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In Memoriam

Professor Czesław LEWA

1937 – 2016

Professor Czesław Lewa – retired professor of the University of Gdańsk passed away after his long illness on the 9th of August 2016.

Prof. Czesław Lewa was born in 1937 at Sipiory in Pomerania, Poland. He graduated from the Secondary School in Kcynia (later, he obtained the title of the Honorary Citizen of the Town) and undertook his studies in Gdańsk. In 1960 he graduated from the Pedagogical University of Gdańsk receiving his Master of Science degree in physics. He started his academic teaching career there continuing it later on at the University of Gdańsk since its foundation in 1970, holding first adjunct rank position and since 1980 junior lecturer (docent), since 1991 associate professor and since 2000 full professor positions of University of Gdańsk. During 1996–2007 he was the Director of the Applied Physics Department in the Institute of Experimental Physics of the University of Gdańsk, where he also held the post of the Chief of the Environmental Acoustics and Spectroscopy Laboratory in the Institute for a few years.

During the period of 1980–1987 he was employed as an academic teacher of physics at the University of Annaba in Algeria. In 1985 and in 1995 he also worked at the University of Rennes in France where he was awarded the title Doctor Honoris Causa of the University of Rennes. Also, Professor Lewa is the prize winner (together with Professor J.D. de Certaines) of the scientific educational film festival for the movie on physical principles of NMR (Nuclear Magnetic Resonance) awarded in 1999.

Professor Cz. Lewa obtained his PhD degree from the Faculty of Mathematics, Physics and Chemistry of the Adam Mickiewicz University in Poznań in 1969 and the degree of Doctor of Science from the same University in 1977. In 1997 he obtained the title of the Professor in Physics.

Professor Lewa was an outstanding scientist specialized in nuclear magnetic resonance (NMR) spectroscopy known in Poland and abroad. In his scientific activity among others, he elaborated and enhanced some elements of the NMR theory (presented first by

the Nobel Prize winners in 1952). His contribution to the development of NMR medical diagnosis methods, particularly his original idea to modulate the NMR signal by acoustic waves (it was the cause of the development of biological tissue NMR elastometry) had been applied mainly in computer tomography.

In general he published 122 papers, among them 25 articles in international journals as well as 32 domestic conference papers; he is the author of 12 patents. Within his group of coworkers he promoted 5 PhD doctors. For the series of his papers on improvements of NMR imaging of large samples of inner structures in medical diagnosis with applying NMR elastometry and elasto-magnetic resonance (EMRS) as well as using the spectroscopy of electric charge carriers mobility (EMMRS) and MR spectroscopy of selective Zeeman states (SSMRS), he was awarded the Minister of Education Prize in 1998.

The new MR spectroscopic methods proposed by Professor Lewa (MR elastography and EMRS) were experimentally verified and applied in other laboratories (among others in MAYO CLINIC in Rochester, USA and in SIMENS company in Lille, France). The EMRS method gives a possibility to observe spectral dependences of absorption and scattering in technical diagnostics (deformation emission) as well as in medical diagnostics (differentiation of healthy and pathological tissues, tumor or sclerotic ones (for example cardio vascular) or imaging of inner emission field of elastic radiation sources.

The EMMRS method allows to identify and to measure the electric mobility distribution of charged material elements (ions, free radicals, protons, or molecules bounded with charge carriers). It enables recognition of fine interactions (e.g. in biological environments where modification and charge transfers can be an essential element determining advance of pathological variations). By measuring the lifetime of short living charge carriers the method opens a way to a more entire recognition of kinetics of some chemical (e.g. catalytic ones) technological processes. Also, it may allow recognition of mechanisms responsible for pathological or therapeutic influence of electromagnetic field on biological systems.

Acoustical aspects of Professor Czesław Lewa's scientific achievements contributed to the NMR domain were many times presented by him not only among physicists but also in the acoustician community with his active participation in many meetings and conferences as well as in Polish Acoustical Society activities. He was the man of merit for the Polish physics and acoustics as a scientist and a teacher of many students, Master and PhD Thesis applicants and coworkers. His passing away is a great and painful loss.

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