WEAK SCALE SUPERSYMMETRY

From Superfields to Scattering Events

Supersymmetry has been proposed as a new symmetry of nature. Supersymmetric models of particle physics predict new superpartner matter states for each known particle in the Standard Model. The existence of such superpartners will have wide-ranging implications, from the early history of the Universe to what is observed at high energy accelerators such as CERN's LHC.

In this text, the authors develop the concepts of supersymmetry from first principles, and show how it can be incorporated into a theoretical framework for describing unified theories of elementary particles. They develop the technical tools of supersymmetry using four-component spinor notation familiar to high energy experimentalists and phenomenologists. The text takes the reader from an abstract formalism to a straightforward recipe for writing supersymmetric gauge theories of particle physics, and ultimately to the calculation of cross sections and decay rates necessary for practical applications to experiments both at colliders and for cosmology.

This advanced text is a comprehensive, practical, and accessible introduction to supersymmetry for experimental and phenomenological particle physicists and graduates studying supersymmetry. Some familiarity with the Standard Model and tree-level calculations in quantum field theory is required. Exercises and worked examples that supplement and clarify the material are interspersed throughout.

This title, first published in 2007, has been reissued as an Open Access publication on Cambridge Core.

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