

ANIL SHARMA

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UGC-DAE CSR, Kolkata Centre

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EDUCATION

Doctor of Philosophy(Ph.D) | Experimental Nuclear Physics

UGC-DAE Consortium for Scientific Research Kolkata Centre

March 2023 – Present

Kolkata

Master of Science | Physics

University of Delhi, New Delhi

Aug. 2019 – July 2021

Grade : 7.6 CGPA

Bachelor of Science | Physics, Mathematics, Chemistry

University of Maharaja College, Jaipur

Aug. 2016 – May 2019

Grade : 68.44%

Senior Secondary Exam(12th Standard)

Nitin Sr. Sec. School, Jaipur

July 2015 – May 2016

Grade : 89.60%

Secondary Exam(10th Standard)

Ankit Public Sr. Sec. School, Jaipur

July 2013 – May 2014

Grade : 84.17%

RESEARCH EXPERIENCES

Collaborative Project : Pulse shape analysis

UGC-DAE Consortium for Scientific Research, Kolkata Centre

May 2023 – Present

Kolkata

- Worked on response pulse shaping and filtering of a nuclear source for a radiation detector
- Also, I worked on the multichannel analyzer(MCA) and Digital Signal Processing how we get the spectrum through any response signal using the peak amplitude of pulses.
- I used CR-RC⁴ filter for shaping and moving average and moving window deconvolutional for filtering.

Study of bulk properties of a medium by heavy ion collisions

Feb 2023 – Nov 2023

Joint Institute for Nuclear Research, Dubna

- I acquired a better understanding of the QCD phase transition mechanism.
- I present the measurement of bulk properties of the matter produced in Bi+Bi collisions at $\sqrt{s_{NN}} = 9.2 \text{ GeV}$ using the identified hadrons (π^{\pm}), kaons(K^{\pm}), proton(p) from the MPD experiment at the Nuclotron-based Ion Collider fAcility (NICA).
- We are generating the data of Bi+Bi collisions by the statistical Monte Carlo generator model named Ultrarelativistic Quantum Molecular Dynamics (UrQMD).
- Also, I analyze the data using the MpdRoot framework and obtain the results on transverse momentum(p_T) spectra, radial position of the event vertex, track selection for TPC(Time projection chamber), Particle identification from the experimental data, the distance of closest approach (DCA) between each track and the event vertex and then the cuts using the rapidity and total momentum analysis.

Collaborative Project : Simulation of HPGe-Detector with GEANT4

Aug 2020 – July 2021

New Delhi

University of Delhi

- I created a virtual detector with a replica used in the computation, which was created inside the Geant4 simulation.
- The simulation output had been compared with the data from the experiment performed under nearly similar conditions.
- I did the calculation of the electric field and the simulation of the detector is an implementation of the electric field inside the HPGe crystal and gets the pulse shape for each randomly incident particle.

Dissertation Project : Exploring the Neutron Star with *ab initio* model

Jan 2021 – July 2021

New Delhi

University of Delhi

- Study about the Relativistic Brueckner Hartree Fock(RBHF) approach in *ab initio* model.
- Learn about the Relativistic Mean Field(RMF) theory approach also.
- Calculate the fitting parameters for the energy density and compare them with the theoretical models.

Campaign : Asteroid Search Campaigns

Oct 2020 – Nov 2020

International Astronomical Search Collaboration (IASC)

- We did some observations of near-Earth objects and Main Belt asteroids by participating in the analysis of images from Pan-STARRS.
- In this project we also learn about how to use the ASTROMETRICA software.
- We discovered two unidentified objects through the given data and images.

ORAL PRESENTATIONS

- **A. Sharma**, Aditi Das, S. Kundu, Pankaj K. Giri, S. S. Ghugre, S. Samanta, K. Katre, I. Bala, R. P. Singh, S. Muralithar, A. Sharma, S. Ali, S. S. Tiwary, S. Bhattacharya, S. Rajbanshi, and R. Raut. Level Structure of ^{69}Ga . Proceedings of the DAE Symp. on Nucl. Phys. A21 (2024)

PROCEEDINGS

- **A. Sharma**, S. Kundu, Pankaj K. Giri, S. S. Ghugre, S. S. Nayak, S. Basu, S. Pal, S. Das, S. Dar, S. Paul, A. Pal, S. Basak, G. Mukherjee, S. Bhattacharyya, R. Raut. Spectroscopy of ^{67}Zn using Digital INGA at VECC. Proceedings of the DAE Symp. on Nucl. Phys. A31 (2023)
- **Anil Sharma**, Alexey Aparin. Study of bulk properties of the medium produced in heavy ion collisions at MPD. Proceedings of the DAE Symp. on Nucl. Phys. E23 (2023)
- S. Kundu, **A. Sharma**, Pankaj K. Giri, S. S. Ghugre, S. Bhattacharya, S. S. Nayak, S. Das, S. Bhattacharyya, G. Mukherjee, R. Palit, R. P. Singh, R. Raut. Integration of CeBr₃ Fast Scintillators with the Digital INGA at VECC. Proceedings of the DAE Symp. on Nucl. Phys. G90 (2023)
- Pankaj K. Giri, **A. Sharma**, K. Basu, S. S. Ghugre, S. Dasgupta, J. Datta, G. Mukherjee, S. Bhattacharyya, P. Pallav, R. Raut. Excitation Function Measurement of ${}^{nat}\text{Sb}$ Reactions for Production of Iodine Isotopes. Proceedings of the DAE Symp. on Nucl. Phys. B186 (2023)
- Pankaj K. Giri, **A. Sharma**, K. Basu, S. S. Ghugre, S. Dasgupta, J. Datta, G. Mukherjee, S. Bhattacharyya, P. Pallav, R. Raut. Excitation Function Measurement of ${}^{nat}\text{Cu}$ Monitor Reactions between 40 and 50 MeV. Proceedings of the DAE Symp. on Nucl. Phys. B187 (2023)
- Kausik Basu, **Anil Sharma**, Soumalya Kundu, Pankaj K. Giri, Sandeep S. Ghugre, Rajarshi Raut, Amitabha Das, Mithun Das. Digital pulse-shape analysis algorithms for gamma-ray spectroscopy. Proceedings of the DAE Symp. on Nucl. Phys. G76 (2023)
- S. Chakraborty, S. Bhattacharyya, G. Mukherjee, S. S. Nayak, Shabir Dar, Sneha Das, S. Basu, Suchorita Paul, Snigdha Pal, S. Basak, A. Pal, D. Kumar, Soumik Bhattacharya, Debasish Mondal, R. Raut, Pankaj K. Giri, **A. Sharma**, S. S. Ghugre, C. Majumder, R. Banik, S. Das Gupta, A. Karmakar, J. Dey, U. Dutta, S. Chattopadhyay, S. Ganguly, S. Rajbanshi. Level scheme of ^{128}Cs below the isomeric $I=(9+)$ state. Proceedings of the DAE Symp. on Nucl. Phys. A2 (2023)

TEACHING AND MENTORING

Mentor

March 2023 – Present

Kolkata

UGC-DAE CSR Kolkata Centre

- Hadi Mohammed Soufy, Integrated M.Sc Student at NISER Bhubaneswar during his NIUS program on the topic of digital pulse processing.
- Monsum Hatikakoty, Mariyam Rasul, Arijee, Nilraj, Kangkan Jyoti Saikia, Krishna, Master's students at Cotton University, Assam
- Ananya, Sukanya, and Shubham, Master's students at Cotton University, Assam
- Disha, and Midhuna, Master's students from Mumbai and Niser respectively
- Sambit Barman, Master's student from Paskuda Bandu College on the topic of Background radiation subtraction.

SPECIALISED COURSE CURRICULUM

- Theoretical & Experimental Nuclear Physics
- Introductory Astronomy
- Nuclear Astrophysics
- Computational Physics Lab
- Classical Mechanics
- Quantum Mechanics
- Statistical Physics
- Electromagnetic theory and Electrodynamics
- Atomic and Molecular Physics
- Nuclear and Particle Physics
- Mathematical Physics
- Electronics

LAB SKILLS AND EXPERIENCE

- Working in India's largest nuclear campaign INGA(Indian National Gamma Array) at VECC(variable energy cyclotron centre). Here, we are making the whole array like beam line arrangement, placing ACS(Anti Compton shields) and detectors in the array, and managing the cabling, cooling process, and electronics of the detectors.
- know about handling the detectors like Clover, LEPS, HPGe, Scintillators(LaBr_3 , NaI , BaF_2 , etc.)
- Personally taking care things of clover detector like replacing their Pre-Amplifier card, annealing process, their cooling or liquid nitrogen filling process, and other electronics as well.
- I gained some knowledge in target preparation for nuclear experiments. Last target, we used, were Antimony(Sb) with mylar, Copper(Cu), Aluminium(Al) etc.
- Handled Data acquisition system and modules like Pixie-16 from XIA, USA.

SKILLS

- **Languages:** English, Hindi, Sanskrit
- **Known Operating System:** Windows, LINUX/UNIX, MacOS
- **Programming Languages:** C/C++, Python, Fortran
- **Document Creation:** M.S Word, M.S Excel, M.S PowerPoint, L^AT_EX, Beamer in L^AT_EX
- **Software for Nuclear Physics:** ROOT data analysis(CERN), Geant4, Radware, LISE++, SRIM, Candle(IUAC)
- **Other Scientific Software:** Image Reduction and Analysis Facility (IRAF), MATLAB, Mathematica, Astrometrica, ORIGIN, GnuPlot

AWARDS AND QUALIFIED NATIONAL LEVEL EXAMS

- Got prize money worth 5000 Rupees in 10th Standard from Department of Science and Technology for getting one hundred percent(100%) marks in Mathematics subject.
- Received Inspire Scholarship for Higher Education (for B.Sc and M.Sc. both) from 2016 to 2021 because I was a student within the top 1% in our state of our 12th Standard examination.
- Get the same Inspire Fellowship for the Ph.D. program in 2022 as well.
- Graduate Aptitude Test in Engineering(GATE)-2022, **Score:** 438, **Percentile:** 92.80%
- Joint Entrance Screening Test (JEST)-2021(For PhD program), **All India Rank:** 253, **Percentile:** 95.07%
- Joint Entrance Screening Test (JEST)-2019 (for Master program), **All India Rank:** 110, **Percentile:** 98.36%
- Joint Admissions test for Masters (JAM)-2019, **Score:** 50.33, **Percentile:** 95.17%
- Delhi University Entrance Exam (For M.Sc. Program)-2019, **Score:** 68, **All India Rank:** 10
- Joint Entrance Examination (JEE) Main-2016, **Score:** 131, **Percentile:** 95.98%

PERSONAL QUALITIES

- Quick learning and sharp problem-solving skills.
- Self-starter with the ability to handle multiple priorities.
- Hardworking, dedicated, and fast learner.
- Well organized and have an excellent work ethic.
- Excellent communication skills in written and verbal both.
- Experienced in clarifying doubts in the concerned subject.
- Proficient in basic computer use and internet savvy.
- Proficient table tennis, cricket, and chess player.

HOBBIES & INTEREST



Sports



Problem Solving



Healthcare



Cooking

