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STEVEN WEINBERG (1982)
Prospects for further unification in the theory of elementary particles

ABSTRACT

Instead of an abstract, the text below is a short introduction by an editor.

To the general public, Steven Weinberg is probably best known as author of the book “The first three minutes”, an extremely well written and popular account of the the beginning of our Universe according to the Big Bang hypothesis. As a Nobel Laureate of 1979, together with Sheldon Glashow and Abdus Salam, he accepted the first invitation to come to a Lindau Meeting, where he gave a lecture which was at least as well composed as his book. Over the years, I have had the pleasure of listening to Weinberg at several physics meetings and my impression has been the same every time. Weinberg received the prize for his part of the theory that unifies the weak and the electromagnetic interactions. His lecture leads up to a discussion of what has become known as GUT, Grand Unified Theory, a theory which unifies all three interactions of the Standard Model: electromagnetic, weak and strong. But to lay the ground for this discussion, Weinberg first gives an exceptionally clear account of the Standard Model, its particles, interactions and conservation laws. In particular he stresses the fact that many of the conservation laws are not conservation laws of nature, they are rather conservation laws of our present theories. This reminds me of Niels Bohr’s statement “Physics does not tell us how nature is, it tells us what we can say about nature”. Also in Weinberg’s lecture, the concept of supersymmetry is introduced, a concept which would give rise to a whole set of new particles. Today, in 2012, the Large Hadron Collider at CERN is actively searching for these hypothetical new particles and the whole physics community is eagerly waiting for the LHC to reach its top energy so as to become able to answer some of the questions raised by theoreticians such as Steven Weinberg.

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