

Walter Eduard Thirring

Walter Eduard Thirring, a pioneer of modern mathematical physics, passed away in Vienna on 18 August 2014.

Born in Vienna on 29 April 1927, he was the son of physicist Hans Thirring, known for the Lense–Thirring frame-dragging effect in general relativity. Walter was originally destined for a career as a musician, but he took up the study of physics at the University of Innsbruck, where under Felix Ehrenhaft he obtained his PhD on relativistic field theory in 1949 at the age of 22. He spent the following 10 years at various research institutions in Europe and the US, including the Dublin Institute for Advanced Studies in Ireland; the Max Planck Institute in Göttingen, Germany; ETH Zürich; and the Institute for Advanced Study in Princeton, New Jersey. He met Erwin Schrödinger, Werner Heisenberg, Wolfgang Pauli, and Albert Einstein during that period.

From 1959 until his retirement in 1995, Walter was a professor of theoretical physics at the University of Vienna. His contributions to particle physics led to his appointment as head of the theory division at CERN from 1968 to 1971, while he was on leave from the university. That critical period in the life of CERN is well described in his autobiography *The Joy of Discovery: Great Encounters Along the Way* (World Scientific, 2011).

Walter was very influential in the international physics community. In addition to his leadership role at CERN, he was a force behind the founding of the International Association of Mathematical Physics (IAMP) in the 1970s, and from 1976 to 1978 he was its first president. The IAMP is one of the few international scientific organizations whose members are individual scientists rather than scientific societies or groups. Walter was the founding president (1993–96) and first director of the Erwin Schrödinger International Institute for Mathematical Physics in Vienna, which became a major meeting place of mathematicians and physicists.

Walter's scientific life was impressively broad and deep. The 51 articles in *Selected Papers of Walter E. Thirring with Commentaries* (American Mathematical Society, 1998) present a panoramic view of his work.

High-energy physics was Walter's earliest scientific interest. Important papers include the first rigorous proof of divergence of perturbation series in a quantum field theory and the discovery of an exactly soluble model in relativistic



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quantum field theory, known as the Thirring model. That 1958 work, not Sin-itiro Tomonaga's paper as occasionally alleged, was the source for Joaquin Luttinger's important model in condensed-matter physics and for "bosonization." Walter's 1955 monograph on quantum electrodynamics was highly influential. Two remarkable papers he published in *Nuclear Physics* in 1959 and 1960 contain ideas pointing to the eightfold way and the theory of quarks developed later by Murray Gell-Mann and Yuval Ne'eman.

In the 1960s Walter's research interests broadened, first to general relativity and statistical physics and subsequently to condensed-matter physics and the physics of atoms and molecules. At the same time, his papers became more mathematical, and he developed his distinctive style of using modern mathematics to solve hard problems in physics. He was one of the first to use the concepts and notation of modern differential geometry in general relativity. In other areas he used sophisticated techniques of functional analysis and the theory of operator algebras. He rapidly absorbed and applied those methods, which were not part of the mathematics curriculum for physics students in Walter's time. Despite his mathematical skills, his motivation always came from physics, and his work was guided by deep physical insight and intuition about the tools that would be appropriate for the physical problem at hand.

In the 1970s Walter became interested in the quantum theory of many-body systems with Coulomb forces. That resulted in our joint work on stability of matter, which led to further developments in physics and mathematics.

Walter's four-volume series *A Course*

in Mathematical Physics (Springer, 1978–83) is a lasting legacy reflecting his role as a researcher and teacher. It covers classical mechanics, classical field theory, the quantum physics of atoms and molecules, and the quantum theory of large systems. Its breathtaking wealth of information and insights will continue to educate and inspire many future generations of mathematical physicists.

Walter received numerous awards and honors recognizing his scientific work. They include the 1967 Eötvös Medal from the Eötvös Physical Society in Hungary; the 1969 Erwin Schrödinger Prize from the Austrian Academy of Sciences; the 1977 Max Planck Medal, the highest award of the German Physical Society; the Austrian Decoration for Science and Art in 1993; and the IAMP's 2000 Henri Poincaré Prize.

Physics was not Walter's only intellectual passion. He composed for organ, piano, and violin. He was also deeply interested in a dialog between science and religion and wrote several books on the subject. The passing of this great master of modern mathematical physics closes a chapter in the intellectual history of the past 70 years.

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