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Study of complete-incomplete fusion mechanisms in $^7\mathrm{Li+}^{89}\mathrm{Y}$ reaction.

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Fusion mechanism of weakly bound stable (6,7 Li and 9 Be) and unstable halo (11 Li, 7,11 Be, and 8 B) nuclei is a subject of great interest from the past few years [1,2]. Due to their low breakup threshold, various reaction processes like complete-incomplete fusion (CF-ICF), elastic breakup, and transfer followed by a breakup, appear in the reaction dynamics. Hence, to study the CF-ICF mechanisms and its dependency on entrance channel parameters in 7 Li+ 89 Y reaction an experiment was performed at the BARC-TIFR Pelletron facility Mumbai, India, using activation technique within the 2.7–5.7 MeV/nucleon energy range. The γ -spectrometry has been used to identify the residues and residual cross-sections have been measured. A systematic analysis of the complete and incomplete fusion dynamics has been carried out by comparing the measured excitation functions with the equilibrium and pre-equilibrium reaction models in the framework of statistical reaction codes EMPIRE3.2.2 and ALICE19. A strong indication of incomplete fusion has been realized within the energy range considered; hence the strength of incomplete fusion fraction (F_{ICF}) has been deduced. F_{ICF} shows an increasing trend with increasing projectile energy [3]. Further, barrier height and radius parameters extracted from the measured data are in good agreement with the Bass model.

References:

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Field of your work

Experiental nuclear physics

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