CHAPTER OVERVIEW

33: Particle Physics

Particle physics (or high energy physics) studies the nature of the particles that constitute matter (particles with mass) and radiation (massless particles). 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 irreducibly fundamental force fields necessary to explain them.

33.0: Prelude to Particle Physics
33.1: The Yukawa Particle and the Heisenberg Uncertainty Principle Revisited
33.2: The Four Basic Forces
33.3: Accelerators Create Matter from Energy
33.4: Particles, Patterns, and Conservation Laws
33.5: Quarks - Is That All There Is?
33.6: GUTs - The Unification of Forces
33.E: Special Relativity (Exercise)

Thumbnail: In this Feynman diagram, an electron and apositron annihilate, producing a photon(represented by the blue sine wave) that becomes aquark–antiquark pair, after which the antiquark radiates a gluon (represented by the green helix). (CC-SA-BY 2.5; Joel Holdsworth).
