

Particle physics (also known as high energy physics) is a branch of physics that studies the nature of the particles that constitute matter and radiation. Although the word particle can refer to various types of very small objects (e.g. protons, gas particles, or even household dust), particle physics usually investigates the irreducibly smallest detectable particles and the fundamental interactions necessary to explain their behaviour.

In current understanding, these elementary particles are excitations of the quantum fields that also govern their interactions. The currently dominant theory explaining these fundamental particles and fields, along with their dynamics, is called the Standard Model. Thus, modern particle physics generally investigates the Standard Model and its various possible extensions, e.g. to the newest "known" particle, the Higgs boson, or even to the oldest known force field, gravity.

In the present book, fifteen typical literatures about Particle physics published on international authoritative journals were selected to introduce the worldwide newest progress, which contains reviews or original researches on Particle physics. We hope this book can demonstrate advances in Particle physics as well as give references to the researchers, students and other related people.¹

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¹ https://en.wikipedia.org/wiki/Particle_physics