PREFACE

The phenomenon of nuclear fission was first discovered by Hahn and Strassmann in 1938. Today almost after half a century, from the date of its discovery, a great deal of informations regarding this epoch making phenomenon has been collected. However, our understanding of the subject is far from adequate. The study of this phenomenon, though, is a branch of nuclear physics, yet it has developed almost independently of the rest of the subject. Compared to the modes used in the nuclear structure, the models used in the correlation of fission data are crude indeed. Of course, we recognise a little order here and there and the underlying principle though are reasonably understood, the method of applying them eludes us. Fission is thus very complex, both theoretically and experimentally. For this very reason it may furnish us a great deal of informations about the nucleus, but uptill now it has been nearly impossible to follow the traditional scientific proceedure of isolating one aspect of the process and studying it in detail.

The study of the disintegration of complex nuclei at high energy nuclear disintegrations in emulsion with special reference to the fission type phenomenon has attracted quite a number of workers, all over the world for years together. Even then a wide gap remains. We are still lagging a clear cut

model as to explain all the salient feature regarding the formation of stars in nuclear emulsion and their characteristics. In high energy interactions of particles with medium weight nuclei, the role played by fission is not yet clear. Moreover, it is also not clear as to the role played by cascade evaporation process in high energy nuclear interactions, because the statistical model, which is the only quantitative reaction model for high energy nuclear disintegrations at present is supposed to break down at excitation energies greater than the total binding energy of the nucleus.

This work is based on the author's investigations on a few aspects of fission produced in high energy nuclear disintegrations of silver and bromine nuclei of photo nuclear emulsion caused by k^- and $\bar{p}$ beams.

An introduction to the subject is presented in Chapter I. Chapter II contains the necessary informations regarding the technique and methods of measurement.

The third Chapter furnishes a report of the general characteristics of non-fission stars. It is needed for the comparison of the general characteristics of non-fission events with that of fission events.

A brief report on the studies of recoils are presented in Chapter IV. This is in the light of the idea that both the phenomenon, fission and recoils occurs at the last stage of cascade evaporation. Here in this Chapter, it is aimed at, to find the similarity, if any, exists between their stages

of production.

The different characteristics of binary fission produced by k^- and $\bar{p}$ interactions are presented in Chapter V.

The report of the observations of rare types of fission are given in Chapter VI. This study is of greater significance, because of the fact that the events are rare and results of experimental evidences are still more rare.

It is all the way a big problem for the physicists to ascertain the stages of production of fission and short range spallation hyperfragments. Here in the Chapter VII, an attempt has been made to that effect by making a comparative study between the different aspects of fission and spallation hyperfragments.

The work is concluded with the author's assessment on the production stages of fission together with a future scope of work in the field of investigation. This is reported in Chapter VIII.

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