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Disha J Kuzhively

Education

June 2014 - June 2019 **Integrated M.Sc. in Physics**, Minor in Mathematics
National Institute of Science Education and Research, Bhubaneswar, India

Master's Thesis

August 2018 - Present **Deuteron Production in Relativistic Heavy Ion Collision**

Supervisors Dr Amaresh Jaiswal and Prof. Sourendu Gupta

Deuteron and other light nuclei are formed in the fireball produced in relativistic heavy ion collision. We take the deuterons to be formed by a coalescence process. The deuterons being loosely bound dissociate when they collide with other particles present in the fireball. The surviving fraction of deuterons is calculated for a spherical, radially expanding fireball.

Academic Projects

June 2018 - July 2018 **Deuteron Production**

Supervisor Prof. Sourendu Gupta, *Tata Institute of Fundamental Research, Mumbai*

- The yield equation for deuteron production through fusion of proton and neutron in the fireball is set up using phase space densities. The reaction probability of the process is approximated to a delta function anticipating that fusion happens when the relative momentum of proton and neutron is negligible. For a static and spherical fireball the fraction of deuteron that survive without dissociating by colliding into other particles (like pions) in the fireball is calculated.

Jan 2017 - April 2017 **Bethe Ansatz for One-Dimensional Heisenberg Ferromagnet**

Supervisor Dr Chethan Gowdigere, *School of Physical Sciences, NISER*

- Bethe Ansatz method was used to obtain exact eigenvalues and eigenvectors of 1D spin = 1/2 Heisenberg model and solve problems in Michael Karbach and Gerhard Müller's introductory articles on Bethe Anstaz.
- The project findings were defended in the poster presentation for 6th Semester Project in School of Physical Sciences, NISER.

June 2016 **Characterisation of a Gamma Detector**

Supervisor Dr Rajesh P. Singh, *Inter-University Accelerator Centre, New Delhi*

- The resolution, efficiency, add-back and peak to total characteristics of the Compton-suppressed HPGe gamma detector at *IUAC* were studied. ^{152}Eu and ^{60}Co radioactive sources were used for relevant measurements.

June 2015 - July 2015 **Boundary Value Problems in Electrodynamics**

Supervisor Dr A. V. Anil Kumar, *School of Physical Sciences, NISER*

- Problems in electrostatics involving boundary surfaces on which either the potential or the surface charge density is specified were solved using the method of images and expansion in orthogonal functions.

Scholarships and Awards

June 2018 - July 2018 Participated in TIFR's annual summer programme **Visiting Students' Research Programme**

June 2016 Participated in **IUAC Summer Programme for B.Sc. (Physics) Students**

27 June 2016 Received **Best Project Presentation Award** for the presentation of the work titled *Characterisation of a Gamma Detector*.

2014 - 2019 **INSPIRE Scholarship**, awarded by the Department of Science and Technology, Govt. of India.

2011 - 2013 **Dakshana Scholar**, awarded by the Dakshana Foundation.

Workshops and Conferences attended

September 2018 **Effective Field Theory at Finite Temperature**
Two day workshop on EFT techniques to understand hot QCD matter, held at TIFR Mumbai

March 2017 **Workshop on Mathematica**
Organised by Amigo Optima at NISER Bhubaneswar

November 2016 **Conference on Optics and Photonics Technology 2016**
One-day conference organized by Optical Society of America (OSA), OSA Chapter, NISER

Technical Skills

Programming Languages
C++, GNU Octave, LINUX/UNIX Shell

Software Packages
gnuplot, Mathematica, LaTeX, ROOT and CANDLE

Relevant Coursework

Physics Theory Courses

- ◇ Relativistic Nucleus-Nucleus Collision and Quark Gluon Plasma
- ◇ Quantum Field Theory-I
- ◇ Experimental High Energy Physics
- ◇ Computational Physics
- ◇ General Relativity
- ◇ Atoms, Molecules and Radiation
- ◇ Nuclei and Particles

Mathematics courses

- ◇ Group Theory
- ◇ Metric Spaces
- ◇ Differential Equations
- ◇ Linear Algebra
- ◇ Probability Theory
- ◇ Numerical Analysis
- ◇ Real Analysis

References

Prof. Sourendu Gupta
Professor, Department of Theoretical Physics,
Tata Institute of Fundamental Research, Mumbai
Email: sgupta@theory.tifr.res.in

Dr Amaresh Jaiswal
Assistant Professor, School of Physical Sciences,
National Institute of Science Education and Research, Bhubaneswar
Email: a.jaiswal@niser.ac.in

Dr Rajesh P. Singh
Scientist-G, Inter-University Accelerator Centre, New Delhi
Email: rps@iuac.res.in