

PLPAC meeting 2024-1

Contribution ID : 2

Dynamics of B-induced reaction at low energies

Tuesday 23 Apr 2024 at 10:00 (00h15')

PI info :

Dr. Moumita Maiti

local collaborator info :

Dr. Suparna Sodaye (BARC)

Collaborators Name :

My students from IIT Roorkee: Bharat Kharpuse, Himanshu Sharma, Yasir Arafat, Pavneet Kaur, Sagar Roy
+ Other members from BARC

Motivation :

The study of breakup-fusion mainly focuses on weakly-bound projectiles with breakup thresholds 1.45--2.45MeV. However, ^{10}B also has low α -separation energy (4.5MeV), suggesting it may undergo breakup and significantly impact fusion mechanisms at low energies. Measurements from $^{10,11}\text{B}+^{159}\text{Tb}/^{209}\text{Bi}$ showed complete fusion suppression of ~15% for ^{10}B and 7% for ^{11}B reactions above the barrier. Since the fusion behavior of ^{10}B and its comparison with ^{11}B remains grossly unexplored in medium and light mass nuclei, we aim to measure fusion excitation functions for $^{10,11}\text{B}$ interactions on ^{89}Y , ^{59}Co , ^{141}Pr within 25--70MeV.

Beam time requirement in shifts :

12

Beam :

^{10}B ^{11}B

Beam Energy :

25-70 (MeV)

Beam Current :

1-5

Beam Port :

30o N Cascade Hall

Buncher Required :

NO

Target / Sample Details :

1-2 mg/cm² foils Co, Y, 500microgram Pr target

Whether the experiment is part of PhD work ? :

YES

Name of the PhD student and year of registration :

Bharat Kharpuse & 2023

Whether the experiment is part of Post-Doc work ? :

NO

Name of the Post Doc fellow :

NO

information on the past beamtime at PLF :

13-18 April 2022 (LINAC); 24-28 March 2023(pelletron);

25-31 Jan2024 (LINAC)

Publication information related to prior work at the PLF :

1. Study of ⁹Be fusion in ⁹³Nb around the Coulomb barrier; Himanshu Sharma, Moumita Maiti, Malvika Sagwal, Rishabh Kumar, Ankur Singh, Suparna Sodaye; Eur. Phys. J. A 60, 64 (2024)
2. Analysis of residual cross sections from ¹⁴N+⁹³Nb reaction: Fusion dynamics of a non- α -cluster projectile; Himanshu Sharma, Moumita Maiti, T. N. Nag, and S. Sodaye; Phys. Rev. C 107, 064601 (2023)
3. Measurement of residues from the ⁶Li + Zn reaction: Analysis of fusion phenomena below 7.1 MeV/nucleon; Ankur Singh, Moumita Maiti, T.N. Nag, S. Sodaye; Phys. Rev. C 108, 024607 (2023)
4. Shell effect driven fission modes in fragment mass and total kinetic energy distribution of ¹⁹²Hg*; Rishabh Kumar, Moumita Maiti*, A. Pal, S. Santra, Pavneet Kaur, Malvika Sagwal, Ankur Singh, P. C. Rout, Abhijit Baishya, Ramandeep Gandhi, and T. Santhosh; Phys. Rev. C 107, 034614 (2023).
5. Reaction dynamics of the ¹²C+¹⁸¹Ta system near the Coulomb barrier: Evidence of fusionfission events; Pavneet Kaur, Moumita Maiti, T. N. Nag, and S. Sodaye; Phys. Rev. C, 105, 014629 (2022).
6. Exploring various features of the reaction mechanism involved in the collision of ⁷Li on Cu; Rishabh Kumar, Moumita Maiti, T.N. Nag, S. Sodaye; Phys. Rev. C 104, 064606 (2021).
7. New measurement of residues from ¹²C+⁹³Nb by the activation technique: A closer look at the reaction mechanisms; Malvika Sagwal, Moumita Maiti, T.N. Nag, S. Sodaye; Eur. Phys. J. Plus 136, 1057 (2021).
8. Study of excitation functions and insights into the reaction mechanisms of ⁶Li fusion in Cu; Rishabh Kumar, Moumita Maiti, Gayatri Sarkar, Malvika Sagwal, Pavneet Kaur, Rinku Prajapat, T.N. Nag, and S. Sodaye; Eur. Phys. J. A 57, 209 (2021).
9. Probing the influence of incomplete fusion in ⁶Li+⁸⁹Y reaction upto 7.2 MeV/nucleon energy; Rinku Prajapat and Moumita Maiti; Phys. Rev. C 103, 034620 (2021).

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