

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

Wednesday, 19 August 2020 16:20 (15 minutes)

Fusion mechanism of weakly bound stable (${}^6,{}^7\text{Li}$ and ${}^9\text{Be}$) and unstable halo (${}^{11}\text{Li}$, ${}^{7,11}\text{Be}$, and ${}^8\text{B}$) 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 ${}^7\text{Li}+{}^{89}\text{Y}$ 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:

- [1] L. F. Canto *et al.*, Phys. Rep. 596, 1 (2015).
- [2] R. Prajapat and M. Maiti, Phys. Rev. C 101, 064620 (2020).
- [3] R. Prajapat and M. Maiti, Phys. Rev. C 101, 024608 (2020).

Field of your work

Experiential nuclear physics

Primary author: Mr PRAJAPAT, Rinku (Department of Physics, Indian Institute of Technology Roorkee, Roorkee-247667, Uttarakhand, India)

Co-author: Prof. MAITI, Moumita (Department of Physics, Indian Institute of Technology Roorkee, Roorkee-247667, Uttarakhand, India)

Presenter: Mr PRAJAPAT, Rinku (Department of Physics, Indian Institute of Technology Roorkee, Roorkee-247667, Uttarakhand, India)

Session Classification: Young Scientist Session 3