

## PREFACE

The work described in this thesis is based on the results of the investigation carried out to study the emission of fast tritons and He-nuclei emitted in the interactions of 24 GeV/c protons with the heavy nuclei of emulsion. An attempt has also been made to investigate the mechanism of hadron-nucleus interactions.

Chapter I deals with a brief description of the importance of the study of nuclear disintegrations. The process of nuclear disintegrations caused by high energy particles has been discussed. The importance of the work on the emission of fast tritons and He-nuclei has been indicated. In the later parts of this chapter the results obtained by various authors on the emission of these energetic fragments have been described.

Chapter II describes the experimental technique. In the beginning of this chapter the details of the stack, the method of scanning, selection criteria, etc. have been presented. Then a brief theoretical account on the parameters — range, ionization and scattering has been given. In the end of this chapter the methods of identification of the secondary particles have been described.

In Chapter III the characteristics of the emitted protons in the energy range  $\sim$ (30-350) MeV have been presented. A brief discussion on the mechanism of emission of these protons in the above energy interval has been given. A separate section has been devoted to investigate the mechanism of hadron-nucleus interactions.

In the beginning of Chapter IV the experimental results on the emission of fast He-nuclei have been given. Theoretical models for interpreting the production of these particles have been presented. Then the characteristics of the observed tritons have been given. The 'pick-up' model and the mechanism of pion absorption in nuclear  $\alpha$ -clusters have been found to explain the experimental results satisfactorily.

The last chapter contains the summary and final remarks. The conclusions drawn in this chapter are based on the analyses carried out in the present investigation. However, the results of other similar experiments have also been referred for comparison purposes. This was considered essential because it is extremely important to note the differences in approaches for interpreting the results. Such comparisons are expected to be helpful in arriving at definite conclusions regarding the mechanism of production of these particles.