CHAPTER VIII

CONCLUDING REMARKS

A comparative study of the observations made on recoils, spallation hyperfragments and binary fissions indicate that the fission, like the other two processes might be the ultimate fate of a disintegrating nucleus during high energy nuclear disintegrations. Cascade evaporation model might be applied to discuss the production of such a phenomenon. However, unlike recoils one cannot conclude definitely that fission results from the splitting of evaporation residue only. This is supported from the observation of 'dumbell shaped' events showing that the fission of excited nuclei may also occur in pre-cascade stage. Further, forward backward ratio (F/B) of fission bisectors (1.4 ± 0.08) is also found to be higher as compared to that of recoils (1.3 ± 0.08). Though this difference may not be high, yet this shows that fission may occur during cascade stage also which results in a higher F/B ratio. Of course this ratio is smaller than that obtained in the case of spallation hyperfragments ($F/B = 2.5 \pm 0.15$) where a define contribution from cascade stage can be estimated. Even then, we can not rule out the possibility of contribution to fission phenomenon from intermediate stages.

This leads to the following conclusion as regards to the production stages of fission of the excited nuclei. They are -

(i) The initial stages, where highly excited nucleus splits into two parts followed by the evaporation of particles from the separated parts. Example of which may be found in 'dumbell shaped' fission phenomenon.

(ii) Intermediate stages, where splitting of a nucleus in the post cascade and pre-evaporation stages of the nucleus might be possible as discussed earlier.

(iii) Final stages, where splitting of the excited nucleus at the end of the evaporation process is possible with no further evaporation of the particles from the fission product. Evidences of which is seen in fission recoils studies in Chapter V.

However, if similar studies are done by other workers then with enhanced statistics one may throw some light in this regard in future. Further, it has been observed that the fission cross-section in the present observation are smaller for both the interactions as compared to those for proton and interactions of comparable ranges of energy. A study may be made to estimate the cross-section of this process at varying ranges of kaons and antiproton energies so as to confirm such a difference in cross-sections and a theoretical explanation for such a difference may also be looked into.

As regards the fission by tunnelling, heavy ion fission and Coulomb fission continue to be a field of wide interest and speculation. More over, it may be pointed out that the detailed study of the fissions in lighter group of emulsion nuclei (CNO) might have some relevance to health physics problems of Nuclear Science.

Though much has been done to fission problem from the date of its discovery, yet a little knowledge is gathered on it. Present worker feels that this work will be simply a contributory one and it may at least give some insight into the fission mechanism which in turn may lead to some results to the complicated problems of nuclear physics.

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