

Resume

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Educational Qualifications :

Degree	Subjects	Name of the University/Board	Year of passing	Marks obtained	Grades
Ph. D	Physics	Homi Bhabha National Institute (Bhabha Atomic Research Centre)	2019	--	--
M.Sc	Physics	West Bengal State University	2013	78.64%	1 st Class
B.Sc	Physics (Honours)	West Bengal State University	2011	74.63%	1 st Class
Higher Secondary (12 th)	Science stream	West Bengal Council of Higher Secondary Education	2008	79.8%	1 st Division
Madhyamik (10 th)	Language stream, Arts stream, Science stream	West Bengal Board of Secondary Education	2006	83.38%	1 st Division

Research Experience:

- (1) Measurement of projectile breakup reactions involving weakly bound stable nuclei.
- (2) Study of coulomb dissociation experiment using weakly bound stable nuclei.
- (3) Handled double sided silicon strip detector array, single Si surface barrier detectors, MWPC (multi wire proportional counter) detectors, HPGe (High Purity Germanium) detector along with necessary electronics and VME-based data acquisition system at Pelletron-LINAC facility, Mumbai. Participated in collaboration experiment using INGA (Indian National Gamma Array) setup with digital data acquisition system.
- (4) Extensively used nuclear reaction codes such as FRESKO, AZURE2, PACE4.
- (5) Involved in the development of gas detector used for Nuclear Fission measurements.
- (6) Developed Monte Carlo based simulation code for La-halide detector characterization.
- (7) Used digital data acquisition system involving CAEN digitizer.

Technical Experience:

- (1) Computer programming in C, C++ and FORTRAN.
- (2) Experience in LAMPS data analysis packages.
- (3) Used GEANT4 and ROOT analysis packages.

Ph.D. Thesis :

I have completed my Ph.D from Homi Bhabha National Institute (Bhabha Atomic Research Centre), Mumbai:400094, India in 2019.

Title of the Thesis: Measurement of projectile breakup cross-sections in ${}^6,7\text{Li}+{}^{112}\text{Sn}$ reactions.

Supervisor: Dr. Satyaranjan Santra, Nuclear Physics Division, Bhabha Atomic Research Centre, Mumbai.

List of Publications:

a) Journal Publications:

- (1) “Direct and resonant breakup of radioactive ^7Be nuclei produced in the $^{112}\text{Sn}(^6\text{Li}, ^7\text{Be})$ reaction”, **D. Chattopadhyay**, S. Santra, A. Pal, A. Kundu, K. Ramachandran, R. Tripathi, T. N. Nag, and S. Kailas, [Phys. Rev. C 102, 021601\(R\), 2020.](#)
- (2) “Role of cluster structure in the breakup of ^7Li ”, **D. Chattopadhyay**, S. Santra, A. Pal, A. Kundu, K. Ramachandran, R. Tripathi, B. J. Roy, T. N. Nag, Y. Sawant, B. K. Nayak, A. Saxena, and S. Kailas, [Phys. Rev. C, 97, 051601\(R\), 2018.](#)
- (3) “Resonant, direct, and transfer breakup of ^6Li by ^{112}Sn ”, **D. Chattopadhyay**, S. Santra, A. Pal, A. Kundu, K. Ramachandran, R. Tripathi, D. Sarkar, S. Sodaye, B. K. Nayak, A. Saxena, and S. Kailas, [Phys. Rev. C, 94, 061602\(R\), 2016.](#)
- (4) “Resonant breakup of ^8Be in $^{112}\text{Sn}(^7\text{Li}, ^8\text{Be} \rightarrow 2\alpha)$ reaction”, **D. Chattopadhyay**, S. Santra, A. Pal, A. Kundu, K. Ramachandran, R. Tripathi, B. J. Roy, Y. Sawant, B. K. Nayak, A. Saxena, and S. Kailas, [Phys. Rev. C, 98, 014609, 2018.](#)
- (5) “Reduction of the effect of internal activity in $\text{LaCl}_3\text{:Ce}$ scintillator”, **D. Chattopadhyay**, Sathi Sharma, M. Saha Sarkar, [JINST 16,P06025, 2021.](#)
- (6) “Effect of projectile breakup on fission-fragment mass distributions in the $^6,^7\text{Li} + ^{238}\text{U}$ reactions”, S. Santra, A. Pal, P. K. Rath, B. K. Nayak, N. L. Singh, **D. Chattopadhyay**, B. R. Behera, Variderajit Singh, A. Jhingan, P. Sugathan, K. S. Golda, S. Sodaye, S. Appannababu, E. Prasad and S. Kailas, [Phys. Rev. C 90,064620, 2014.](#)

- (7) “Determination of $^{238}\text{Pu}(n, f)$ and $^{236}\text{Np}(n, f)$ cross sections using surrogate reactions”, A. Pal, S. Santra, B. K. Nayak, K. Mahata, V. V. Desai, **D. Chattopadhyay** and R. Tripathi, *Phys. Rev. C* 91, 054618, 2015.
- (8) “Probing systematic model dependence of complete fusion for reactions with weakly bound projectiles $^6,^7\text{Li}$ ”, A. Kundu, S. Santra, A. Pal, **D. Chattopadhyay**, B.K. Nayak, A. Saxena and S. Kailas, *Phys. Rev. C* 94, 014603, 2016.
- (9) “Elastic, inelastic, and 1-nucleon transfer channels in the $^7\text{Li} + ^{120}\text{Sn}$ system”, A. Kundu, S. Santra, A. Pal, **D. Chattopadhyay**, R. Tripathi, B. J. Roy, T. N. Nag, B. K. Nayak, A. Saxena, and S. Kailas, *Phys. Rev. C* 95, 034615, 2017.
- (10) “Projectile-breakup-induced fission-fragment angular distributions in the $^6\text{Li} + ^{232}\text{Th}$ reaction”, A. Pal, S. Santra, **D. Chattopadhyay**, A. Kundu, K. Ramachandran, R. Tripathi, B. J. Roy, T. N. Nag, Y. Sawant, D. Sarkar, B. K. Nayak, A. Saxena, and S. Kailas, *Phys. Rev. C* 96, 024603, 2017.
- (11) “Deep-inelastic multi-nucleon transfer processes in the $^{16}\text{O} + ^{27}\text{Al}$ reaction”, B.J. Roy, Y. Sawant, P. Patwari, S. Santra, A. Pal, A. Kundu, **D. Chattopadhyay**, V.Jha, S.K. Pandit, V.V. Parkar, K. Ramachandran, K. Mahata, B.K. Nayak, A. Saxena, S. Kailas, T.N. Nag, R.N. Sahoo, P.P. Singh and K. Sekizawa, *Phys. Rev. C* 97, 034603, 2018.
- (12) “Mass distributions of fission fragments from nuclei populated by multi-nucleon transfer or incomplete fusion channels in $^6,^7\text{Li} + ^{238}\text{U}$ reactions”, A. Pal, S. Santra, **D.**

Chattopadhyay, A. Kundu, A. Jhingan, P. Sugathan, N. Saneesh, MohitKumar, N. L. Singh, A. Yadav, C. Yadav, R. Dubey, K. Kapoor, Kavita Rani, HoneyArora, Visakh A. C., Devinder Kaur, B. K. Nayak, A. Saxena, S. Kailas, and K. -H.Schmidt, [Phys. Rev. C 98, 031601\(R\), 2018.](#)

(13) “Measurement of incomplete fusion cross-sections in ${}^6,7\text{Li}+{}^{238}\text{U}$ reactions”, A. Pal, S. Santra, **D. Chattopadhyay**, A. Kundu, A. Jhingan, P. Sugathan, B. K.Nayak, A. Saxena, and S. Kailas, [Phys. Rev. C 99, 024620, 2019.](#)

(14) “Low lying quadrupole and octupole collective excitations in the ${}^{112,116,118,120,122,124}\text{Sn}$ isotopes”, A. Kundu, S. Santra, A. Pal, **D. Chattopadhyay**, R.Tripathi, B. J. Roy, T. N. Nag, B. K. Nayak, A. Saxena, and S. Kailas, [Phys. Rev. C 99, 034609, 2019.](#)

(15)“Measurement of the 2_1^+ level lifetime in ${}^{120}\text{Sn}$ by the Doppler shift attenuation method: Evidence of enhanced collectivity”, A. Kundu, S. Santra, A. Pal, **D. Chattopadhyay**, R. Raut, R. Palit, Md. S. R. Laskar, F. S. Babra, C. S. Palshetkar, B. K. Nayak, and S. Kailas, [Phys. Rev. C 100, 034327 \(2019\).](#)

(16)“Determination of ${}^{59}\text{Ni}$ (n, xp) reaction cross sections using surrogate reactions”, Jyoti Pandey, Bhawna Pandey, A. Pal, S. V. Suryanarayana, S. Santra, B. K. Nayak, E. T. Mirgule, AlokSaxena, **D. Chattopadhyay**, A. Kundu, V. V. Desai, A. Parihari, G. Mohanto, D. Sarkar, P. C. Rout, B. Srinivasan, K. Mahata, B. J. Roy, S. De, and H. M. Agrawal, [Phys. Rev. C 99, 014601 \(2019\).](#)

(17) “Kinetic energy spectra and angular distributions of projectile-like fragments in ${}^{12,13}\text{C}+{}^{93}\text{Nb}$ reactions”, T. N. Nag, R. Tripathi, S. Sodaye, K. Sudarshan, S. Santra, K.

Ramachandran, A. Kundu, **D. Chattopadhyay**, A. Pal, and P. K. Pujari, [Phys. Rev. C 102, 024610 \(2020\)](#).

(18) “Large back-angle quasi-elastic scattering for $^7\text{Li}+^{159}\text{Tb}$ ”, Piyasi Biswas, A. Mukherjee, **D. Chattopadhyay**, SaikatBhattacharjee, M. K. Pradhan, Md. Moin Shaikh, Subinit Roy, A. Goswami, P. Basu, S. Santra, S. K. Pandit, K. Mahata, and A. Shrivastava, [Phys. Rev. C 103, 014606 \(2021\)](#).

(19) “Fission fragment mass distribution in the $^{32}\text{S} + ^{144}\text{Sm}$ reaction”, T.N.Nag, R.Tripathi, S.Patra, A.Mhatre, S.Santra, P.C.Rout, A.Kundu, **D.Chattopadhyay**, A .Pal, P.K.Pujari, [Phys. Rev. C 103, 034612 \(2021\)](#).

(20) “Quasielastic backscattering and barrier distribution for the weakly bound projectile ^6Li on ^{159}Tb ”, Piyasi Biswas, A. Mukherjee, Saikat Bhattacharjee, **D. Chattopadhyay**, Subinit Roy, S. Santra, S. K. Pandit, K. Ramachandran, K. Mahata, and A. Shrivastava, [Phys. Rev. C 104, 034620 \(2021\)](#).

(21) “Fusion of $^{16}\text{O}+^{165}\text{Ho}$ at deep sub-barrier energies”, Saikat Bhattacharjee, A. Mukherjee, Ashish Gupta, Rajkumar Santra, **D. Chattopadhyay**, N. Deshmukh, Sangeeta Dhuri, Shilpi Gupta, V. V. Parkar, S. K. Pandit, K. Ramachandran, K. Mahata, A. Shrivastava, Rebecca Pachua, and S. Rathi, [Phys. Rev. C 104, 054607 \(2021\)](#).

(b) International Conferences/Symposium proceedings online:

(1) “Determination Of Breakup Cross-Sections Using A 3-bodySimulation Code Based On Monte Carlo Method”, **D. Chattopadhyay**, S. Santra, A. Pal, A. Kundu and S. Kailas, [JPS Conf. Proc. 32, 010009 \(2020\)](#).

- (2) “Elastic, inelastic and inclusive alpha cross-sections in ${}^6\text{Li}+{}^{112}\text{Sn}$ system”, **D. Chattopadhyay**, S. Santra, A. Pal, A. Kundu, B. K. Nayak, K. Mahata, K. Ramachandran, R. Tripathi, V. V. Parkar, S. Sodaye, D. Sarkar, B. Pandey and G. Kaur, *EPJ Web of Conferences*, 117, 06022, 2016.

- (3) “Determination of astrophysical S-factor of ${}^2\text{H}(\alpha,\gamma){}^6\text{Li}$ from the Coulomb dissociation measurement”, **D. Chattopadhyay**, S. Santra, A. Pal, A. Kundu, K. Ramachandran, R. Tripathi, B. J. Roy, Y. Sawant, T. N. Nag, B. K. Nayak, S. Kailas, *Proceedings of the DAE International Symp. On Nucl. Phys.* 63, 766 (2018).

- (4) “Probe dependence of the nuclear deformation length of ${}^{120}\text{Sn}$ ”, A. Kundu, S. Santra, A. Pal, **D. Chattopadhyay**, T.N. Nag, R. Gandhi, P.C. Rout, B.J. Roy, B.K. Nayak, S. Kailas, *Proceedings of the DAE International Symp. On Nucl. Phys.* 63, 432 (2018).

- (5) “Kinetic energy spectra and angular distributions of projectile like fragments in ${}^{13}\text{C}+{}^{93}\text{Nb}$ reaction”, T. N Nag, R Tripathi, S Sodaye, K Sudarshan, S Santra, K Ramachandran, A Kundu, **D Chattopadhyay**, A Pal, P. K Pujari, *Proceedings of the DAE International Symp. On Nucl. Phys.* 63, 442 (2018).

- (6) “Determination of the ${}^{59}\text{Ni}(\text{n},\text{xp})$ reaction cross-sections for fusion technology”, Jyoti Pandey, Bhawna Pandey, A. Pal, S.V. Suryanarayana, S. Santra, B.K. Nayak, E.T. Mirgule, Alok Saxena, **D. Chattopadhyay**, A. Kundu, V.V. Desai, A. Parihari, G. Mohanto, D. Sarkar, P.C. Rout, B. Srinivasan, K. Mahata, B.J. Roy, S. De, H.M. Agrawal, *Proceedings of the DAE International Symp. On Nucl. Phys.* 63, 516 (2018).

- (7) “Measurement of incomplete fusion cross-sections in ${}^{6,7}\text{Li}+{}^{238}\text{U}$ reactions”, A. Pal, S. Santra, **D. Chattopadhyay**, A. Kundu, A. Jhingan, P. Sugathan, B.K. Nayak, A. Saxena, S. Kailas, *Proceedings of the DAE International Symp. On Nucl. Phys.* 63, 538 (2018).

- (8) “Breakup of ${}^9\text{Be}$ by ${}^{112}\text{Sn}$ and ${}^{209}\text{Bi}$ target nuclei”, R. Gandhi, **D. Chattopadhyay**, B.K. Nayak, S. Santra, P.C. Rout, A. Pal, A. Kundu, K. Ramachandran, R. Tripathi, V. Jha, T.N. Nag, G. Mohanto, B.J. Roy, T. Santhosh, A. Gandhi, P. Patil, J. Pandey, S. Kailas, *Proceedings of the DAE International Symp. On Nucl. Phys.* 63, 648 (2018).

- (9) “Exploration of Effects of Nuclear Structure and.. Reaction Mechanism on the Threshold Behaviour in Nuclear Reactions with Weakly Bound Projectiles: the ${}^7\text{Li} + {}^{74}\text{Se}$ System”, U. K. Pal, V. V. Parkar, S. Santra, A. Pal, H. Kumawat, K. Ramachandran, **D. Chattopadhyay**, A. Kundu, C. Joshi, T. N. Nag, G. Mahanto, A. Parihari, S. De, A. Patel, Hemlatha, B. K. Nayak, *Proceedings of the DAE International Symp. On Nucl. Phys.* 63, 660 (2018).
- (10) “Large Back-angle Quasi-elastic Scattering for ${}^6\text{Li}+{}^{159}\text{Tb}$ ”, Piyasi Biswas, A. Mukherjee, S. Bhattacharjee, Subinit Roy, **D. Chattopadhyay**, K. Ramachandran, S. Santra, K. Mahata, A. Shrivastava, S.K. Pandit, *Proceedings of the DAE International Symp. On Nucl. Phys.* 63, 674 (2018).
- (11) “Study of fission dynamics of ${}^{32}\text{S} + {}^{184,186}\text{W}$ reactions using Neutron Multiplicity as a probe”, Prashant N. Patil, N.M. Badiger, B.K. Nayak, P.C. Rout, A. Pal, G. Mohanto, S. Santra, **D. Chattopadhyay**, K. Mahata, N. Madhavan, M.M. Hosamani, A. Vinayak, S.P. Behera, A. Kundu, R. Gandhi, S. De, E.T. Mirgule, R. Kujur, V.D. Bharud, *Proceedings of the DAE International Symp. On Nucl. Phys.* 63, 720 (2018).

(c). National Conferences/Symposium proceedings online:

- (1) “Study of direct and sequential break-up reactions in ${}^6\text{Li}+{}^{112}\text{Sn}$ system”, **D. Chattopadhyay**, S. Santra, A. Pal, A. Kundu, B.K. Nayak, K. Mahata, K. Ramachandran, R. Tripathi, V.V. Parkar, G. Kaur, D. Sarkar, S. Sodaye, B. Pandey and S. Kailas, *Proceedings of the DAE Symp. On Nucl. Phys.* 60, 338 (2015).
- (2) “Observation of breakup via 1^+ resonant state of ${}^6\text{Li}$ ”; **D. Chattopadhyay**, S. Santra, A. Pal, A. Kundu, K. Ramachandran, R. Tripathi, D. Sarkar, S. Sodaye, B. K. Nayak, A. Saxena, and S. Kailas, *Proceedings of the DAE Symp. On Nucl. Phys.* 61, 360 (2016).
- (3) “Inclusive alpha and d in ${}^6\text{Li}+{}^{112}\text{Sn}$ system”; **D. Chattopadhyay**, S. Santra, A. Pal, A. Kundu, K. Ramachandran, R. Tripathi, D. Sarkar, S. Sodaye, B.K. Nayak, A. Saxena and S. Kailas, *Proceedings of the DAE Symp. On Nucl. Phys.* 61, 466 (2016).

- (4) “1p transfer induced breakup in ${}^7\text{Li}+{}^{112}\text{Sn}$ reaction”, **D. Chattopadhyay**, S. Santra, A. Pal, A. Kundu, K. Ramachandran, R. Tripathi, B. J. Roy, Y. Sawant, D. Sarkar, J. Pandey, B. K. Nayak, A. Saxena and S. Kailas, [Proceedings of the international conference in nuclear physics with energetic heavy ion beams, Chandigar, INDIA: abstract book , 2017.](#)
- (5) “Resonant breakup of ${}^8\text{Be}$ in ${}^{112}\text{Sn}({}^7\text{Li}, {}^8\text{Be}\rightarrow\alpha+\alpha)$ reaction”, **D. Chattopadhyay**, S. Santra, A. Pal, A. Kundu, K. Ramachandran, R. Tripathi, B.J. Roy, Y. Sawant, T.N. Nag, B.K. Nayak, A. Saxena and S. Kailas, [Proceedings of the DAE Symp. On Nucl. Phys. 62, 374 \(2017\).](#)
- (6) “Direct and sequential breakup in ${}^7\text{Li}+{}^{112}\text{Sn}$ reaction”, S. Santra, **D. Chattopadhyay**, A. Pal, A. Kundu, K. Ramachandran, R. Tripathi, B. J. Roy, Y. Sawant, T. N. Nag, B. K. Nayak, A. Saxena and S. Kailas, [Proceedings of the DAE Symp. On Nucl. Phys. 62, 416 \(2017\).](#)
- (7) “Study of direct and sequential breakup of radioactive nuclei of ${}^7\text{Be}$ ”, **D. Chattopadhyay**, S. Santra, A. Pal, A. Kundu, K. Ramachandran, R. Tripathi, T. N. Nag, S. Kailas, [Proceedings of the DAE Symp. On Nucl. Phys. 64, 329 \(2019\).](#)
- (8) “Elimination of the effect of alpha contamination in LaCl_3 scintillators by pulse shape discrimination”, **D. Chattopadhyay**, M. Saha Sarkar and S. Sharma, [Proceedings of the DAE Symp. on Nucl. Phys. 64, 904 \(2019\).](#)
- (12) “Total fusion and inclusive alpha in ${}^6,7\text{Li}+{}^{238}\text{U}$: Role of projectile breakup”, **D. Chattopadhyay**, S. Santra, A. Pal, A. Parihari, R. Tripathi, K. Mahata, B.K. Nayak, S. Kailas, [Proceedings of the DAE Symp. On Nucl. Phys. 59, 428 \(2014\).](#)
- (13) “Determination of ${}^{236}\text{Np}(n,f)$ and ${}^{238}\text{Pu}(n,f)$ cross-sections using surrogate reactions”, A. Pal, S. Santra, B.K. Nayak, K. Mahata, R. Tripathi, A. Parihari, V. V. Desai, **D. Chattopadhyay**, S. Kailas, [Proceedings of the DAE Symp. On Nucl. Phys. 59, 342 \(2014\).](#)
- (14) “Fission fragment anisotropy for breakup/transfer induced reactions”, A. Parihari, S. Santra, A. Pal, **D. Chattopadhyay**, T.K. Ghosh, A. Chaudhuri, K. Banerjee, S. Kundu, A. Shrivastava, K. Mahata, R. Tripathi, K. Ramachandran, S. Pandit, V.V. Parkar, J.K. Meena, N.L. Singh, S. Kailas, [Proceedings of the DAE Symp. On Nucl. Phys. 59, 374 \(2014\).](#)

- (15) “Understanding complete and incomplete fusion-fission reactions induced by weakly bound nuclei ${}^6,{}^7\text{Li}$ ”, S. Santra, A. Parihari, B. K. Nayak, A. Pal, P. K. Rath, N. L. Singh, **D. Chattopadhyay**, B. R. Behera, Varinderjit Singh, A. Jhingan, P. Sugathan, K. S. Golda, S. Sodaye, S. Appannababu, E. Prasad, S. Kailas, *Proceedings of the DAE Symp. On Nucl. Phys.* 59, 416 (2014).
- (16) “Systematic model-dependent behaviour of fusion involving weakly bound projectiles ${}^6,{}^7\text{Li}$ ”, A. Kundu, S. Santra, A. Pal, **D. Chattopadhyay**, *Proceedings of the DAE Symp. On Nucl. Phys.* 60, 436 (2015).
- (17) “Understanding Reaction Mechanisms of Multi-nucleon Transfer Reactions in Deformed Nuclei”, B. J. Roy, Anjali Aggarwal, Shivani, Taniya Basu, Sonika, H. Kumawat, S. K. Pandit, V. V. Parkar, K. Ramchandran, K. Mahata, A. Pal, A. Kundu, **D. Chattopadhyay**, S. Santra, T. Sinha, A. K. Mohanty, K. Sakizawa, *Proceedings of the DAE Symp. On Nucl. Phys.* 60, 328 (2015).
- (18) “BE(3) transition strength from inelastic scattering in ${}^6\text{Li}+{}^{112}\text{Sn}$ reaction”, S. Santra, A. Kundu, A. Pal, D. Chattopadhyay, B. K. Nayak, K. Mahata, K. Ramchandran, R. Tripathi, V. V. Parkar, V. V. Desai, D. Sarkar, *Proceedings of the DAE Symp. On Nucl. Phys.* 60, 376 (2015).
- (19) “Reaction Mechanism Studies of Multi-nucleon Transfer Reactions in ${}^{208}\text{Pb}({}^{16}\text{O}, x)$ and comparison with ${}^{206}\text{Pb}({}^{18}\text{O}, x)$ ”, B. J. Roy, K. Sakizawa, Sonika, Taniya Basu, Shivani, Anjali Aggarwal, H. Kumawat, S. K. Pandit, V. V. Parkar, K. Ramchandran, K. Mahata, A. Pal, A. Kundu, **D. Chattopadhyay**, S. Santra, T. Sinha, A. K. Mohanty, *Proceedings of the DAE Symp. On Nucl. Phys.* 60, 392 (2015).
- (20) “Simultaneous description of elastic, inelastic and 1-nucleon transfer channels in ${}^7\text{Li}+{}^{120}\text{Sn}$ system”, A. Kundu, S. Santra, A. Pal, **D. Chattopadhyay**, R. Tripathi, B. J. Roy, T. N. Nag, B. K. Nayak, A. Saxena, S. Kailas, *Proceedings of the DAE Symp. On Nucl. Phys.* 61, 362 (2016).
- (21) “Mass distribution of fission fragments in coincidence with alpha in ${}^6,{}^7\text{Li}+{}^{238}\text{U}$ reactions”, A. Pal, S. Santra, **D. Chattopadhyay**, A. Kundu, A. Jhingan, P. Sugathan, N.

Saneesh, Mohit Kumar, N. L. Singh, A. Yadav, C. Yadav, R. Dubey, K. Kapoor, Kavita Rani, H. Arora, A. C. Visakh, Devinder Kaur, B. K. Nayak, A. Saxena, S. Kailas, [Proceedings of the DAE Symp. On Nucl. Phys. 61, 376 \(2016\).](#)

(22) “Transfer induced fission fragment angular distribution in $^{11}\text{B}+^{238}\text{U}$ reaction at near barrier energy”, T. N. Nag, R. Tripathi, S. Sodaye, K. Sudarshan, A. Pal, S. Santra, K. Ramachandran, **D. Chattopadhyay**, A. Kundu, P. K. Pujari, [Proceedings of the DAE Symp. On Nucl. Phys. 61, 390 \(2016\).](#)

(23) “Multi-nucleon Transfer Reactions with Deformed Target near Coulomb Barrier”, B. J. Roy, Y. Sawant, N. Dhingra, S. Santra, A. Pal, A. Kundu, **D. Chattopadhyay**, T. N. Nag, V. Jha, S. K. Pandit, V. V. Parkar, K. Ramachandran, K. Mahata, R. N. Sahoo, P. P. Singh, B. K. Nayak, A. Saxena, K. Sekizawa [Proceedings of the DAE Symp. On Nucl. Phys. 61, 406 \(2016\).](#)

(24) “Study of Multi-nucleon Transfer Reactions in Light System $^{16}\text{O} + ^{27}\text{Al}$ at an incident Energy above Coulomb Barrier”, B. J. Roy, Y. Sawant, **D. Chattopadhyay**, A. Kundu, A. Pal, S. Hazarika, S. Saha, S. Santra, V. Jha, K. Ramachandran, T. N. Nag, S. K. Pandit, V. V. Parkar, K. Mahata, R. N. Sahoo, P. P. Singh, B. K. Nayak, A. Saxena, K. Sekizawa, [Proceedings of the DAE Symp. On Nucl. Phys. 61, 408 \(2016\).](#)

(25) “Fission fragments mass distributions of nuclei populated by multinucleon transfer channels in $^{6,7}\text{Li}+^{238}\text{U}$ reaction”, A. Pal, S. Santra, **D. Chattopadhyay**, A. Kundu, A. Jhingan, P. Sugathan, N. Saneesh, Mohit Kumar, N. L. Singh, A. Yadav, C. Yadav, R. Dubey, K. Kapoor, Kavita Rani, Honey Arora, A. C. Visakh, Devinder Kaur, B. K. Nayak, A. Saxena, S. Kailas, [Proceedings of the DAE Symp. On Nucl. Phys. 62, 368 \(2017\).](#)

(26) “Neutron and proton transition matrix elements for low-lying collective excitations in Sn isotopes”, A. Kundu, S. Santra, A. Pal, **D. Chattopadhyay**, R. Tripathi, B. J. Roy, T. N. Nag, B. K. Nayak, A. Saxena, S. Kailas, [Proceedings of the DAE Symp. On Nucl. Phys. 62, 382 \(2017\).](#)

(27) “Development of a compact MWPC detector”, A. Pal, S. Santra, A. Kundu, **D. Chattopadhyay**, A. Jhingan, B. K. Nayak, A. Saxena, [Proceedings of the DAE Symp. On](#)

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Research

1. Past and/or current research:

My research work interest focuses on the: (1) Understanding the dynamics of nuclear reactions involving weakly bound stable nuclei and (2) Study of coulomb dissociation experiment using weakly bound stable nuclei. All the research work till now have been carried out in India using two accelerator facilities, namely: i) Pelletron-LINAC accelerator facility at Tata Institute of Fundamental Research(TIFR), Mumbai and ii) Folded Tandem

ION accelerator facility at Bhabha Atomic Research Centre, Mumbai. Apart from that I have actively involved in the characterization of the La-halide scintillator at Saha Institute of Nuclear Physics, Kolkata during my first post-doc. Presently at Tata Institute of Fundamental Research, My research work deals with the theoretical understanding of Nuclear reaction processes responsible for Big-bang and stellar nucleosynthesis processes and to study the systematic behaviour electron screening effect. I have participated in other collaborative experiments at (1) ECR facility, TIFR, (2) Pelletron accelerator facility at IUAC, New Delhi and (3) Cyclotron accelerator facility at VECC, Kolkata. In USA, my current research is focused on the simulation and analysis of MuSIC (Multi Sampling Ionization Chamber).

Current/Past Position and description of work

1. Post-doctoral research associate: (December 2021 to present)

Department of Chemistry, Indiana University, Bloomington: 47405, INDIA

I am involved in development of simulation code for MuSIC detector and analyzing the experimental data of proton capture by ^{18}O reactions.

2. Visiting post-doc fellow: (January 2021 to December 2021)

Department of Nuclear and Atomic Physics, Tata Institute of Fundamental Research, Mumbai: 400005, INDIA

At TIFR, I have done my second post-doctoral research work. My research work was based on the understanding nuclear reaction processes responsible for Big-bang and stellar nucleosynthesis processes and to study the systematic behaviour of electron screening effect relevant to big bang nucleosynthesis. This work was purely theoretical and

computational. Apart from my work, I have participated several experiments at (a) ECR facility, TIFR and (b) Pelletron-LINAC accelerator facility at Tata Institute of Fundamental Research (TIFR), Mumbai. Manuscript is under preparation.

3. Research Associate: (February 2019 to December 2020)

Nuclear Physics Division, Saha Institute of Nuclear Physics, Kolkata: 700064, INDIA

During my post-doc at SINP, I have carried out my research work on breakup of radioactive nuclei ${}^7\text{Be}$ produced in the reaction ${}^{112}\text{Sn} ({}^6\text{Li}, {}^7\text{Be})$ where, the two resonant states of ${}^7\text{Be}$ ($7/2^-$ and $5/2^-$) have been identified for the first time. Apart from I am involved in the characterization of La-halide detector making it useful for the low energy Nuclear Astrophysics experiments. As a post-doc, I have learnt to use the digital data acquisition system. In addition, I have involved in several collaborative experiments at (a) Pelletron-LINAC accelerator facility at Tata Institute of Fundamental Research(TIFR), Mumbai and (b) Cyclotron accelerator facility at VECC, Kolkata.

4. Visitor: (November 2018 to January 2019)

Department of Nuclear and Atomic Physics, Tata Institute of Fundamental Research, Mumbai: 400005, INDIA

As a visitor, I have involved on particle-gamma coincidence set-up designed to study the non-yrast states in Zr isotopes. I have successfully completed the assigned project during the short stay at TIFR.

5. PhD Research Scholar: (October 2013 to October 2018)

Nuclear Physics Division, Bhabha Atomic Research Centre, Mumbai: 400085, INDIA

I have carried out my Ph.D. thesis work in Nuclear Physics Division, BARC, Mumbai. The title of my thesis was “Measurement of projectile breakup cross-sections in ${}^{6,7}\text{Li}+{}^{112}\text{Sn}$

reactions". My thesis research deals with the understanding of breakup reactions of weakly bound projectiles ${}^6,{}^7\text{Li}$ by medium mass nuclei ${}^{112}\text{Sn}$. Since ${}^6,{}^7\text{Li}$ nuclei exhibit $\alpha + x$ cluster structure having weak binding, similar to the exotic nuclei near drip lines, the study of the reaction mechanism involving these nuclei will be very useful to understand some of the important features of the reactions involving exotic nuclei. It is observed that ${}^6\text{Li}$ (${}^7\text{Li}$) not only breaks into its cluster constituents $\alpha + d(t)$, but also exchange some nucleons with the target before forming the quasi-bound nuclei which subsequently breaks into $\alpha + y$, where y can be an alpha, d, p, etc. In order to capture all the breakup fragments large area Double sided silicon-strip detector array is used at experiments at TIFR-BARC Pelletron-LINAC Facility, Mumbai and Monte Carlo Simulation Code was developed both in C++ and GEANT4. Several kinematic correlation techniques are used to identify the breakup fragments in coincidence and compared with the simulation. Several interesting results have been observed for the first time in the measurements involving both the systems, i.e., ${}^6\text{Li}+{}^{112}\text{Sn}$ and ${}^7\text{Li}+{}^{112}\text{Sn}$. For the first time, we have observed $\alpha + d$ breakup through the 1^+ resonant state of ${}^6\text{Li}$, $\alpha + t$ breakup through $5/2^-$ resonant state of ${}^7\text{Li}$, and $\alpha + \alpha$ breakup through 4^+ resonant state of ${}^8\text{Be}$. Also we have observed the breakup of ${}^7\text{Li}$ into ${}^6\text{He}+p$ for the first time suggesting the possibilities of another cluster structure of ${}^7\text{Li}$ as ${}^6\text{He}+p$ apart from its well-known $\alpha + t$ cluster. The cross-section for each breakup process is evaluated with the help of simulation code and also by using the JACOBIAN and the results have been compared with the theoretical cross sections calculated using the well-known FRESKO code. The detailed study of resonant, direct and transfer induced breakup into two fragments via different resonant states provides a good foundation towards understanding the reaction mechanisms of total α production, the sequential modes of projectile breakup and their impact on fusion cross sections.

References:

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