

HADRON-NUCLEONS INTERACTIONS AT HIGH ENERGIES

Mira Jurić and Olga Adamović

FACULTY OF NATURAL AND MATHEMATICAL SCIENCES Beograd.
DEPARTMENT OF PHYSICS AND METEOROLOGY

During the last ten years it was possible in high energy physics to study interactions of charged long lived hadrons with nuclei: hadron-proton (h,p) and hadron-nucleus (h,A) interactions in the lab momentum range 20-500 GeV/c, and proton-proton (p,p) interactions in the range 20-200 GeV/c. The main characteristic of these reactions was the process of multiparticle, multihadron production

$$h + p \rightarrow c_1 + c_2 + \dots + c_i + \dots + c_n \quad 1)$$

$$h + A \rightarrow \sum_{i=1}^n c_i + \sum_{i=1}^{n'} d_i + \sum_{i=1}^{n''} e_i \quad 2)$$

where h,p and A are the primary particles, h being the incident ones, p or A the target nuclei, and c_i, d_i, e_i the secondary particles produced in the interactions. More than 80% of the secondary hadrons- c_i particles are pions. In interactions of type 2 (mainly studied by emulsion techniques) c_i particles were of $\frac{v}{c}$ 0.7, d_i of 0.2 $\frac{v}{c}$ 0.7 and e_i is of $\frac{v}{c}$ 0.2. Generally d_i and e_i represent nucleons or fragments of the target nucleus.

The aim of all these experiments was to clarify the mechanism of multiparticle production that in a specific way unveils the nature of strong interactions and the structure of hadrons.

Comparisons of (h,p) with (h,A) interactions indicate a weak influence of target nuclei on basic, well established properties of hadron-nucleon interactions. In this manner the information on the space-time characteristics of the virtual phase of hadron-nucleon interactions were obtained. Since the space-time evolution of hadron-nucleon interactions is hardly observable in elementary (h,p) reactions the nucleus may be considered an appropriate detector of the space-time evolution of hadron-nucleon interactions.

Further investigations of (h,h) and (h,A) reactions at higher energies are expected to give more the specific data on the virtual phase of the interactions, as well as data on the transformation of the virtual phase into real particles.