In Memoriam

HORIA SCUTARU-UNGUREANU

(30 October 1943 – 22 November 2014)

On November 22, 2014, Horia Scutaru-Ungureanu, an outstanding Romanian physicist, the founding father of the Romanian School of Quantum Information Physics, passed away after a short illness.

Horia Scutaru was born eighty years ago on October 30, 1943, in Roman, Neamţ County, Romania. He graduated in 1961 from the "Calistrat Hogaş" High School in Piatra Neamţ, Romania. In the same year, he became a student of the Faculty of Physics of the University of Bucharest that he graduated in 1966 in the Department of Theoretical Physics. In 1966 he was employed as a physicist and then as a scientific researcher in the Department of Theoretical Physics of the Institute of Atomic Physics, Magurele, Romania. He passed all the stages of the scientific hierarchy, up to the position of scientific researcher first degree, obtained within the Department of Theoretical Physics, at the Horia Hulubei National Institute for Physics and Nuclear Engineering. He got a PhD degree in Physics in 1980, when he defended the thesis “Structure and stability of open quantum systems”.

In 1984 he received, together with Mircea Iosifescu, the “Dragomir Hurmuzescu” Award (Prize) of the Romanian Academy, for contributions in the classification and elaboration of the constraints imposed by the dynamical symmetries on

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observables of classical and quantum systems. Since 1987, he has been a scientific referee for a number of prestigious scientific journals, including the "Journal of Mathematical Physics", published by the American Physical Society.

In 1993 he became a Corresponding Member, and in 1995 a Titular Member of the Romanian Academy. He was the President of the Section of Physical Sciences of the Romanian Academy from 1993 to 2013. Also from 1993, for a period of several years, he was the representative of Romania in the East-West Committee of the European Physical Society (EPS).

Horia Scutaru obtained valuable scientific results in the field of theoretical physics, in the following research directions: the foundation(s) of quantum physics, the theory of atomic nuclei, the theory of elementary particles, the theory of completely integrable systems, the applications of group theory in physics, and the theory of quantum information. We mention some of the important results obtained by Horia Scutaru. He introduced the concepts of classical entropy of a quantum state and of the quantum entropy of a classical state [H. Scutaru, *Estimations of the entropy of a quantum state with the aid of covariant and contravariant symbols*, Reports on Mathematical Physics **15**, 305-315 (1979)]; established the duality between covariant and contravariant symbols defined with the help of coherent states; obtained the lower bound for the mutual information of a quantum communication channel [H. Scutaru, *Lower bound for mutual information of a quantum channel*, Phys. Rev. Lett. **75**, 773 (1995)]; studied the localization of quantum systems in the phase space, the quantification and dequantization through completely positive applications between algebras of observables, the entropic uncertainty relations, the classical and quantum systems with dynamical symmetry, the correspondence between classical and quantum systems through the polynomial identities satisfied by the classical and quantum observables – a theory with deep connections with the theory of quantum groups and completely integrable systems, the application of the theory of open quantum systems to the description of charge equilibration and deep inelastic collisions of heavy ions [A. Sandulescu, H. Scutaru, *Open quantum systems and the damping of collective modes in deep inelastic collisions*, Ann. Phys. **173**, 277-317 (1987)], the calculations regarding the structure of light nuclei [I. Guiasu, M. Iosifescu, H. Scutaru, M. Cristu, *Hartree-Fock calculations for light nuclei*, Lett. Nuovo Cim. **3**, 279 (1970)], the application of quasifree states in quantum optics [H. Scutaru, *Transition probabilities between quasifree states*, J. Math. Phys. **39**, 6403–6415 (1998)]. He published, in collaboration with scientists from Romania and Germany, a classical review paper on open quantum systems [A. Isar, A. Sandulescu, H. Scutaru, E. Stefanescu, W. Scheid, *Open quantum systems*, Int. J. Mod. Phys. E **3**, 635–714 (1994)].

Horia Scutaru, in collaboration with Paulina Marian and Tudor A. Marian, published a series of relevant works in the area of quantum information theory:

P. Marian, T. A. Marian, H. Scutaru, *Quantifying nonclassicality of one-mode Gaussian states of the radiation field*, Phys. Rev. Lett. **88**, 153601 (2002); *Bures distance as a measure of entanglement for two-mode squeezed thermal states*, Phys. Rev. A **68**, 062309 (2003); *Distinguishability and nonclassicality of one-mode Gaussian states*, Phys. Rev. A **69**, 022104 (2004).

In collaboration with Mircea Iosifescu, an outstanding Romanian physicist and mathematician, Horia Scutaru published influential papers in the area of mathematical physics: M. Iosifescu, H. Scutaru, *On six-dimensional canonical realizations of the so(4,2) algebra*, J. Math. Phys. **21**, 2033–2045 (1980); *Boson realization from quantum constraints*, J. Math. Phys. **27**, 524–528 (1986); *Second-degree kinematical constraints associated with dynamical symmetries*, J. Math. Phys. **29**, 742–757 (1988).

The loss of Horia Scutaru has closed another page in the history of physics research at Magurele Physics Campus, Romania. Horia Scutaru is gloriously inscribed in this history, through everything he achieved and meant for the community of physicists in Romania.

We, his colleagues and collaborators from the Department of Theoretical Physics, Horia Hulubei National Institute for Physics and Nuclear Engineering, Magurele, will keep him forever in our memory! May God rest his Soul in Peace!

Colleagues from the Department of Theoretical Physics,
Horia Hulubei National Institute for Physics and Nuclear Engineering,
Magurele, Romania