

Incomplete vs Complete Fusion at 4-7 MeV/nucleon*

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The incomplete fusion (ICF) at low projectile energies (i.e., 4-7 MeV/nucleon) has been extensively investigated in recent years [1-2]. The question of entrance channel effect on the onset and strength of ICF has been widely debated. Recently, we have performed several experiments to have an insight into the effect of various entrance channel parameters, such as; (a) projectile energy, (b) mass-asymmetry, and (c) the input angular momenta, on the onset and strength of ICF. Spin-distributions and feeding-intensity profiles have been measured to probe reaction dependent de-excitation patterns, and to get information about involved input angular momenta in complete (CF) and ICF products [3-5]. Low energy ICF is found to be originated from high input angular momenta driven into the system due to non-central interactions. Strong feeding through broad spin range has been observed in case of CF. However, the spin-distributions associated with ICF are found to arise from the narrow spin population, localized near and/or above the critical angular momentum for CF. In order to understand the competition of ICF with complete fusion, ICF strength functions for different projectile-target combinations have been measured. The ICF is found to compete with CF even at energy as low as $\approx 7\%$ above the Coulomb barrier [6-7]. Forward-recoil-ranges of heavy partners have also been measured to disentangle CF and ICF events, and to complement our findings [8]. Different linear-momentum-transfer (LMT) components associated with intact and/or fractional fusion of projectile with target nucleus have been observed. The detailed results of aforementioned studies will be presented during the symposium.

- [1] R. Rafiei *et al.*, Phys. Rev. C **81**, 024601 (2010), and the references therein.
- [2] L. R. Gasques *et al.*, Phys. Rev. C **74**, 064615 (2006) and the references therein.
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- [6] Pushpendra P. Singh *et al.*, Phys. Rev. C **77**, 014607 (2008)
- [7] Pushpendra P. Singh *et al.*, Phys. Rev. C (2010) to be submitted
- [8] Pushpendra P. Singh *et al.*, Eur. Phys. J. A **34**, 29–39 (2007)

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