SUMMARY AND CONCLUSION

CHAPTER V

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The spontaneous emission of alpha particle from the radioactive elements is called Alpha decay. In this present work the alpha decay studied using Unified fission model modified from PCM. The decay of the parent nucleus via emission can be calculated by WKB barrier penetration penetrability. The scattering potential V(R) for the overlapping region considered as second order polynomial for $R_0 < R < R_t$ and for the non-overlapping region is equal to sum of Coulomb potential, proximity potential. Characteristics of alpha decay like Q value, preformation probability, total penetrability was found for 34 even-even, 40 even-odd, 47 odd-even nuclei. Experimental half-lives are taken from [50]. Preformation probability is calculated by using WKB barrier penetrability. The minimum and maximum P_0 is found out for two regions belonging to N=126, N=152. Also minimum and maximum total penetrability for two regions are found. Also calculated $\log_{10}T_{1/2}$ are in better agreement for some nuclei with the experimental value.

Dynamical cluster decay model was developed for the decay of a hot and rotating compound nucleus formed in the heavy ion reactions. Here the DCM model is applied for hot and rotating $^{48}Cr^*$ formed in the heavy-ion $^{24}Mg+^{24}Mg$ reaction. From this model fragmentation potential for the decay of $^{48}Cr^*$ formed in $^{24}Mg+^{24}Mg$ is found out for all charge minimized binary fragments of the outgoing channel with T=0 MeV, $\ell=0\hbar$ at $R=R_t$ fm. There is no clear preference for four nucleon, but a minima is found at ^{4} He and ^{16}O and odd-even structure is also noted for other odd-even structure. For $\ell=0$ to $50\hbar$ temperature dependent fragmentation potential is found at temperature T=3.43MeV with R=Rt+1 fm. As angular momentum increases from 0 to $50\hbar$, at lower angular momentum, light particle emission is preferred, whereas ℓ increase symmetric channel is preferred. The cross sections for light particle and intermediate mass fragments are found at various angular momentum values. The preformation probabilities for light particles and intermediate mass fragments are calculated and light particles

emission is preferred at lower angular momentum and symmetric fragment is preferred at high angular momentum. Since no attempt is made to fit the calculated cross section for light particle and intermediate mass fragments, with the experimental one. It can be achieved by vary ΔR from 0.1 to 1.5 fm and cross-sections for individual fragments can be also obtained.