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## Delving $\alpha$ and non- $\alpha$ structure beams induced incomplete fusion@ 4-7 MeV/A : A Role of Deformation

Study of heavy-ion interactions using  $\alpha$  and non- $\alpha$  structure beams at low energies [1-4] may provide a great deal of information on the in-complete fusion (ICF) reactions. In order to understand the dynamics of ICF reactions, several studies have been made and a large enhancement in cross section for  $\alpha$ -emitting channels with respect to the calculations done with code PACE4[5] has been reported [3,7,8]. In heavy ion interactions at energies  $\simeq 4-7$  MeV/A, using both the strongly as well as weakly bound projectiles. A substantial contribution of ICF fraction has been observed [6-8]. To under the systematic behavior in the enhancement of cross section for alpha emitting channels is still an open area of investigation. In this scenario, the role of deformation of the projectile and target nuclei in observed significant contribution is not well understood. Present work is focused to study the role of deformation [9] of the target nuclides in the incomplete fusion reactions at energies of interest, using alpha and non-alpha structure beams. In order to understand the role of the target deformation in ICF, fourteen reactions have been studied using beams of  $^{12}\text{C}$ ,  $^{16}\text{O}$ , and  $^{19}\text{F}$  with various targets e.g.,  $^{93}\text{Nb}$ ,  $^{103}\text{Rh}$ ,  $^{115}\text{In}$ ,  $^{159}\text{Tb}$ ,  $^{165}\text{Ho}$ ,  $^{169}\text{Tm}$ ,  $^{175}\text{Lu}$  and  $^{181}\text{Ta}$ . It has been observed that the incomplete fusion fraction increasing in an exponentially manner with the deformation ( $\beta_2$ ) of the target nucleus separately for each projectile. This systematic behavior of ICF fraction with the deformation parameter of the target nuclei has been used to develop an empirical relation. Further, analysis is in progress and results with details will be presented during the conference. The present work is supported by the Department of Science and Technology (DST), Delhi, India.

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