

Martinus J.G. Veltman Biography

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Contents

Martinus J.G. Veltman Biography.....	1
Contents.....	2
Biography.....	3



Biography

Over the course of his career, Martinus J.G. Veltman made fundamental contributions to elementary **particle physics** and is particularly renowned for his work on gauge theories and the quantum structure of electroweak interactions, for which he shared the Nobel Prize in physics. Born in the Netherlands, the Dutch physicist received his education at the University of Utrecht, earning a Ph.D. in theoretical physics in 1963. For the next three years he was a fellow at CERN, the European organization for nuclear research. Veltman joined the University of Utrecht as professor of physics in 1966.

While the electroweak interaction theory was developed in the early 1960s, it had reached a standstill in the world of physics, partly because of the complex and time-consuming calculations needed to provide more details about subatomic physical quantities. Undaunted, Veltman started researching the **renormalization** of gauge theories in 1968, incorporating into his work Schoonschip, a computer program that Veltman had developed in 1963 to do complex algebra problems. This program was to prove invaluable in assisting with the tedious calculations and theory testing needed for research of field and gauge theories. In 1969, Veltman was joined in his work by Gerardus 't Hooft, a 22-year-old graduate student. Together, the two laid down the foundations for physicists to mathematically predict properties of sub-atomic particles that make up all **matter** in the **universe** and the forces that hold these particles together. As a part of that effort, the duo's work showed that the **electroweak theory** made sense. In 1999, the pair received the Nobel Prize in physics for "elucidating the quantum structure of electroweak interactions in physics," placing particle physics theory on a firmer mathematical foundation. Their work also led to the discovery of the top quark.

Veltman left the Netherlands to join the University of Michigan in 1981 as the John D. and Catherine T. MacArthur Professor of Physics. His other contributions to science and physics include developing a practical method of implementing probability conversion in field theory, known as the Veltman cutting rules. He also made contributions in the **quantum theory** of gravitation and in the theory of radiative corrections. Veltman's many awards include the 1989 Alexander von Humboldt Award, the 1993 High **Energy** Physics prize from the European Physical Society, and knighthood into the Dutch Order of the Lion.