CHAPTER 1

INTRODUCTION

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1.1 INTRODUCTION

High-energy physics deals basically with the study of the ultimate constituents of matter and the nature of the interactions between them. Experimental research in this field of science is carried out with giant particle accelerators and their associated detection equipment.

High energies are necessary for two reasons: firstly to localize the investigations to very small scales of distance associated with the elementary constituents, one requires radiation of the smallest possible wavelength and highest possible energy, and secondly because many of the fundamental constituents have large masses and require high energy for their creation and study [1]. Estimation of the cross -section, for example, of the heavy quarks production are necessary in order to plan experiments on future accelerators [2]. Constituents of hadrons are called " partons". Partons consists of two parts, the quarks which carry some properties such as charge (Z), strangeness (S),colors, ...etc., and gluons.

1.2 THE QUARK MODEL

Gell-Mann in (1964) and independently Zweig in (1965) have postulated the existence of an SU(3) triplet of hypothetical particles from which all hadrons can be constructed, these hypothetical particles were called "aces" by Zweig and "quarks" by Gell-Mann [3]. Hadrons are strongly interacting particles built from two types of quark combinations: