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INTRODUCTION

In this chapter, we provide a general introduction to elementary particle physics, including a brief discussion of the fundamental building blocks of matter, quantum chromodynamics (QCD), deep inelastic scattering (DIS), parton distribution functions (PDFs), nucleon structure functions, and parton evolution equations. This chapter provides a brief description of small-x physics and nonlinear processes such as gluon recombination and saturation. The importance of nonlinear parton evolution equations is explained in this chapter.

1.1 Fundamental Building Blocks of Matter

Understanding the origin of matter at the elementary level has been one of the primary goals of particle physics research. Matter makes up everything that surrounds us, including us and the whole universe. However, questions come up: What constitutes the matter? What are the basic components or elements that make up matter? The desire to understand the fundamental building blocks of matter dates back to ancient times. Philosophers of antiquity conjectured that the four sets of basic elements—earth, water, air, and fire—were the main components of nature. The

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by Ranjan Saikia

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