-PbO-Fe}_2\text{O}_3$  glasses [743]. From the following three numbers we refer here to the article of G. Popa and Mariana Gheorghiu on plasma treatments of polymers [744], the article of I. Lazanu and Al. Mihul, on elementary particle systematics [745], the article of M. Sin *et al.* on fission probabilities calculation code [746], the contribution of O.G. Dului on computer simulation of the electron paramagnetic resonance spectra [747] and, lastly, that of Aurelia Cionga, Mihaela Vătăşescu, Magda Fifirig, and Viorica Florescu, which presents an analytic approach to three-photon  $1s$ -continuum transitions in hydrogen [748]. Viorica Florescu, currently an Emeritus Professor at University of Bucharest, is a gifted professor and mentor appreciated by numerous generations of physicists, as well as an outstanding researcher with broad international recognition, well known for her work on photon scattering, in particular the elastic scattering of photons by electrons at high energies and nonlinear Compton scattering with laser pulses [749–753]. Numbers 5 and 6 of the journal appeared jointly in a single tome and include the article of D. Iordache *et al.* that reports different random walk simulations of boson kinetics in one dimensional lattices [754], the article of I. Munteanu *et al.* on the switching and memory phenomena in amorphous InSe thin films [755], that of Adrian Dafinei and Ana Ioanid on the modeling of thermomagnetic cooling [756], the contribution of A.Th. Ionescu that discusses the critical electric field of a new synthesized organo-metallic liquid crystal [757], the paper of V.V. Grecu *et al.* on irradiation effects on polymers [758], that of I. Munteanu *et al.* on electron spin resonance studies on semiconducting systems [759], and, lastly, that of Livia Maria Constantinescu and C. Berlic on non exponential relaxations in polymers [760]. Numbers 7 and 8 of the journal were also published in a single tome that includes, among other contributions, the article of Valentin I. Vlad *et al.* on self-diffraction on high modulated phase gratings induced in photorefractive crystals [761], that of Mihai Ralea *et al.* on holographic interferometry diagnosis of thermic phenomena generated by gas electric discharges with hollow cathode effect [762], that of I. Iova *et al.* on selective excitations of atoms and ions in hollow cathode electric discharges [763], that of F. Bertinotto and co-workers on tunable semiconductor lasers for use in spectroscopy measurements [764], that of M. Ristici *et al.* on a green He-Se laser emission [765], the historical review of Clementina Timus *et al.* entitled *More than 30 years of laser optics. Progress and limits* [766], and the contribution of Mihaela Enescu *et al.* on computer simulation of the modal distribution inside a folded resonator [767]. In the second part of the tome we find the article of Elena Cordoneanu and Ion Drăghici dedicated to the influence of the Black Sea on the atmospheric mesoscale processes above the South-Eastern Romania [768], that of Sabina Ştefan, Adriana Sima, and Mihai Dima on the

microphysics of precipitation that discusses the raindrop-size distribution [769]. Sabina Ștefan is an accomplished researcher and gifted mentor of numerous students from the Faculty of Physics of University of Bucharest, with contributions in atmospheric physics, climatology, meteorology, and physics of the environment, see Refs. [770-772] for a short selection of her scientific results. Mihai Dima is a distinguished environmental physicist largely focused on climatology with significant contributions on the rapid 20th-century increase in coastal upwelling off northwest Africa [773] and the Atlantic multidecadal oscillation [774]. We continue our survey with the article of Ion Armeanu and Dan Blideanu on the classification of the groups having a strongly embedded subgroup [775], and that of N. Cotfas on a class of infinite regular graphs [776]. We end our survey with the article of Cristian M. Teodorescu on absorption spectra of sodium clusters [777]. Cristian M. Teodorescu is a distinguished materials scientist with broad research contributions that include, among other topics, absorption spectra and excitations and fragmentation of free sulfur aggregates [778-780].

Our selection of articles from volume 47 of the journal starts with two articles published in the first number, namely the paper of Mihai A. Popescu that discusses the brain and the neural network [781] and the work of Radu Mutihac that introduces a mathematical framework for neural networks modeling [782]. Mihai A. Popescu is a distinguished solid-state physicist with significant contributions on research subjects as diverse as defect formation in amorphous structures via numerical simulations [783] and disordered chalcogenide optoelectronic materials [784]. Radu Mutihac is a noted biophysicist whose contributions cover, among other topics, liquid-liquid extraction and transport through membrane, mining in chemometrics and TARDBP pathogenic mutations [785-787]. From number 2 we have selected for our survey the article of V. Hristea *et al.* on the development of some numerical algorithms for solving transport equations in slab geometry based on operational methods [788], that of D. Ghilencea *et al.* on the numerical evaluation of Coulomb Born approximation for double bremsstrahlung [789] and, lastly, that of A. Andriesh *et al.* on fiber optic displacement sensor based on clad modes detection [790]. The following two numbers were published together and include numerous contributions in solid-state physics from which we have selected that of Doina Bica on the preparation of magnetic fluids [791]. Doina Bica (born: 1952, deceased: 2008) was an outstanding physical chemist with substantial contributions to magnetic nanofluids and to the development of magnetic fluid technology in Romania. Starting with 1980, at the Laboratory of Magnetic Fluids of University Politehnica of Timisoara, she established and worked out the synthesis procedures of over 50 types of magnetic nanofluids for engineering and biomedical applications, described in 12 Romanian patents. The sealing magnetic fluids she developed were up-scaled and serve as the basic smart nanomaterial component in leak-proof rotating seals manufactured today at industrial level in Romania. From the same number we continue our

selection of articles with that of Ioan Bica on obtaining of nanoparticles in argon plasma [792], that of Victor Sofonea and colleagues on magneto-optical investigations on microstructural processes in magnetic fluids [793], that of Maria Balasoiu *et al.* on the study of particle structure, interparticle interactions and dynamics in ferrofluids by small angle scattering of neutrons [794], that of Michael Schott *et al.* on rheological and magnetorheological behavior of some magnetic fluids with various concentrations [795], and, finally, that of Marius I. Piso on magnetofluidic inertial sensors [796]. Marius I. Piso is a distinguished researcher specialized in the development of inertial sensors [797].

A survey of the articles published in volume 48 of *Romanian Reports in Physics* outlines, for the first numbers, the article of Nicholas Ionescu-Pallas and colleagues on the refractive index determination in axially symmetric optically inhomogeneous media [798], that of I. Pintilie *et al.* on trapping levels in high resistivity silicon induced by neutron irradiation [799], that of I.M. Brâncuș and H. Rebel on the renaissance of interest in cosmic rays [800], and that of V. Babin, A. Mocofanescu, and V.I. Vlad on exact analysis of stimulated Brillouin scattering using characteristic equations [801]. The aforementioned article was followed by an important monograph, coauthored by M.J. Damzen, V.I. Vlad, V. Babin, and A. Mocofanescu, printed by the Institute of Physics Publishing [802]. For the articles published in the second part of the volume we start our list with the article of Florin F. Popescu and F. Marica which come up with a proposal for phase-sensitive detection, amplification and frequency up-conversion in the centimeter or millimeter regions of the radiofrequency of centimeter microwave signals [803]. Florin F. Popescu is an Emeritus Professor at the Faculty of Physics of University of Bucharest, where he introduced numerous students to scientific research and conducted research in the large area of solid-state physics [804–806]. Our survey then includes the work of Raluca Mureșan and Mircea Penția on Hopfield neural network in HEP track reconstruction [807], that of S. Antohe, L. Țugulea, and V. Gheorghe on photoelectrical properties of ITO/chlorophyll a/TPyP/Al p-n heterojunction cells [808], that of I. Stamatina *et al.* on the closing of the carbon structures sheets in fullerenes C 60 [809], that of G. Tulbure *et al.* on two-channel experimental set-up for the study of a vacuum breaker plasma radiation [810], and, lastly, that of G. Dinescu and colleagues on the RF capacitive post discharge as a source of active species [811].

Volume 49 of *Romanian Reports in Physics*, published in 1997, opens with an article of I.-Iovitz Popescu, M. Ganciu, Maria-Cristina Penache, and D. Penache on the Lavalette ranking law [812] and continues with extracts from the PhD thesis of Gheorghe Căta-Danil on nuclear structure investigations for the mass region  $A \approx 90 \div 100$  [813]. Gheorghe Căta-Danil is a distinguished experimental nuclear physicist, as well as a gifted professor and mentor for numerous young researchers. His research interests are broad and we mention here the works on band structure in doubly odd  $^{100}\text{Rh}$  and  $^{102}\text{Rh}$  [814,815] and the experimental studies on the  $^{128}\text{Ba}$

nucleus with the (p,t) reaction [816]. From the other articles published in the first four numbers of the journal we also mention here that of C.B. Collins *et al.* on long and intense constricted pulsed discharge at low gas pressures [817], that of E. Scarlat and coworkers on two-pulse excitation circuit for copper laser plasma [818], that of Viorel Braic and colleagues on probe plasma diagnosis in an ECR ion source [819], and, lastly, that of Viorel Braic *et al.* on Langmuir probe investigations of a plasma produced in a DC magnetron sputtering system [820]. From the second part of the volume we refer here to the article of M. Bercu *et al.*, which presents an investigation on  $^{31}\text{P}^+$  related defects in implanted  $\text{SiO}_2/\text{Si}$  by EPR and optical spectroscopy [821], that of O.C. Gheorghiu and Viorica N. Gheorghe, which discusses discharges seen as atomic beam sources for the hydrogen maser [822], that of V. Stancalie on modeling the recombining laser-produced plasmas [823], that of O.G. Dului and I. Ursu, in two parts, on the precision of the radiometric age methods [824,825], and that of M. Ristici and Iosefina Ristici dedicated to the green and blue-green laser oscillation of a He-Se short positive column laser [826]. Lastly, we end our survey of articles published in 1997 with that of Gheorghe Popescu on three international frequency comparisons involving the Romanian primary length standard RO.2 [827] and that of Alexandru Lupascu and Antoine Kevorkian on local electric effects during ionic exchanges in optical glasses [828].

Our survey for volume 50 of *Romanian Reports in Physics* brings forward the article of Ioan Bică and Ioan Mușcutariu on physical procedures in obtaining the ultrafine powders for magnetic liquid preparation [829], that of E. Rezlescu *et al.* on the effects of nonmagnetic additives and rare-earth ions substitutions on the quality of a Li-Zn ferrite [830], that of C. Bizdădea and S.O. Saliu on the BRST quantization of massive Abelian gauge fields [831], that of A. Galatanu *et al.* on the effects of electron irradiation on the resistive behaviour of YBCO-type ceramics [832], and the article of Al. Jipa and R. Mărginean on pion absorption in relativistic heavy ion collisions [833]. In the same volume we find the article co-authored jointly by Monica Hașegan and Vlad Popa on acceptance analysis for a large area monopole experiment using nuclear track detectors [834]. Vlad Popa, a graduate of University of Bucharest, is a noted astrophysicist, active in a series of international collaborations such as ANTARES, KM3NeT, Euclid, and MoEDAL [835]. Lastly, we end our survey of volume 50 with the article by Monica Hașegan, Lucia Popa, and P. Ștefănescu detailing a comparative study of the CMB radiation anisotropy with the COBE data [836]. Lucia Aurelia Popa is a noted astrophysicist specialized in scientific data analysis, software design, validation, verification and tests for the Planck mission, as well as cosmological constraints on the Higgs boson mass [837,838].

Volume 51 of *Romanian Reports in Physics* was published in 1999 in ten numbers, which have the same broad thematic coverage seen in the previous ones. From the first four numbers we have selected for our historical overview the article

of Ionel Solomon on a thermodynamic model of metastable amorphous silicon [839], that W. Hoyer and coworkers on modeling the medium-range order in the Au<sub>4</sub>Ge molten alloy [840], and that of A. Popescu, which presents some components for integrated optics based on amorphous chalcogenide materials [841]. From numbers 5 and 6, published jointly, we refer here to the article of Cipriana Mandache *et al.* on cooling cesium atoms with laser radiation [842], that of C. Turcus and collaborators on the use of bracelet dosimeters for the characterization of the high energies mixed fields of electrons and photons [843], and, lastly, that of I. Lazanu and M. Rujoiu, which puts forward a re-analysis and a new interpretation of experimental data on a particle annihilation process in liquid targets [844]. The remaining four numbers were published jointly in a single tome from where we have selected the article of Marius Petraşcu entitled *Tradition and prospects in nuclear physics* [845]. Marius Petraşcu (born: 1929, deceased 2007) was an outstanding experimental nuclear physicist, whose scientific contributions received broad international recognition, as well as a dedicated mentor of young researchers, whose efforts to attract and prepare brilliant students to forefront scientific research strengthened the Romanian nuclear physics community [846]. His research interest, in both physics and nuclear engineering, covered the fission processes induced by muons and pions in heavy elements, the neutron polarizer used to determine the dipole moment of the neutron, the measurement of fission cross sections of <sup>239</sup>P and <sup>235</sup>U, and, on a more engineering side, the installation and subsequent tests (between 1977-1981) of the post-acceleration system at the Tandem accelerator of Institute of Physics and Nuclear Engineering, Măgurele [847–849]. We continue our survey with the article of E. Drăgulescu *et al.* on the excited state structure of <sup>136</sup><sub>56</sub>Ba<sub>80</sub> [850], and that of I. Silişteanu, Mărgărit Rizea, and A. Săndulescu on similar cluster decay rates for the trans-tin and trans-lead nuclei [851]. Mărgărit Rizea is a distinguished computational physicist who published, jointly with Liviu G. Ixaru, a celebrated Numerov-like scheme for the numerical solution of the Schrödinger equation in the deep continuum spectrum of energies [852], a comparison of some 4-step methods for the numerical solution of the Schrödinger equation [853], a Numerov method maximally adapted to the Schrödinger equation [854], and piecewise perturbation methods for calculating eigensolutions of a complex optical potential [855]. These articles, which were published in prestigious international journals, reflect the strength of the Romanian School of computational physics. From the second part of the tome we refer here to the article of N. Ionescu-Pallas and V.I. Vlad on photons in a spherical cavity [856], that of S.E. Enescu *et al.* on a study of the pyrolytic graphite by Rayleigh scattering of Mössbauer radiation [857], that of S. Constantinescu and M.N. Grecu on local electric field properties in K<sub>2</sub>ZnCl<sub>4</sub> [858], and that of Ioan Baltog *et al.* on identification by surface Raman scattering of disordered states on conducting polymers and porous silicon thin films [859]. Ioan Baltog (born: 1939, deceased: 2016), elected Corresponding Member of The Romanian Academy in 2016, was an

outstanding experimental physicist whose work covered material sciences, optics, and nanoscience. Ioan Baltog made significant contributions to carbon nanotubes and surface-enhanced Raman scattering in a wide variety of materials [860–862]. We end our survey of volume 51 with the article of Attila Bende and Valer Toşa, which presents a model for infrared multiple photon excitation of  $\text{CF}_2\text{HCl}$  [863]. Attila Bende and Valer Toşa are two distinguished physicists from The National Institute for Research and Development of Isotopic and Molecular Technologies, Cluj-Napoca, Romania [864]. Attila Bende is a distinguished theoretical and computational physicist interested in intermolecular interactions using high-level electron correlation methods, macromolecular modeling, self-assembled molecular design, band structure of biopolymers, and excited state relaxation dynamics, see Refs. [865–868] for some of his main results. We point out that Ref. [868] published in *Langmuir* in 2013 has had a significant impact within the scientific community and was dubbed Highly Cited Paper by the Web of Science/Clarivate Analytics database. Valer Toşa is a distinguished physicist interested in molecular physics, as well as laser physics and engineering at large, see Refs. [869–872] for some of his main results. We would like to note that Refs. [870–872] concern ultra-short laser pulses, in the femto- and attosecond regimes, and are relevant for the experiments envisaged to take place at the three pillars of the Extreme Light Infrastructure European facility, currently under implementation.

Our survey of volume 52 of the journal, published in 2000 in ten numbers, starts with the article of Rodica V. Ghiţă on some general features of semiconductor lasers [873]. Then we continue our survey with the article of Aurel I. Popescu on a multidisciplinary approach of cell interactions [874], and that of Radu Paul Lungu, in two parts, on the Floquet theory of the time-periodic Hamiltonian systems [875,876]. Next on the list of selected articles is that of I. Bibicu *et al.* on proportional counters for conversion and transmission Mössbauer spectroscopy [877] followed by that of Călin Beşliu *et al.* on apparent temperatures of  $^4\text{He}$  projectile fragments at 4.6 A GeV incident energy [878]. From the articles published in the second part of the volume we mention here that of Magda Fifirig and Viorica Florescu on interference effects in three-colour ionization of hydrogen [879], that of Vasile N. Dima and Emil E. Barna on selective sound absorption in some wood species [880], that of Antoaneta Ene *et al.* on an analysis of minor and trace constituents of deoxidized steels by thermal neutron activation [881], and, lastly, that of Sorin Anghel and coworkers on the influence of the modernization of the power stations on the air quality in Câmpu-Lung city (Romania) [882].

Our survey of the articles published by *Romanian Reports in Physics* in 2001, volume 53, starts with the article of Radu Constantinescu and Florea Uliu from University of Craiova [883] on the generalized canonical formalism for the electromagnetic field [884]. Radu Constantinescu is a noted mathematical physicist with contributions on the Becchi-Rouet-Stora-Tyutin quantization [885,886], while

Florea Uliu is a noted professor with contributions in optics teaching [887,888]. We continue the survey with the article of Mihaela (Dumitru) Ghelmez *et al.* on a computer analysis of laser interaction with some fatty acids and mixtures [889], and that of S. Levai and coworkers on the measurement of the high values refractive index [890]. We continue our survey with two articles by Marian Apostol on Fermi liquid theory [891,892]. Marian Apostol is an outstanding theoretical physicist with broad interests that cover condensed matter physics in general, with emphasis on interaction of charged particles with matter, metallic atomic clusters, Bose- and Fermi-gases, low dimensional systems, molecular dynamics in high electric fields, and scattering of charged particles by high-intensity electromagnetic radiation [893–898]. We continue our survey with the article of Adrian Tănasă and Vlad Popa on possible radiative decays of solar neutrinos [899]. From the same volume we point out the historical review of Romanian seismology of Florin Rădulescu [900], the work of G. Suliman and Gh. Căta-Danil on collective and single particle states in medium mass vibrational nuclei [901], and that of Petru Ghenuche and colleagues on a new interpretation of light interference [902]. Petru Ghenuche is a noted experimental physicist with interests and contributions on strong light-matter interaction and photonics at large [903,904]. We end our survey with the article of Adrian Petriș, E. Fazio, T. Bazaru, M. Bertolotti, and V.I. Vlad on all-optical methods for the characterization of nonlinear optical materials [905]. Adrian Petriș is a distinguished experimental physicist specialized in nonlinear optics and nonlinear optical materials, see Ref. [906] for a recent result.

From our survey of years 2002 and 2003, volumes 54 and 55, we mention here the articles of V. Stăncălie and O. Budriga on laser-induced degenerate states [907] and that of N. Ionescu-Pallas on the origin of gravitation [908] that sheds new light on the study of Ioan-Ioviț Popescu dedicated to the “etheron” concept [909]. We continue the selection with the article of Dan Cutoiu on aspects of radioactive waste management [910], and that of Mădălina Boca and Marius Stroe, which discusses the dressed states of an electron in the modified Pöschl-Teller potential [911]. Our enumeration continues with the article of Emilia Popescu *et al.* on seismic source properties, in particular the indications of lithosphere irregular structure on depth beneath the Vrancea region [912], that of S. Dobrescu and colleagues entitled *Thirty years of physics at the Bucharest Tandem accelerator* [913], and that of M. Ivașcu, D. Bucurescu, I. Căta-Danil, Gh. Căta-Danil, Nicolae Mărginean, L. Stroe, and G. Suliman on the experimental study of the  $^{147}\text{Eu}$  nucleus with the  $(p,n\gamma)$  reaction [914]. Nicolae Mărginean is a distinguished experimental nuclear physicist with broad international recognition and expertise in nuclei far from stability and measurements of sub-nanosecond nuclear lifetimes, to name only two of his topics of interest [915,916]. From the articles published in the second part of 2003, we mention here the article of D.B. Ion *et al.* on the spontaneous pion emission during fission, which indicates a new type of nuclear

radioactivity [917], that of D. Grecu and Anca Vişinescu on higher order dispersion effects on the modulational instability of nonlinear Schrödinger type equations [918], that of D. Pantelica *et al.* on magnetic moments and shape coexistence near the  $N=38$  shell gap [919], and, finally, that of Sabin Stoica on the double-beta decay [920]. Sabin Stoica is a distinguished theoretical physicist whose areas of interest are mainly focused on nuclear and high energy physics, with significant contributions to the theory of double-beta decay [921–924].

From volume 56 of *Romanian Reports in Physics*, published in 2004, we have selected for our survey the article of Claudia Timofte on homogenization results for parabolic problems with dynamical boundary conditions [925], and that of Magdalena Lidia Ciurea on silicon-based nanostructured materials [926]. Magdalena Lidia Ciurea is a distinguished condensed matter physicist and materials scientist focused on thin films at large in the context of nanophysics and nanotechnology, with emphasis on electrical behavior, electronic transport, and structural properties [927–931]. We continue our survey with the article of Simion Aştilean, which discusses the fabrication of periodic metallic nanostructures using nanosphere lithography [932]. Simion Aştilean is a distinguished professor and accomplished researcher at the Faculty of Physics of Babeş-Bolyai University of Cluj-Napoca, who received international recognition for his works on optical spectroscopy, methods of nanofabrication and characterization of nanostructures, as well as nanobiophotonics, see Refs. [933–935]. Next on our list of selected papers is that of M. Balasoiu *et al.* on structural studies of ferrofluids by small-angle neutron scattering [936], followed by that of M. Dondera and Viorica Florescu on laser modified electron bremsstrahlung [937], that of I. Lazanu and S. Lazanu on silicon detectors operating beyond LHC conditions [938], and, finally, that of B. Mitrica *et al.* on experimentally guided Monte Carlo calculations of the atmospheric muon flux [939].

The articles published in volumes 57 and 58, which appeared in 2005 and 2006, respectively, cover the same research topics and contributions from many of the authors already mentioned. We note, however, the article of C. Micu and Erhardt Papp on the use of  $q$ -Laguerre polynomials in the derivation of  $q$ -deformed energies of oscillator and Coulomb systems [940]. Erhardt Papp was an outstanding theoretical physicist who worked in Romania and Germany. The research interests of Erhardt Papp were very broad and covered mesoscopic systems in external fields, transport phenomena, Stark-Wannier resonances, quantum groups, and Wentzel–Kramers–Brillouin and  $1/N$  semiclassical methods [941,942]. His research into the quasiclassical approach to the virial theorem and to the evaluation of the ground-state energy and that on quasiclassical symmetry properties were summarized in two extensive reviews published in *Physics Reports* [943,944]. We continue our survey with the article of Ladislau Vékás *et al.* on magnetic nanofluids stabilized with different chain length surfactants [945]. Ladislau Vékás, elected Corresponding Member of The Romanian Academy in

2012, is a renowned expert in magnetic fluids and magnetic nanoparticles, a topic on which he published extensively [946,947]. We also note the article on nuclear and magnetic structures of non-polar ferrofluids by small-angle neutron scattering by Maria Bălășoiu, M.V. Avdeev, A.I. Kuklin, V.L. Aksenov, Dumitru Hașegan *et al.* [948]. Maria Bălășoiu is a distinguished condensed matter physicist with noted contributions on structural organization of water-based ferrofluids and microstructure of stomaflex based magnetic elastomers [949,950]. Dumitru Hașegan is a distinguished physicist with interest in cosmic rays, radiation detection, and space science at large [951–953]. Moving on to volume 59, published in 2007, we mention the article on first order phase transition in a model for generalized statistics [954] of Dragoș V. Anghel, a noted theoretical physicist with contributions to classical and fractional statistics [955–957]. We continue our survey with the article of T. Lippert, D.B. Chrisey, A. Purice, C. Constantinescu, M. Filipescu, N.D. Scarisoreanu, and Maria Dinescu on laser processing of soft materials [958]. Maria Dinescu is a distinguished laser scientist with broad international recognition for her work focused on the laser processing of materials, from which we mention here the research on ZnO thin film deposition by laser ablation and boron-carbon nitride film laser deposition [959,960], as well as that on the preparation and characterization of titanium oxynitride thin films [961]. From the same volume we focus our attention to the number dedicated to Professor Dumitru Barbu Ion, main author of Ref. [917] that reports on the possibility of a new type of nuclear radioactivity. The laudation [962] was written by Horia Scutaru (born: 1943, deceased: 2014), elected Titulary Member of The Romanian Academy in 1995, an outstanding theoretical physicist, working in quantum theory of open systems and quantum information theory, whose influential scientific contributions are well acknowledged [963–967]. We end our survey of volume 59 with the article on nuclear matter equations of state for the practitioner by Șerban Mișicu [968], a distinguished theoretical nuclear physics with significant contributions on hindrance of heavy-ion fusion due to nuclear incompressibility [969] and role of fragment orientations in the formation of fusion valleys of superheavy elements [970].

Analyzing the articles published in volume 60 of *Romanian Reports in Physics* one notices little variations in the set of topics covered and the list of authors. We note, however, the article by N. Herascu, M. Simileanu, and R. Radvan on color changes in the artwork materials aged by UV radiation [971] and that of Ioan Gottlieb, P. Nica, and M. Agop, on scale relativity theory for an arbitrary fractal dimension [972]. Ioan Gottlieb (born: 1929, deceased: 2011) was an outstanding theoretical physicist with broad research interests that cover numerous aspects of general relativity, as well as a gifted professor and mentor for young researchers [973]. Our survey of volume 60 continues with the article of Nicolae M. Avram and collaborators on the electron-phonon interaction in doped fluoride crystals [974]. Nicolae M. Avram is a distinguished professor and

accomplished researcher whose areas of scientific expertise cover, among other topics, crystal field effects in pyrochlores and other materials [975,976], as well as investigations on the Franck-Condon factors for the Morse potential [977]. We end our survey of volume 60 with the article of Șerban Georgescu *et al.* on effects of particle size on the luminescence of  $\text{YVO}_4:\text{Eu}$  nanocrystals [978]. Șerban Georgescu is a distinguished optics and laser physicist with relevant contributions in spectroscopy of laser active media, especially in the field of spectroscopy of rare-earth doped laser materials [979–981].

From our survey of volume 61 and 62, published in 2009 and 2010, we mention here the article of A. Ene *et al.* on transfer efficiencies of minor elements during steelmaking by neutron activation technique [982] and that of N. Rezlescu and coworkers on gas sensing properties of porous Cu-, Cd-, and Zn-ferrites [983]. We continue the survey with the article of Anca Nemuc, Doina Nicolae, C. Talianu, E. Carstea, and C. Radu on the dynamics of the lower troposphere from multi-wavelength LIDAR measurements [984]. Doina Nicolae and Anca Nemuc are two noted physicists specialized on environmental physics whose research interests include, among other subjects, the characterization of fresh and aged biomass burning events using multi-wavelength Raman lidar and mass spectroscopy [985]. Our survey of *Romanian Reports in Physics* continues with the article of I. Gottlieb, C. Mociutchi, G. Ciobanu, M. Gartu, V. Gartu, M. Colotin, and M. Agop on indefinite integrals in the theory of fractal space-time [986]. Next on our list of selected articles is that of Ion I. Cotăescu on Binet-type equations in general relativity [987]. Ion I. Cotăescu is a distinguished theoretical physicist, gifted professor and mentor to numerous young researchers from West University of Timișoara [988] whose research focused on external symmetry in general relativity [989] and partial wave analysis of Dirac fermions scattered from black holes [990,991], to select only two topics of interest. On the side of biophysics we refer here to the article of Irina Băran, Constanța Ganea and V. Băran on numerical studies on the activity of the muscle calcium channel [992]. Irina Băran and Constanța Ganea are two distinguished biophysicists from whose list of contributions we refer here to the work on the possible effects of external perturbations on cell proliferation [993] and those on leukemia Jurkat T cells [994,995]. We also mention the article of Adrian Ștefan Cârstea and A.T. Grecu on time delay effects on oscillatory signals in genetic repressilators with two promoters [996]. Adrian Ștefan Cârstea is a noted mathematical physicist specialized in nonlinear science and its applications [997]. Next on our selection is the article of Valentin Barna and collaborators on random laser effect in a new dye-nematic liquid crystalline composite [998]. Valentin Barna is a noted physicist with contributions on topics such as helixed liquid crystals embedded in holographically sculptured polymeric microcavities [999] and optical nanotomography of anisotropic fluids [1000], as well as co-ownership of an Italian Patent on the transient interface charged layer effect on the relaxation of electro-optic switching

in nematic liquid crystals [1001]. We continue the survey with the article of Sorin Miclos, Dan Savastru, and I. Lancranjan on numerical simulation of a fiber laser bending sensitivity [1002]. The research interests of Sorin Miclos and Dan Savastru also cover high-contrast 2D etched holes array obtained by direct laser writing on chalcogenide  $\text{As}_2\text{S}_3$  films [1003] and algorithms for mapping cutaneous tissue oxygen concentration using hyperspectral imaging [1004]. We end our survey of these two volumes with the article of B. Mitrica and collaborators that reports some studies of the high energy muon flux in Unirea salt mine from Slănic Prahova (Romania) [1005].

Our selection of the articles published in volume 63 of *Romanian Reports in Physics* starts with that of E. Firu, V. Bradnova, Maria Haiduc, A.D. Kovalenko, A.I. Malakhov, A.T. Neagu, P.A. Rukoyatkin, V.V. Rusakova, S. Vokal, and P.I. Zarubin on a study of peripheral collisions of the  $^{56}\text{Fe}$  at 1 A GeV/c in nuclear emulsion [1006]. Maria Haiduc is a distinguished astrophysicist specialized in cosmic radiation physics and heavy ions reactions [1007]. We continue our survey with the article of C.G. Popescu on the relation between vehicles traffic and heavy metals content from the particulate matters [1008], as well as that on educational physics by L. Dinescu, Cristina Miron, and E.S. Barna on new trends in motivating students to study physics [1009] and that of I. Stoica, S. Moraru, and Cristina Miron that discusses *Concept maps, a must for the modern teaching-learning process* [1010]. Cristina Miron is a noted physicist specialized in educational physics, a topic on which she published extensively [1011–1013]. Next on our list of selected papers is that of Mihail Mirea on microscopic treatments of fission inertia within the Woods-Saxon two center shell model [1014]. Mihail Mirea is a distinguished theoretical and computational nuclear physicist whose contributions cover spontaneous heavy-ion emissions (cluster decay), alpha and double-beta decays, nuclear fission, and microscopic cold fission [1015–1018]. We continue our survey with the article co-authored by A. Lupei, V. Lupei, C. Gheorghe, and A. Ikesue on spectroscopic investigations of  $\text{Sm}^{3+}$  in YAG ceramics [1019]. Next on our selection of papers published in 2011 is the article of A.I. Budaca and Ion Silișteanu on the use of alpha-decay as a sensitive tool to derive nuclear shell structure of superheavy nuclei [1020]. Ion Silișteanu is a distinguished theoretical nuclear physicist whose work is focused on proton, alpha, and cluster decays, as well as the properties of superheavy nuclei, to name only a few topics of interest [1021–1023]. Our survey continues with the article of A. Palla-Papavlu *et al.* on laser induced forward transfer for materials patterning [1024], and that of D. Grecu and A.T. Grecu on dust acoustic solitons in dusty plasmas with grain size distribution [1025]. We end the survey of papers published in volume 63 of *Romanian Reports in Physics* with the article of Alexandru I. Nicolin on Faraday waves in Bose-Einstein condensates [1026], which reflects the author's scientific contributions to the dynamics of ultra-cold quantum gases [1027–1030].

Our selection of articles from volumes 64 and 65 of *Romanian Reports in Physics* starts with that of M.C. Raportaru on the emergence of Faraday and resonant waves in driven Bose-Einstein condensates [1031] and continues with the article of M.E. Mihailov, M.I. Tomescu-Chivu, and V. Dima on Black Sea water dynamics on the Romanian littoral [1032]. We continue the survey with the article of Marius-Victor Bîrsan and co-authors on the observed trends in Romania's stream flow during the period 1976-2005 [1033]. Marius-Victor Bîrsan is a distinguished researcher working on climatology, time series analysis, and related topics [1034,1035]. Next on our list of selected articles is that co-authored by Dumitru Băleanu, J.H. Asad, and I. Petras on fractional-order two-electric pendulum [1036]. Dumitru Băleanu is a distinguished theoretical physicist specialized in fractional calculus and fractional differential equations, research topics on which he published extensively [1037,1038]. Our selection continues with the article of C. Kuncser, A. Kuncser, G. Maftai, and S. Antohe on computer assisted methods in teaching basics of magnetism at high-school level [1039] and, lastly, the article on the effect of boundary conditions on magnetization of a nanosize ferromagnet [1040] by Sergiu Cojocaru, a noted solid-state physicist [1041].

The selection of articles from volume 65, published in 2013, starts with that of M. Cuciuc, M. Ciubancan, V. Tudorache, Alexandra Tudorache, R. Paun, G. Stoicea and, Călin Alexa on building and testing an infrastructure for studying proton-proton collisions at TeV scale [1042], which takes us to the Romanian contribution to the group that found the first experimental evidence of the Higgs boson [1043]. For two of the authors in the aforementioned article published *Romanian Reports in Physics*, namely, Calin Alexa, a distinguished experimental particle physicist and Alexandra Tudorache, we mention their theoretical contribution in Ref. [1044]. We continue our survey with the article of D. Chicea *et al.* on *HAS particle size characterization by AFM* [1045] and that of C. Radulescu *et al.* on the assessment of heavy metals level in some perennial medicinal plants by flame atomic absorption spectrometry [1046]. Next on our list of articles is that of Andrei Bălă, a noted geophysicist, on the modeling of seismic site amplification based on in site geophysical measurements in Bucharest, Romania [1047]. We continue the survey with the article of Ioan I. Ursu and N.V. Zamfir on the novel research opportunities at IFIN-HH [1048]. Ioan I. Ursu is a distinguished nuclear scientist whose results include the description of the M1 state and the major collective bands and the semiclassical description of a sixth-order quadrupole boson Hamiltonian [1049,1050]. Our survey continues with the article of A. Isar on quantum entanglement of two-mode Gaussian system in a two-reservoir model [1051], and, finally, that of Iulia Ghiu on asymmetric telecloning of qubits using non-maximally entangled channels and on the transmission of the qubit information to two spatially separated observers [1052]. Iulia Ghiu is a noted researcher with significant contributions to the theory of many-to-many quantum communication of information [1053]. We continue our selection of articles with

that on nanoelectronics on a single atom sheet by Mircea Dragoman [1054], a reputed solid state physicist with substantial contributions to plasmonics and graphene-based quantum electronics [1055,1056]. Next on our survey is the article of H. Leblond, H. Triki, and D. Mihalache on ultrashort-soliton propagation in nonlinear optical media from a general quantum model [1057]. The aforementioned article announced the comprehensive review paper, published in *Physics Reports*, co-authored jointly by H. Leblond and D. Mihalache on *Models of few optical cycles solitons beyond the slowly varying envelope approximation* [1058]. We end our selection with the article coauthored by G. Salamu, F. Voicu, Nicolaie Pavel, Traian Dascalu, F. Jipa, and M. Zamfirescu on laser emission in diode-pumped Nd:YAG single-crystal waveguides realized by direct femtosecond-laser writing technique [1059]. Nicolaie Pavel and Traian Dascalu are two distinguished laser scientists recognized for their work on diode-pumped solid-state lasers [1060,1061]. We continue our selection of articles from volume 65 with that of G.C. Vasile *et al.* on the modeling the 2D plasmonic structures with active chalcogenide glass layer [1062] and that co-authored jointly by A. Staicu, A. Pascu, A. Nuta, A. Sorescu, V. Raditoiu, and Mihail Lucian Pascu on phthalocyanine photosensitizers that can be used in photodynamic therapy [1063]. Mihail Lucian Pascu is a distinguished laser scientist specialized in basic research on tunable lasers, optical and laser spectroscopy studies in micro- and nano-biomedicine and nano-pharmacology, and the development of methods to monitor environment pollutants using laser spectroscopy methods, see Refs. [1064,1065] for some of his relevant works.

Looking at volumes 66 and 67, published in 2014 and 2015, respectively, we notice the article of Aurel I. Popescu, D.M. Gazdaru, C.G. Chilom, and M. Bacalum on biophysical interactions and their paramount importance for life [1066]. Aurel I. Popescu is a distinguished biophysicist and a gifted professor, appreciated by both graduate and undergraduate students, whose research contributions cover, among other topics, the properties of transbilayer pores induced by thickness fluctuations, as well as bionics, biological systems and the principle of optimal design [1067,1068]. We continue the survey with the article of T.E. Pahomi, A. Neacșu, M. Mirea, and S. Stoica on phase space calculations for  $\beta^-$  decays [1069] and that of S. Gosav and M.L. Birsa on multivariate study of flavonoids active against Caco-2 colon carcinoma [1070]. Next on our list of selected papers is that of M. Rogozea, Gheorghe Mărmureanu, Mircea Radulian, and D. Toma on the earthquake on January 23rd, 1838, in the Vrancea region of Romania [1071]. Gheorghe Mărmureanu and Mircea Radulian are two distinguished Romanian seismologists whose research interests are focused mainly on characterization of seismogenic zones of Romania, geodynamics and intermediate-depth seismicity in Vrancea region of Romania, and assessment of seismic hazard in Romania, subjects on which they published extensively [1072–1074]. On the side of physics education we mention here the article of

Anamaria Trandafir, Adrian Trandafir, Corneliu I. Oprea, and Mihai A. Gîrțu on an educational approach to modeling conjugated dyes for dye-sensitized solar cells, which details an elementary tight-binding method for simple electronic structure calculations [1075]. Mihai A. Gîrțu is a distinguished materials scientist with significant contributions to magnetic materials [1076–1078]. Corneliu I. Oprea is a noted material scientist with contributions on the density functional theory [1079]. We continue our survey with the article of A. Neculae, R. Giugiulan, Mădălin Bunoiu, and M. Lungu on the effects of fluid flow velocity upon nanoparticle distribution in microfluidic devices under dielectrophoresis [1080]. Mădălin Bunoiu is a noted materials scientist specialized in crystal growth and crystal characterization [1081–1083]. We continue the survey with the article of L. Barbes *et al.* on spectrometric characterisation of polymeric materials [1084], that of Camelia Vișan on spin transport in graphene-boron nitride hybrid materials [1085], and, lastly, that of L. Davidova, Sz. Boda, and Zoltan Néda on order-disorder transitions in a minimal model of self-sustained coupled oscillators [1086]. Zoltan Néda is an outstanding theoretical physicist specialized in the statistical physics of complex systems, a subject on which he received broad international recognition. Among his most important contributions we mention here those on stochastic resonances in Ising systems [1087], self-organization in hands clapping [1088], spiral cracks in drying precipitates [1089], and, most importantly, the evolution of the social network of scientific collaborators [1090]. Next on our list of selected articles is the lengthy review on Bose-Einstein condensation co-authored by V.S. Bagnato, D.J. Frantzeskakis, P.G. Kevrekidis, B.A. Malomed, and D. Mihalache, entitled *Bose-Einstein condensation: Twenty years after* [1091]. The review is part of a number dedicated to the twentieth celebration of the experimental achievement of Bose-Einstein condensation from which we also mention the article of A.I. Nicolin *et al.* on effective low-dimensional polynomial equations for Bose-Einstein condensates [1092]. From the next number of the volume we mention the article of A. Olacel, Cătălin Borcea, A. Negreț, and O. Sima on Monte Carlo simulations for the efficiency of two HPGe detectors in close geometry [1093]. Cătălin Borcea is an outstanding experimental nuclear scientist and gifted mentor to numerous young scientists, with broad research interests covering accelerator physics, nuclear reactions and nuclear structure [1094,1095]. Next on our list of selected paper is that of Vasile A. Popescu and Nicolae N. Pușcaș on the propagation characteristics in a new photonic fiber-based plasmonic sensor [1096], which is representative for the research profiles of the two authors who are acknowledged experts in the field of plasmonics and plasmonic sensors [1097]. We continue our selection of articles with that of V. Tiron, I.L. Velicu, F. Gheorghiu, and Gheorghe Popa on the influence of both magnetic field strength and gas pressure on sheath properties in high-power impulse magnetron sputtering discharge [1098]. Gheorghe Popa is a distinguished plasma physicist and gifted professor, well known for his works on plasma

instabilities and magnetron discharges, as well as stimulation of wound healing using plasma treatments [1099–1101]. From the following number of the volume we have selected for our survey the computational physics article of O. Budriga, E. D'Humieres, and Cătălin M. Ticoș on simulations for protons and electrons acceleration with the 1 PW laser pulse from CETAL facility [1102]. Cătălin M. Ticoș is a distinguished laser physicist whose fields of expertise include plasma physics, particle beams and particle acceleration, and the accompanying computational methods, see Refs. [1103,1104] for two of his most important papers. From the same number we also mention the article on quantum information and quantum technologies of Radu Ionicioiu [1105], a distinguished theoretical quantum physicist [1106] whose research contributions cover, among others, mesoscopic Stern-Gerlach devices [1107] and the efficient sorting of quantum systems [1108]. Let us also mention the article of Virgil Florin Duma, G. Dobre, D. Demian, R. Cernat, C. Sinescu, F.I. Topala, M.L. Negrutiu, G. Hutiu, A. Bradu, and Adrian G. Podoleanu on handheld scanning probes for optical coherence tomography [1109]. Virgil Florin Duma is a distinguished researcher and a gifted professor at Aurel Vlaicu University of Arad [1110], whose research interests cover optomechanics and optomechatronics at large, see Refs. [1111–1114] for some of his relevant works. Adrian G. Podoleanu is an outstanding optical physicist and engineer, whose research interests cover a broad spectrum of topics going from his early studies on laser physics and engineering to his more recent high-impact investigations in biomedical optics, with special focus on optical coherence tomography (OCT), imaging the eye, and distance measurements using low coherence interferometry [1115–1117]. We end the survey of volume 67 with the article of G. Popescu-Pelin, Doina Crăciun, G. Socol, D. Cristea, L. Floroian, M. Badea, M. Socol, and Valentin Crăciun on some investigations of pulsed laser deposited TiN thin films for titanium implants [1118]. Doina Crăciun and Valentin Crăciun are two distinguished laser physicists working in materials science, whose research interests cover the growth and characterization of thin films at large, see Refs. [1119–1122] for a selection of some of their results.

We end our historical survey of the articles published in *Romanian Reports in Physics* with volumes 68 and 69 of the journal. We start with the first number of volume 68 and point out the article of Ciprian A. Sporea and Dumitru N. Vulcanov on using Maple and GRTensorII in teaching basics of general relativity and cosmology [1123], which is indicative of the research direction in general relativity at the Faculty of Physics of West University of Timișoara [1124,1125]. We continue our selection with the article of Irina Zgura, Ștefan Frunza, L. Frunza, M. Enculescu, C. Florica, V.F. Cotorobai, and C.P. Ganea on polyester fabrics covered with amorphous titanium dioxide layers [1126]. The topic of this article is representative for the research profile of Ștefan Frunză, an outstanding materials scientist who made significant contributions to the confinement of liquid crystals in molecular sieves [1127] and the dynamics of surface layer in octylcyanobiphenyl-

aerosol systems [1128]. Irina Zgura is a noted material scientist with contributions on the temperature dependence of the density of some liquid crystals in the alkyl cyanobiphenyl series [1129]. Next on our list of articles is that of A. Pantazi, S. Palade, C. Berbecaru, M. Veca, A. Dinescu, V. Schiopu, O. Oprea, and Daniela Dragoman on dielectric properties of composites containing silicone rubber and multiwall carbon nanotubes decorated with gold [1130]. Daniela Dragoman is a distinguished theoretical solid-state physicist with broad scientific contributions, which include those on terahertz fields and applications [1131], the giant thermoelectric effect in graphene [1132], and the use of the Wigner distribution function in optics and optoelectronics [1133]. We end our survey of the articles published in volume 68 with that of R. Casadio, Octavian Micu, and F. Scardigli on the horizon wave function [1134].

Our survey of volume 69 of *Romanian Reports in Physics*, published in 2017, starts with the article of Nicușor Arsene, Laurențiu-Ioan Caramete, P.B. Denton, and Octavian Micu on quantum black holes effects on the shape of extensive air showers [1135] that is indicative of the research on general relativity at the Institute of Space Sciences. We mention next the article of Laura Ionel and Marian Zamfirescu on the design of periodic structures in a multiple beam interference scheme [1136]. Marian Zamfirescu is a distinguished laser scientist [1137,1138] whose research interests now cover ultrafast lasers and their applications. From the same number of volume 69 we mention as well the topical overview of D. Mihalache on multidimensional localized structures in optical and matter-wave media [1139] and the article of L.M. Trinca, C. Besleaga, V. Stancu, R. Radu, A. Iuga, A.G. Boni, A.C. Galca, and Lucian Pintilie on the influence of temperature on the capacitance-voltage hysteresis of a transparent heterostructure material [1140]. Lucian Pintilie is a distinguished materials scientist with broad scientific contributions, which include studies on metal-ferroelectric-metal heterostructures with Schottky contacts and ferroelectric polarization-leakage current dependence in high quality thin films [1141,1142]. We end our survey of volume 69 with the article of A.E. Baci, E. Uyy, V.I. Suica, R.M. Boteanu, A.I. Popescu, C. Giulea, D. Manda, C. Badiu, and F. Antohe on proteomic analysis of plasma molecular markers as predictors of differentiated thyroid cancer [1143].

As our selection of articles covers the research topics largely representative for *Romanian Reports in Physics*, there are some unavoidable omissions with respect to the full picture of the Romanian physics community. To get a grasp on the evolution of the Romanian scientific community over the past three decades, with special emphasis on physics research, we recommend the volumes authored or edited by Petre T. Frangopol and coworkers that scrutinize the Romanian research and higher-education [1144–1151].

### 3.1 Technical Design Reports of *Extreme Light Infrastructure – Nuclear Physics (ELI-NP)*

We have omitted from the previous survey the Technical Design Reports (TDRs) of the *Extreme Light Infrastructure – Nuclear Physics (ELI-NP)* experimental facility, which were published in volume 68 of *Romanian Reports in Physics* as a Special Number. We start the list of TDRs with that of Florin Negoită, Dan Stutman and colleagues on laser driven nuclear physics [1152]. Florin Negoită is a distinguished experimental nuclear physicist specialized in the structure of nuclei far from stability [1153,1154], while Dan Stutman is an outstanding plasma physicist specialized in plasma spectroscopic diagnostics, X-ray optics, as well as imaging and fusion plasma physics, see Refs. [1155,1156] for two of his most important contributions. The next TDR on our selection is that of Ion Cristian Edmond Turcu, Daniel Ursescu and colleagues on high field physics and QED experiments [1157]. Ion Cristian Edmond Turcu is an outstanding laser scientist with a long experience in X-ray generation with high power lasers [1158,1159]. Daniel Ursescu is an accomplished laser physicist with significant contributions on ultra-short laser pulses [1160]. The following two TDRs on our selection are those by K. Homma *et al.* on combined laser gamma experiments [1161] and H.R. Weller, Călin Alexandru Ur and colleagues on gamma beam delivery and diagnostics [1162]. Călin Alexandru Ur is a distinguished experimental nuclear physicist with contributions on excited states in  $^{52}\text{Fe}$  and the origin of the yrast trap at  $I^\pi=12^+$  [1163] and the shell-model description of  $N$  approximately equal to  $Z$   $I_{f_{7/2}}$  nuclei [1164]. Let us now mention the TDR of F. Camera *et al.* on gamma above the neutron threshold experiments [1165], that of D.L. Balabanski and colleagues on photofission experiments [1166], and that of Ovidiu Teșileanu *et al.* on charged particle detection [1167]. Ovidiu Teșileanu is a noted astrophysicist [1168] whose research interests now focus mainly on nuclear physics. Lastly, we end our survey of the TDRs with that of N. Djourelov *et al.* on positron production by gamma beam [1169] and that of I.O. Mitu *et al.* on radiation protection and safety at ELI-NP [1170].

### 3.2 Articles on the preservation, conservation, and restoration of Romanian cultural heritage

The use of physical and analytical methods in the study of art and archaeological objects can provide qualitative and quantitative information that shed light on the life of our ancestors, as well as the skills and resources of the ancient craftsmen. Such knowledge can be useful to determine the raw materials, to understand the manufacturing techniques of archaeological items (composition and inner structure), to trace back their provenance and to identify geological sources, to date artifacts, to test the authenticity of objects proposed for acquisition to the Romanian museums and, lastly, to prepare and carry out restoration and

conservation procedures. All these objectives are common to a large community of people working in the field of archaeometry, which uses scientific methods in art and archaeology. This type of applied research has a multidisciplinary character, the synergy between the actors carrying such scientific studies (physicists, chemists, geologists, biologists, archaeologists, curators, art historians, and restorers) being essential for establishing long-term successful collaborations.

We start our survey of the articles published by *Romanian Reports in Physics* on the general topic of preservation, conservation, and restoration of cultural heritage with that co-authored by Bogdan Constantinescu *et al.* on the applications of X-ray based elemental analysis methods for studies on Romanian gold minerals [1171], research performed in order to establish the provenance of the raw materials for the very ancient gold artifacts from Romanian museums. The group of Bogdan Constantinescu used successfully X-ray based elemental analyses to characterize the Pietroasa hoard [1172], and the Transylvanian gold nuggets [1173]. Next on our list of articles is that of Angela Vasilescu and Bogdan Constantinescu on X-ray fluorescence compositional microanalysis for provenance studies of metallic artifacts [1174], an analysis that the group of Bogdan Constantinescu applied for the determination of pigments used for Neolithic ceramics [1175], as well as ancient glass and ceramics [1176], medieval silver coins [1177], gold from the Cavnic ore deposit in Baia Mare, Romania [1178], ancient bronze, silver and obsidian artifacts [1179], Byzantine pottery from Harsova-Carsium, Romania [1180], and pre-monetary signs from Histria and of Agighiol hoard [1181]. We continue our selection with the article of Bogdan Constantinescu *et al.* on studies of Transylvanian native gold samples from Rosia Montana and Cavnic deposits using the micro-Particle Induced X-ray Emission (micro-PIXE) technique [1182] and the work of Roxana Bugoi *et al.* on the ion beam analysis studies of ancient glass bracelets discovered in Bucharest [1183]. The group has performed similar analyses on the gold Dacian bracelets [1184–1187] and on glass bracelets from Nufăru, Romania [1082]. Next on the list of articles published by *Romanian Reports in Physics* is that by A. Vasilescu *et al.* on elemental characterization of Bronze Age copper objects by micro-beam measurements [1188] and that of R. Bugoi *et al.* on archaeometallurgical studies of Bronze Age objects from the Romanian cultural heritage [1189]. On a related research topic we mention here the article by Sister Serafima and coworkers on Fourier-transform infrared spectroscopy, X-ray fluorescence and optical microscopy analysis of the painting layer of an early 19th century icon [1190], and that of M. Simileanu on laser-induced breakdown spectroscopy quantitative analyses of bronze objects for cultural heritage applications [1191]. We note now the article of A.A. Balog *et al.* from Cluj-Napoca, which reports an analysis of limestone from heritage buildings as a means to assess damage [1192]. Next we mention the article on the composition of the Isaccea mosaic tesserae by R. Bugoi *et al.* [1193], which is related thematically to another article, in joint cooperation of

the Romanian group of Bogdan Constantinescu with researchers from France, on the glass bracelets from Isaccea [1194]. We end the survey with the paper of C. Armeanu on image reconstruction with back filtered projection algorithms used in cultural heritage imaging investigations [1195] and that of D. Cristea-Stan *et al.* on the application of X-ray fluorescence elemental analysis for mural painting restoration of Oteteleşeanu church in Măgurele, Romania, realized by Gheorghe Tătărescu [1196].

### 3.3 Special Numbers of *Romanian Reports in Physics*

Outside of the regular issues of the journal let us note that there have also been a series of Special Numbers, which had great impact in the physics community, from which we have selected the following:

- Proceedings of the IVth National Workshop on *Magnetic Fluids and Application*, published in Volume 47, Numbers 3-5, 1995, edited by I. Anton (Guest Editor)
- *Annual Scientific Session of the Faculty of Physics, University of Bucharest*, in two parts, published in Volume 48, Numbers 5-6 and 7-8, 1996, edited by Iancu Iova (Guest Editor)
- *Ion Agârbiceanu (1907-1971)*, A volume dedicated to his 90th birthday commemoration, published in Volume 49, Numbers 8-9-10, 1997, Foreword by Valentin I. Vlad and Nicholas Ionescu-Pallas
- *Annual Scientific Session of the Faculty of Physics, University of Bucharest*, published in Volume 50, Numbers 7-8-9, 1998, Foreword by Voicu Grecu
- Volume dedicated to the memory of Professor Horia Hulubei, published in Volume 51, Numbers 7-8-9-10, 1999, edited by Tatiana Angelescu and Anișoara Constantinescu (Guest Editors)
- Issue dedicated to Academician Andrei Andriesh on his 65th anniversary, published in Volume 51, Numbers 3-4, 1999, edited by Mihai Popescu (Guest Editor), Foreword by Radu Grigorovici
- *Professor Th. V. Ionescu (1899-1988). A volume dedicated to his 100th birthday commemoration*, published in Volume 52, Numbers 5-6-7 and 8-9, edited by Nicolae N. Gherbanovschi (Guest Editor), Foreword by Octav Gheorghiu and Nicolae N. Gherbanovschi
- Volume dedicated to Geavit Musa on his 70th anniversary, in two parts, published in Volume 54, Numbers 1-5 and Numbers 6-10, 2002, edited by Bianca Cudalbu (Guest Editor)
- *Annual Scientific Session of the Faculty of Physics, University of Bucharest, Bucharest-Magurele, May 28, 2004*, published in Volume 56, Number 4, 2004, edited by Sabina Ștefan (Guest Editor)
- Special Issue on *Contributions in Physics Research in The World Year of Physics*, published in Volume 57, Number 4, 2005, Foreword by Valentin I. Vlad

- Professor Marin Ivaşcu's 80th anniversary, published in Volume 63, Supplement, 2011
- Honoring Academician Ioan-Iovitz Popescu on his 80th anniversary, published in Volume 64, Supplement, 2012, Foreword by Gabriel Altmann
- Professor Valentin I. Vlad at his 70th anniversary, published in Volume 65, Number 3, 2013, Foreword by Dumitru Mihalache and Adrian Petris
- *Bose-Einstein Condensation: Twenty Years After*, published in Volume 67, Number 1, 2015, edited by V. S. Bagnato (Guest Editor), D. J. Frantzeskakis (Guest Editor), P. G. Kevrekidis (Guest Editor), B. A. Malomed (Guest Editor), D. Mihalache, and A. I. Nicolin
- *2015 International Year of Light*, published in Volume 67, Number 4, 2015, edited by V. I. Vlad
- *Technical Design Reports of Extreme Light Infrastructure - Nuclear Physics (ELI-NP)*, published in Volume 68, Supplement, 2016, Foreword by N.V. Zamfir.

#### 4. RESEARCH INFRASTRUCTURES AND SCIENTIFIC COMPUTING

Inspecting the archive of *Studii și Cercetări de Fizică*, one easily notices that a significant fraction of the published papers are devoted to experimental results obtained using the large-scale research infrastructures located on the Măgurele Physics Campus, that resulted from ambitious policies focused on developing Romanian experimental facilities within international cooperation. These research infrastructures were initially located at the premises of The Institute of Atomic Physics and were then inherited by research institutes that later emerged from it. Chief among these infrastructures of the Institute of Atomic Physics was the 2000 kW VVR-S reactor discussed by I. Purica in Ref. [98] with respect to its transient regimes, by A. Ștefănescu in the context of neutron flux in the active zone of the reactor [144], by Th. Roșescu and M. Sabău who discuss in Ref. [158] the extension of its experimental capabilities, and, lastly, by L. Schächter in his study focused on the measurement of  $\gamma$  fluxes in the vertical channels of the reactor [197]. Next on the list were, in order of their appearance in *Studii și Cercetări de Fizică*, the neutron crystal spectrometer described by D. Bally, E. Țarină, S. Todireanu, and I. Olteanu in Ref. [121], the betatron whose electron injector was discussed by G. Baciuc in Ref. [188], and the neutron diffractometer presented by Z. Gheorghiu, N. Duțescu, A. Gelberg, and D. Bally in Ref. [271].

Starting with 1969 we notice several papers, published in *Studii și Cercetări de Fizică*, devoted to a series of Romanian lasers produced in the group of Ion I. Agârbiceanu. The first Romanian lasing effect was obtained in the group of Ion I. Agârbiceanu on October 20th 1962 and was announced to the scientific community at the Third International Congress on Quantum Electronics organized by P. Grivet and N. Bloembergen in Paris, February 11-15, 1963. The creation of the first Romanian lasers, shortly after that built in 1960 by Theodore H. Maiman,

was a unique scientific and engineering accomplishment that showed the impressive level of scientific excellence reached by the relatively young Romanian laser community of that period. Among the first papers published in *Studii și Cercetări de Fizică* reporting the creation of Romanian lasers is that describing the laser with luminescent discharge in a tubular cathode, authored jointly by I. Agârbiceanu, A. Preda, A. Agafiței, and V. Vasiliu, see Ref. [272], and that reporting the He-Ne laser created by A. Agafiței, A. Chetroiu, and V. Vasiliu, see Ref. [301].

On a research direction directly related to the history of the infrastructures on the Măgurele Physics Campus let us mention the article of Mihail Bălănescu on pre-compressed concrete recipients for nuclear reactors [335]. We continue our survey of articles devoted to research infrastructures with that of D. Apostol, V. Blaj, A. Ionescu, M. Ristici, and S. Tutelea on the LG-500 He-Ne laser [416] and that of A.I. Ciura, Eva Cojocar, and I.M. Popescu on the He-Cd II laser [420]. Our survey continues with the Tandem accelerator of the Institute of Atomic Physics whose energy calibration was described by C. Ciortea, B. Constantinescu, S. Dobrescu, and M. Petrașcu in Ref. [446]. Next on the list are two articles on He-Ne lasers by I.M. Popescu, A.Gh. Podoleanu, M.A. Dumitru, and P.E. Sterian, see Ref. [571], and by V.M. Cătuneanu, A.Gh. Podoleanu, and P.E. Sterian, see Ref. [572], and one paper on solid-state lasers with thermally induced lens in the dynamical stability zones co-authored by V. Ioniță-Mânzatu, N. Pavel, and V. Lupei [677]. We continue our survey with the article of D. Bucureșcu *et al.* on the recoil mass spectrometer of the Institute of Atomic Physics and the questions it can answer [703], that of M. Ristici *et al.* on a green He-Se laser emission [765], and, finally, the historical one of S. Dobrescu *et al.* on the first thirty years of experimental investigations at the Bucharest Tandem accelerator [913].

As shown by the previous selection of articles, the scientific community of experimental physicists and engineers in the Măgurele Physics Campus excelled and received broad international recognition in nuclear physics and laser physics and engineering. There are, of course, other research areas where the Romanian researchers and engineers achieved notable results, but this two-folded scientific tradition of the Romanian physics community gave birth to the *Extreme Light Infrastructure – Nuclear Physics (ELI-NP)* European facility. This European facility, now in its implementation phase within the premises of Horia Hulubei National Institute for Physics and Nuclear Engineering, is the most important research infrastructure on the landscape of Romanian science, which bridges between the aforementioned research fields, as detailed in the ELI-NP Technical Design Reports, and establishes, in fact, an exciting emergent research direction: *Nuclear Photonics* [1197-1199].

The impressive scientific results, both theoretical and experimental, obtained over the past seven decades from the Măgurele Physics Campus have benefited greatly from the emergence and subsequent development of computers and

scientific computing. The founding father of computer engineering in Romania was Victor Toma (born: 1922, deceased: 2008), elected Honorary Member of The Romanian Academy in 1993. Victor Toma coordinated the team that designed and realized CIFA 1 (*Calculatorul Institutului de Fizică Atomică 1*), the first Romanian computer and, in fact, one of the first computers in Eastern Europe [1200,1201]. Following the creation of CIFA 1, as well as that of its subsequent siblings (see the monograph and the historical account of Dragoş Vaida on the computers made at the Institute of Atomic Physics [1202,1203]), and the acquisition of IBM 370/135 computer [1204,1205], we notice a series of articles in *Studii și Cercetări de Fizică* dedicated to numerical methods and scientific computing at large. To glance at the computing themes of interest within the Măgurele Physics Campus we mention here the pioneering article of Th. Roşescu on matrix computations for nuclear reactors [230], that of M. Pavelescu on numerical methods for solving the neutron transport equation [262], and those of C. Deberth and B. Cîrstoiu on the computations of photonuclear effective cross-sections [359]. From the articles published after 1990, when scientific computing was a well-established research direction, we mention here that of Sabina Ştefan and D. Borşa on the numerical simulation of the processes that take place in fog [666], that article of O.G. Dului on computer simulation of the electron paramagnetic resonance spectra in polycrystalline and vitreous samples [747], and the article of Mihaela Enescu, S. Amarande, I. Farcas, and C. Vasilescu on computer simulation of the modal distribution inside a folded resonator [767]. On the same direction we mention here the article of V. Hristea, M. Constantin, and V. Balaceanu on the development of some numerical algorithms for solving transport equations [788], that of D. Ghilencea, O. Toader, and C. Diaconu on numerical evaluation of Coulomb Born approximation for double bremsstrahlung [789], and, lastly, that of B. Mitrica and coworkers on experimentally guided Monte Carlo calculations of the atmospheric muon flux [939]. The aforementioned articles reflect a strong tradition in scientific computing within the Măgurele Physics Campus, the expertise of the current groups working in the field now covering both high-throughput computing (HTC) [1206–1211], mostly for the computational support of the experiments at CERN [1212], and high-performance computing (HPC) [1213] for a broad set of research topics that go from biophysics and soft-matter physics on one end, to laser-plasma interaction and nanoscience on the other end [1214]. The scientific and technological developments that led to more effective implementations of advanced information and communication technologies over the past decade resulted in a surge of computational investigations and pan-European collaborations involving the Research Institutes on the Măgurele Physics Campus [1215].

## 5. PRESENTATION OF THE CURRENT NUMBER

To celebrate the publication of the seventieth volume of *Romanian Reports in Physics*, the current Special Number gathered a series of articles that address recent developments and topical reviews in the field of experimental, computational, and theoretical physics. The diversity of the articles gathered in this volume reflects the broadness of the scientific coverage of the journal over the previous sixty-nine volumes, and is in itself a twofold sign of the maturity of the Romanian physics community and of the appeal that the journal has within the international community.

In the following paragraphs we present a short synopsis of the articles in this volume:

1. S. Chen *et al.*, *Special types of elastic resonant soliton solutions of the Kadomtsev-Petviashvili II equation*, Rom. Rep. Phys. **70**, 102 (2018)

The article [1216] introduces special types of exact two- and three-soliton solutions of the Kadomtsev–Petviashvili II equation in terms of hyperbolic cosines. The key features of line solitons in the far region were characterized analytically. Under special conditions, an isolated bump in the interaction center may arise, which is much higher in amplitude than the surrounding line solitons. These results are of interest in the context of generating extreme high-amplitude waves, in a reservoir of small waves, based on nonlinear interactions between the involved waves.

2. A. Isar, *Dynamics of quantum interferometric power in Gaussian open systems*, Rom. Rep. Phys. **70**, 103 (2018)

The paper [1217] describes the dynamics of the quantum interferometric power in systems with two bosonic modes immersed in a thermal reservoir, using the theory of open systems based on completely positive quantum dynamical semigroups. It is shown in the article that, independent of the initial state, the Gaussian interferometric power is monotonically decreasing in time, and in the limit of large times it asymptotically decreases to a zero value.

3. I. Ghiu, *Entanglement versus quantum degree of polarization*, Rom. Rep. Phys. **70**, 104 (2018)

The article [1218] presents a comparison between the behavior of entanglement and quantum degree of polarization for the Bell-type diagonal mixed states of the radiation field. In the case of three-photon mixed states, the concurrence and the Chernoff quantum degree of polarization are shown. It is also found that the entanglement and the quantum degree of polarization are incomparable measures.

4. S. Micluta-Campeanu *et al.*, *Fingerprints of global classical phase-space structure in quantum spectra*, Rom. Rep. Phys. **70**, 105 (2018)

The article [1219] considers a model based on two coupled fourth-order oscillators that describes the intrinsic quadrupole vibrations of atomic nuclear surface in order to

investigate the classical-quantum correspondence. We explore the role of the classical phase-space structure upon the statistical properties of energy levels distribution of the associated quantum system. A mixed distribution function, encoding two possible mechanisms for energy levels generation is proposed. Its features can be related to the relative weight of the regular and irregular volumes in the classical phase-space.

5. M. Mirea and A. Sandulescu, *Fission times and pairing properties*, Rom. Rep. Phys. **70**, 201 (2018)

The article [1220] reports calculations of fission times and pairing properties of  $^{232}\text{Th}$ , along a fission trajectory that connects the ground state of the parent nucleus to the scission configuration. The fission trajectory is obtained from the least action principle, while for the rearrangement of the single particle level scheme the Woods-Saxon two-center shell model is employed.

6. C. Ishizuka, S. Chiba, and N. Carjan, *Charge polarization and the elongation of the fissioning nucleus at scission*, Rom. Rep. Phys. **70**, 202 (2018)

The paper [1221] presents calculations on the charge polarization and the elongation of the fissioning nucleus at scission. To this end the deviation of the charge of a fission fragment from the unchanged charge distribution is determined by minimizing the total macroscopic energy at scission. An analytical formula for the deviation of the charge of a fission fragment is deduced and applied to the nucleus  $^{236}\text{U}$  at different mass divisions. The formula is shown to be in good qualitative and quantitative agreement with the experimental data for  $^{235}\text{U}(n_{\text{th}}, f)$  reaction.

7. M.C. Raportaru *et al.*, *Cross sections for electron capture in  $\text{Li}^{3+} + \text{H}(1s)$  collisions in Debye plasmas*, Rom. Rep. Phys. **70**, 203 (2018)

The article [1222] discusses the electron capture process for collisions of the  $\text{Li}^{3+}$  ions with hydrogen atoms in their ground state in Debye plasmas using the two-center atomic orbital close-coupling method. The plasma-screened interaction of the electron with the two centers is represented through the Debye-Hückel potential, which is known to describe a wide class of laboratory and astrophysical plasmas.

8. A.H. Fariborz, R. Jora, and S. Nasri, *Mass Ansätze for the Standard Model fermions from a composite perspective*, Rom. Rep. Phys. **70**, 301 (2018)

The paper [1223] considers a composite model in which the Standard Model fermions are bound states of elementary spin 1/2 particles, namely the preons, which are situated in the conjugate product representation of the color group. Two mass Ansätze are proposed, one for leptons and the other one for quarks, which provide an adequate description of the known Standard Model fermion masses.

9. S.V. Sazonov, *Optical solitons in systems of two-level atoms*, Rom. Rep. Phys. **70**, 401 (2018)

The article [1224] presents a topical review on the derivation of nonlinear evolution equations that describe the interaction of laser pulses with two-level atoms and have solutions of optical soliton type. The discussion is focused on the propagation regimes

of the solitons, with emphasis on resonant and quasi-resonant envelope solitons, as well as few-optical-cycle solitons, with different temporal durations.

10. M. Salhi *et al.*, *Broadly peak power and pulse width tunable dissipative soliton resonance generation in figure of eight fiber laser*, Rom. Rep. Phys. **70**, 402 (2018)

The paper [1225] reports the experimental realization of a broadly tunable dissipative soliton resonance dual-amplifier figure-of-eight fiber laser emission. To this end, the peak power is tuned continuously from 8.8 to 41.4 W by the first amplifier and pulse width from 84 to 416 ns by the second one.

11. N.N. Konobeeva and M.B. Belonenko, *Influence of initial shape of three-dimensional few-cycle optical pulse on its propagation in topological insulator thin films*, Rom. Rep. Phys. **70**, 403 (2018)

The article [1226] reports a series of numerical results on the propagation of three-dimensional few-cycle optical pulses in topological insulator thin films using an effective long-wave Hamiltonian for low temperatures. The analysis of the propagation dynamics is performed for input beams of Gaussian, Bessel, and Airy types.

12. V.A. Popescu, *Application of a transfer matrix method to hollow-core Bragg fiber with a gold layer*, Rom. Rep. Phys. **70**, 404 (2018)

The paper [1227] discusses a hollow-core Bragg fiber with a thin gold layer that is instrumental in the transmission of high-power laser pulses due to very low loss, as a result of the confinement in the core of the fiber. Following a series of detailed theoretical investigations, it is shown that when a high index material positioned just before the outermost region of a hollow-core Bragg fiber is replaced by a gold layer, the optical confinement for the mode in the core is increased about ten times. However, if the gold layer is located between the first and the penultimate layer, the loss for the same mode is increased.

13. M. Meisterhans *et al.*, *Silicon microring within a fiber laser cavity for high-repetition-rate pulse train generation*, Rom. Rep. Phys. **70**, 405 (2018)

The article [1228] reports investigations into the generation of trains of short optical pulses whose repetition frequency is determined by the free spectral range of a silicon microring resonator embedded into a fiber laser cavity. Due to the selection of microresonator in a silicon-on-insulator chip, the repetition frequencies of the pulse trains range from 110 GHz to 450 GHz. The article also reports multiple pulses generated in the microresonator and laser lines nonlinear broadening.

14. M. Tlidi and K. Panajotov, *Cavity solitons: Dissipative structures in nonlinear photonics*, Rom. Rep. Phys. **70**, 406 (2018)

The paper [1229] is akin to a resource article on the formation of dissipative structures in various out-of-equilibrium systems, as well as the generation and key dynamical features of optical cavity solitons. Among the systems discussed in this paper we mention here passive resonators (such as optical fibers), whispering gallery mode

cavities, integrated ring resonators, left-handed materials, and vertical cavity surface emitting lasers with or without saturable absorption.

15. V. Ceban and M.A. Macovei, *Enhanced cooling for stronger qubit-phonon couplings*, Rom. Rep. Phys. **70**, 407 (2018)

The article [1230] shows in detail, by theoretical means, how cooling effects impact opto-mechanical systems beyond the secular approximation. To this end, a laser-driven two-level quantum dot embedded in a phononic nano-cavity is investigated in the regime of moderately strong quantum-dot-phonon interactions.

16. P. Li, L. Li, and D. Mihalache, *Optical solitons in PT-symmetric potentials with competing cubic-quintic nonlinearity: existence, stability, and dynamics*, Rom. Rep. Phys. **70**, 408 (2018)

The paper [1231] addresses the properties of optical solitons that are supported by media with competing cubic-quintic nonlinearity and parity-time-symmetric complex-valued external potentials. The underlying model describes the propagation of solitons in nonlinear optical waveguides with balanced gain and loss. Results are reported on the existence, stability, and robustness of fundamental, dipole, and multipole solitons in parity-time-symmetric systems.

17. D. Susan-Resiga and L. Vekas, *From high magnetization ferrofluids to nano-micro composite magnetorheological fluids: properties and applications*, Rom. Rep. Phys. **70**, 501 (2018)

The article [1232] overviews a series of experimental results, obtained mainly by the authors, on the synthesis and high magnetization ferrofluids and ferrofluid-based magnetorheological fluids. The survey covers the structural characteristics at nanometer level, colloidal behavior in specific environments, magnetic and flow behavior of a large variety of ferrofluids, and some newly developed nano-micro composite magnetizable fluids. The aforementioned results were obtained using a variety of experimental techniques such as transmission electron microscopy, X-ray photoelectron spectroscopy, dynamic and static light scattering, small angle neutron scattering, small angle X-ray scattering, vibrating sample magnetometry, Mössbauer spectroscopy, rheo-magnetorheometry, chemi-luminescence, and differential scanning calorimetry.

18. H. Sakaguchi *et al.*, *Composite solitons in two-dimensional spin-orbit coupled self-attractive Bose-Einstein condensates in free space*, Rom. Rep. Phys. **70**, 502 (2018)

The paper [1233] reviews some key properties of two-dimensional matter-wave solitons governed by a spinor system of Gross-Pitaevskii equations with cubic nonlinearity, including spin-orbit coupling and Zeeman splitting. Unlike the collapse instability typical for the free space, spin-orbit coupling gives rise to stable solitary vortices. Existence and stability domains for the soliton families are presented in terms of experiment-related quantities.

19. J. d'Ambroise, D.J. Frantzeskakis, and P.G. Kevrekidis, *Traveling dark-bright solitons in a reduced spin-orbit coupled system: application to Bose-Einstein condensates*, *Rom. Rep. Phys.* **70**, 503 (2018)

The article [1234] explores the potential of spin-orbit coupled Bose-Einstein condensates to support multi-component solitonic states in the form of dark-bright solitons. For the case when the Raman linear coupling between components is absent, the authors report a multiscale expansion method that was used to reduce the underlying model to the integrable Mel'nikov system, which, in turn, allowed the reconstruction of approximate traveling dark-bright solitons for the reduced spin-orbit coupled system.

20. E.G. Charalampidis *et al.*, *Rogue waves in ultracold bosonic seas*, *Rom. Rep. Phys.* **70**, 504 (2018)

The paper [1235] presents a series of numerical results on the initial value problem for nonlinear Schrödinger-type models arising in the physics of ultracold bosonic gases, with generic Gaussian initial data. The authors explore the one-dimensional, standard nonlinear Schrödinger equation with general power law nonlinearity, in which large amplitude excitations reminiscent of Peregrine solitons or regular solitons appear to form, as the width of the Gaussian input is varied.

We are grateful for the insightful discussions with many of our colleagues on the history of Romanian physics journals and take upon ourselves any shortcomings of this resource article. A full list of thanks to all the colleagues who have helped us complete this manuscript would require a lengthy discussion, but we would like to note here that we have benefited greatly from the historical works dedicated to the Romanian physics community at large written by Bogdan Constantinescu, Roxana Bugoi, Vasile N. Dima, Mihai V. Dima, Ștefan Antohe, Sabina Ștefan, Radu Homescu, Mihai Toma, Dorina N. Rusu, Tatiana Magda, Petre T. Frangopol, Ana-Maria Stan, Gheorghe Stratan, Victor Bârsan, and Florin Buzatu. We are also grateful to the colleagues that helped us finalize this manuscript by giving us information about the history of the Romanian physics community and helping us find old articles. An exhaustive list is virtually impossible, but we would like to mention our fruitful discussions with Șerban Constantinescu, Andrei Dorobanțu, Mihnea Dulea, and Antun Balaz. Lastly, we would like to thank the staff of The National Physics Library who gave us access to the full archive of the journal and assisted us on all technical tasks.

We are thankful to all authors and referees for their efforts, which have made the publication of this Special Number possible. We are particularly thankful to Margareta Oancea and Alexandru T. Grecu, from the Editorial Office of *Romanian Reports in Physics*, for their continuous support. Moreover, we would like to acknowledge the fruitful collaboration with the Editorial and Technical Teams of The Publishing House of the Romanian Academy, the publisher of *Romanian Reports in Physics*.

Our work on this survey of the first seventy volumes of *Studii și Cercetări de Fizică/Romanian Reports in Physics* has shown us the tremendous changes that took place in physics research over the past seven decades, as well as the changes in the Romanian research institutions and the landscape of research topics. The articles that we have surveyed mirror all these changes and show that the Romanian Physics Community was very dynamic, largely synchronized with the international one, well acknowledged world-wide for a series of impressive scientific results, and ready to take on new scientific challenges, as in the case of *The Extreme Light Infrastructure – Nuclear Physics (ELI-NP)*, currently under implementation on the Măgurele Physics Campus. We trust that *Romanian Reports in Physics* will continue to meet the expectations and needs of its authors and readers, and we look forward with optimism to the next seventy volumes.

This article is the result of the fruitful discussions and continued collaboration of its authors starting with the autumn of 2016, when the idea of this historical survey of the Romanian physicists who published in *Studii și Cercetări de Fizică/Romanian Reports in Physics* first appeared. While the work on this manuscript has been fulfilling in many ways, it also marks the incomprehensible loss of Ionel-Valentin Vlad on December 24th, 2017, a dear colleague and valued friend. He was well known and highly appreciated for his dedication to *Romanian Reports in Physics*, where he served as Editor-in-Chief since 1999, and his wholehearted support for the Romanian scientific community at large, most visible during his presidency of The Romanian Academy, which started in April 2014 and ended abruptly in December 2017.

Thanks to a fortunate correlation of events, 2018 marks the anniversary of 100 years since the unification of all Romanian provinces within a single nation state. In this context, our brief review on the seven-decade history of *Romanian Reports in Physics* can be regarded as a small contribution to the history of the Romanian scientific communities and their role in the advancement of the modern state of Romania.

**Acknowledgements.** For this work Dumitru Mihalache and Alexandru I. Nicolin were supported by the Romanian Ministry of Research and Innovation under the projects PN 18090101/2018 and PN 18090205/2018, respectively. Virgil Baran was supported for this work by PN-III-P4-ID-PCE-2016-0792 financed by UEFISCDI and ELI-RO 29/2016 financed by The Institute of Atomic Physics.

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