The Standard Model of the Elementary Particles was born in the 1970s as a daring assumption concerning the behavior of all known sub-atomic particles, but quickly grew to become the most accurate description that we have until now. Yet there are several indications that it cannot be exactly right. In particular, the gravitational force does not seem to go well with the fundamental principles of Quantum Mechanics, on which the Standard Model is based. Where do we start improving the existing theories? Does Einstein’s gravity theory need to be refined? Is Quantum Mechanics not what it seems to be? The fundamental building blocks of matter still have secrets for us.

From the Standard Model to Quantum Gravity

The Twenty-first Public Joseph and Sophia Konopinski Memorial Lecture in Physics
Gerardus ‘t Hooft was born in Den Helder on July 5th 1946. He majored in Physics and Mathematics at Utrecht University, graduating in 1969. In 1972 ‘t Hooft earned his doctorate with his thesis titled “Renormalization Procedure for Yang-Mills fields”. He was soon given a two-year fellowship at CERN in Geneva, and subsequently appointed to a professorship at Utrecht University in 1974, where he stayed since.

His work concentrates on gauge theory, black holes, quantum gravity and fundamental aspects of quantum mechanics. His contributions to physics include a proof that gauge theories are renormalizable, dimensional regularization, a proposal for the resolution of the information paradox, and the holographic principle.

In 1999 Gerard ‘t Hooft was awarded the Nobel Prize in Physics “for elucidating the quantum structure of electroweak interactions in physics”. He was knighted commander in the Order of the Netherlands Lion, and officer in the French Legion of Honor. The asteroid 9491 Thooft has been named in his honor. Prof. ‘t Hooft is a Foreign Associate of the US National Academy of Sciences (1984) and a Foreign Honorary Member of the American Academy of Arts and Sciences (1986). He is a member of the Royal Dutch Academy of Sciences (1982), a Fellow of the British Institute of Physics (2000), and an Associé étranger of the French Académie des Sciences (1995). ‘t Hooft has received numerous other awards, including the 1982 Wolf Prize and the 1986 Lorentz Medal.

Previous Konopinski Lecturers:

1991: Leon Lederman
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