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Influence of Multi-Neutron Transfer Channels on sub-barrier fusion enhancement

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Heavy ion fusion reaction dynamics in the vicinity of the Coulomb barrier have been extensively explored over the past few decades. The fusion cross sections at sub-barrier energies in the literature have been found to be enhanced over the predictions of One Dimensional Barrier Penetration Model (1-D BPM) calculations [1]. The effect of positive Q value Neutron Transfer (PQNT) channels on the sub-barrier fusion enhancement is still elusive in most of the cases. Therefore, in order to ascertain the aforementioned aspects, fusion excitation function measurements from ~15 % below and above the Coulomb barrier have been performed for ^{28}**Si +** ^{116,120,124}**Sn** systems using the Heavy Ion Reaction Analyzer (HIRA) at Inter University Accelerator Centre (IUAC), New Delhi. The experimentally measured fusion cross sections for all three Sn isotopes around the Coulomb barrier have been found to be enhanced as compared to uncoupled calculations. Coupled-Channels (CC) formalism has been employed to probe the underlying reaction mechanism [2]. The effect of Multi-Neutron Transfer (MNT) channels on sub-barrier fusion enhancement has been highlighted. Further, fusion barrier distribution have also been derived from the experimental data to understand the dynamics of the various channels coupled in the reaction. Detailed analysis and results will be presented during the conference.

References

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