IN MEMORIAM OF PROFESSOR ANATOLIE CASIAN

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On May 29, 2020, Professor Anatolie Casian, Professor, DSc, Academician of International Thermoelectric Academy, corresponding member of the American–Romanian Academy of Arts and Sciences, Laureate of National Prize in the Domain of Science and Technique, passed away.

Anatolie Casian was born on November 17, 1935 in the village Colicautsi, Briceni district, Republic of Moldova. He finished secondary school no. 2 from the city Edinet with silver medal in 1952. In 1957 he graduated from the Department of Theoretical Physics with first degree honors of the Kishinev State University (now State University of Moldova, Chisinau). During his studies at the university, he was awarded the prestigious "Lenin" scholarship. In the period of 1957–1960, he continued postgraduate study in theoretical physics at the same University.

In the period of 1960–1969, Prof. Casian was engaged in different positions at the Academy of Sciences of Moldova (ASM): junior and senior researcher and scientific secretary of Physicotechnical and Mathematical Section of the ASM.

Between 1962 and 1963 he studied at the Moscow State University under the supervision of acad. N. N. Bogoliubov. During that period, he had the opportunity to attend the course of Prof. V. L. Bonch-Bruevich, acad. A. A. Abricosov, and acad. I. M. Lifshits at the Moscow State University. He also participated to the scientific seminars headed by Prof. V. L. Bonch-Bruevich and Professors S. V. Tyablicov and D. N. Zubarev at Steklov Institute of Mathematics. All this contributed to advancing his professional qualification; later, he became

one of the most high-skilled physicists in the Republic of Moldova.

In 1965 Prof. Casian defended his candidate dissertation (now doctoral) in physics and mathematics under the guidance of acad. V. Moskalenko.

In the period of 1967–1969, Prof. Casian was delegated as invited Professor at the Alger University. There, under his supervision, Naziha Kesri, PhD student at the Alger University, defended her doctoral thesis. At that time, she was the second Algerian woman with a PhD degree at the Alger University.

After his return in 1969, A. Casian accepted the invitation of the Rector of the Kishinev Polytechnic Institute—acad. S. Radautsan— to take the lead of Theoretical Mechanics Department. Under his leadership, the Department of Theoretical Mechanics has achieved a significant development. Since 1970, he has been the scientific secretary of the Institute Council and contributed essentially to the improvement of the Council's activities. In 1974 he obtained the title of associate professor. During the period of 1976 – 1982, Prof. Casian performed a fruitful research activity at the local subsidiary of Research Institute of Current Sources, Scientific and Enterprise Production Kvant (with the headquarter in Moscow), occupying the positions of senior researcher, then head of laboratory, vice director, and director.

Regarding his scientific activity in the field of thermoelectricity, Prof. Casian was one of the first scientist that investigated the quasi one-dimensional nanostructured organic systems from the point of view of thermoelectric applications. In this sense, it has to be mentioned the collaboration with Prof. Z. Dashevsky, which lasted many years. In the period of 1982–2016, he returned at the Kishinev Polytechnic Institute (now the Technical University of Moldova) as the head of Theoretical Mechanics Department. Thus, he had worked in this position for more than 40 years.

He defended his doctoral dissertation (now Doctor Hability) "Kinetic Effects in Semiconductors and Multilayer Structures Caused by Dynamical Screening and Interference of Scattering Mechanisms" in 1988. After that, in 1990, he received the title of professor.

In 1994 Anatolie Casian was elected as full member of the International Thermoelectric Academy; in 1999, as corresponding member of the American–Romanian Academy of Arts and Sciences. He was Vice-Head of Theoretical Physics Council at the Academy of Sciences of Moldova, Vice-Head of the examination board for PhD and DSc thesis in theoretical physics at the Academy of Sciences of Moldova. Anatolie Casian was a member of the International Editorial Board of "Journal of Thermoelectricity," Assistant Editor of "Moldavian Journal of the Physical Sciences," Academy of Sciences of Moldova, and a member of the editorial board of the journal "Physics and Modern Technologies," Chisinau. In 2017 he was awarded the gold trophy of the International Academy of Thermoelectricity.

The name of Prof. A. Casian is well known not only within the national scientific community, but he was a scientist at the international level. For more than 50 years, he has actively been involved in different scientific investigations. The scientific activities of Prof. Anatolie Casian were based on fundamental research in the field of theoretical physics, the mechanics of the crystalline lattice, the theory of semiconductors and nanostructures. In 2004 he was Laureate of the National Prize in the Domain of Science and Technique. He is author and co-author of over 350 scientific publications, in particular, 7 manuals for students and 2 monographs:

1. A. Casian, Kinetic effects in semiconductors of different dimensions, Stiinta Publishing House, Kishinev, 1989, p. 122 (in Russian);
2. I. Balmuș, Z. Dashevskii, and A. Casian, Thermoelectric effects in multilayer semiconductor structures, Stiinta Publishing House, Kishinev, 1992, p. 144 (in Russian).

Prof. A. Casian was the scientific supervisor of 9 doctoral students at the Technical University of Moldova, who defended 7 doctoral theses. Two theses were defended in Algeria. He participated in more than 20 scientific projects, as a team leader in many of them, in particular he was the leader of the local group of researchers for 6 International projects: INTAS-96-535; USA Grant N00014-97-C-0219 supported by Office of Naval Research, USA; CRDF-MRDA grant No ME-3010; INTAS-01-0184", STCU 5344 and the FP7 308768 project. He participated as a team leader under prestigious FP7 program together with four teams from the United Kingdom, Germany, Latvia, Bulgaria, and an industrial company from the United Kingdom. All those projects have been finished with important scientific results.

He collaborated with different researchers, such as Iu. Klimontovici (MGU), I. Zveaghin (MGU), D. Zubarev (Institute of Mathematics, Moscow), V. Kaidanov (Polytechnic Institute of St. Petersburg), N. Plakida (Dubna), Z. Dashevskii (UT, Moscow, then Israel), I. Boico (Kiev), P. Sima (Brasov), H. Scherrer (France), J. Stockholm (France), K. Popov (Bulgaria), and J. Pflaum (Germany). In 1996 and 2002, Prof. Anatolie Casian was invited to Ben-Gurion University, from Beer-Sheva, Israel, in 1997, 1998, and 2000 to Henri Poincaré University in Nancy, France, and in 1999 he was invited by TE Technology company (United States) to Washington, where he presented a report to the Technical Council. In 2002, he was invited to the University of California, River Side, United States; in 2005, Nano and Micro Technologies Observatory, Paris, France; in 2013, Julius-Maximilians University, Wuerzburg, Germany, where he held a series of seminars based on his latest scientific papers; and Institute of Solid State Physics of Latvia University (2014), where he participated in seminars on thermoelectric organic materials. He presented reports at many international scientific conferences, in particular, invited papers (most recently, at XIII, XIV, XV, and XVI International Forums on Thermoelectricity, 2009, 2011, 2013, and 2015). He participated with oral communications at European Conference on Thermoelectricity ECT-2013, Netherlands, and ECT-2014, Madrid, Spain. Professor A. Casian received the Diploma of the best paper at the 7th International Forum on Thermoelectricity, Kiev, 1996.

The scientific activities of Professor Anatolie Casian were diverse and included the following: fundamental problems of the crystal lattice dynamics and the theory of semiconductors; transport and thermoelectric phenomena in low-dimensional quantum well structures; and thermoelectric properties of quasi-one-dimensional organic crystals. Some of the research directions where he has obtained new and valuable results are as follows:

- theory of kinetic and optical phenomena in polar semiconductors under conditions of dynamic screening;
- thermoelectric effects in structures with many *p–n* homo- and heterojunctions;
- kinetics of current of nonequilibrium carriers in ionizing radiation detectors;
- optical, transport, and thermoelectric properties of some low-dimensional structures;
- thermoelectric properties of quasi-one-dimensional organic crystals.

The list of selective representative publications includes the following:

1. S. Andronic, I. Sanduleac, and A. Casian, IFMBE Proc. 77, 199 (2020).
2. I. Sanduleac, J. Pflaum, and A. Casian, J. Appl. Phys. 126, 175501 (2019).
3. S. Andronic and A. Casian, Adv. Mater. Phys. Chem. 7, 212 (2017).
4. S. Andronic and A. Casian, Adv. Mater. Phys. Chem. 6, 104 (2016).
5. A. Casian and I. Sanduleac, Mater. Today. Proc. 2, 504 (2015).
6. S. Andronic, A. Casian, and V. Dusciac, Mater. Today. Proc. 2, 3829 (2015).

7. I. Sanduleac and A. Casian, J. Electron. Mater. 45, 3, 1316 (2016).
8. A. Casian, J. Pflaum, and I. Sanduleac, J. Thermoelectricity 16 (2015).
9. A. Casian and I. Sanduleac, J. Electron. Mater. 43, 3740 (2014).
10. I. Sanduleac, A. Casian, and J. Pflaum. J. Nanoeletron. Optoelectron. 9, 247 (2014).
11. A. Casian and V. Dusciac. J. Electron. Mater. 42, 2151 (2013).
12. A. Casian, Kishinev, Kinetic Effects in Semiconductors of Different Dimensions, Stiinta, Kishinev, 1989 (in Russian).
13. I. Balmus, Z. Dashevsky, and A. Casian, Thermoelectric Effects in Multilayer Semiconductor Structures, Stiinta, Kishinev, 1992, (in Russian).
14. A. Casian, I. Sur, and A. A. Balandin, Modeling of the Electrical Conductivity in Multivalley PbTe/$Pb_{1-x}Eu_xTe$ Quantum Wells (chapter in Nanoscience and Nanoengineering, Series in Micro and Nanoengineering), Ed. by E. Andronescu et al., Romanian Academy of Sciences Publishers, Bucharest, 2002.
15. A. Casian, Chapter 36 in Thermoelectric Handbook: Macro to Nano-Structured Materials, Ed. by M. Rowe, CRC Press, FL, USA, 2006.

The administration and the staff of the Technical University of Moldova, and all the people who met Professor Anatolie Casian are deeply saddened by the passing of his life; we will all miss this remarkable scientist.

Anatolie Casian was a model teacher, a remarkable pedagogue, who knew how to guide disciples on the path of knowledge, a reliable colleague, and a true friend.

We are with family and grieving relatives.

God rest him in peace.