



Riasat Sheikh

PhD Researcher · Theory of Elementary Particles Lab

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About

I'm a PhD researcher in elementary particle theory, working on dark matter models, particle phenomenology, and exploring new ideas beyond the Standard Model. My work is driven by a curiosity to understand the universe at its most fundamental level.

Any inquiries, collaboration opportunities, or discussions related to my research are welcome. Feel free to connect—let's explore the infinite wonders of theoretical physics together.

Education

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|---------------------|---|-------|
| Apr 2024 - Present | PhD (Physics) Kyushu University, Fukuoka | Japan |
| | <ul style="list-style-type: none">• <u>Lab</u>: Theory of Elementary Particles• Development of models for DM production and annihilation• <u>Funding</u>: Ministry of Education, Culture, Sports, Science and Technology (MEXT) Scholarship, 2024 | |
| Jun 2020 - Jul 2022 | Master of Science (Physics) Banaras Hindu University, Varanasi | India |
| | <ul style="list-style-type: none">• <u>Specialization</u>: Nuclear and Particle Physics• Graduated with First Division, Distinction, Gold Medal, and First Position• <u>Key Courses</u>: Particle Physics, Weak Interaction & Electroweak Unification, Quantum Field Theory, Methods in Theoretical Physics, Advanced Quantum Mechanics, Computational Physics. | |
| Jun 2016 - Jul 2019 | Bachelor of Science (Physics) Cotton University, Guwahati | India |
| | <ul style="list-style-type: none">• Graduated with First Division• Major in Physics, Minor in Mathematics and Chemistry• <u>Key Courses</u>: Classical Mechanics, Special Theory of Relativity, Quantum Mechanics, Mathematical Physics, Nuclear and Particle Physics, Radiation Theory, Statistical Mechanics. | |

Research Experience

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|-----------------------------------|---|-------|
| Oct 2024 - Mar 2025 (6 months) | Research Assistant Kyushu University, Fukuoka | Japan |
| | <ul style="list-style-type: none">• Working on the project pseudo-Nambu-Goldstone boson Dark Matter | |
| Aug 2022 - Mar 2023 (8 months) | Research Assistant Banaras Hindu University, Varanasi | India |
| | <ul style="list-style-type: none">• Worked on a research project funded by the IoE Scheme (Number 6031) at Department of Physics, Banaras Hindu University, Varanasi. | |

- Jul 2007 - Oct 2007 **Student Researcher** *India*
(5 months) **National Children's Science Congress, Assam**
- Contributed to a research project for the 15th National Children's Science Congress, State Level Children's Science Congress, Assam.
 - Organized by Assam Science Technology and Environment Council (ASTEC), Bharat Jana Vigyan Jatha (BJVJ), Assam, and Society for Socio-Economic Awareness and Environment Protection (SSEAEP), GHAROA, Luming.
 - Supported by Rashtriya Vigyan Pradyogiki Sanchar Parishad (RVSP) and Department of Science & Technology, Govt. of India, New Delhi.

Honors & Awards

International

- Apr 2024 **Ministry of Education, Culture, Sports, Science and Technology (MEXT) Scholarship** *Japan*
Awarded by the Japanese Government for PhD in Japan

National

- Nov 2022 **Prof. Ashwani Kumar Nigam Memorial Gold Medal** *India*
Awarded for securing highest marks in MSc Physics - Nuclear and Particle Physics
- Oct 2021 **Elite Certification** *India*
Achieved in Introduction to Research NPTEL course
- Apr 2021 **Elite + Silver Certification** *India*
Attained in Electronic Theory of Solids NPTEL course
- Oct 2010 **Participant in Bijan Jyoti Jatra** *India*
Selected for the Scientific Excursion by Train organized by ASTEC & DST, Govt. of Assam
- May 2008 **Winner of Scientific Model competition** *India*
On the program Science Festival organized by Assam Science Society
- Jun 2007 **Winner of Essay writing competition** *India*
On Conservation of Nature and Natural Resources conducted by Aaranyak

Projects

- Oct 2024 - Mar 2025 **pseudo-Nambu Goldstone Boson Dark Matter** *Japan*
Kyushu University, Fukuoka
- Aug 2022 - Mar 2023 **Gravity, Minimal Length and Quantum Phenomena** *India*
Banaras Hindu University, Varanasi
- Research conducted under the research grant for faculty under IoE Scheme (Number 6031).
 - Investigated Generalized Uncertainty Principle (GUP) quantization of Electromagnetic (EM) radiation fields.
 - Computed corrections to the Einstein and Debye specific heat model using modified EM quantization, leading to observed changes in the dispersion relation of elastic waves.
 - Technical Skills: Mathematica, LaTeX.
 - Soft Skills: Time Management, Presentation skills, Research paper writing.
- Jul 2007 - Oct 2007 **Ecology and Conservation Strategy of Bats in Rural Areas** *India*
National Children's Science Congress, Assam
- Conducted surveys and collected data on Bats and their habitats in a selected zone.
 - Identified collected bats and recorded plant species data.
 - Analyzed data to identify trends between bat species, favored habitats, and foraging plants.
 - Technical Skills: Data management and analysis, Field survey.
 - Soft Skills: Report writing, Logical and Critical Thinking, Presentation skills.

Publications

Journal Articles

1. Sheikh Riasat, Bhabani Prasad Mandal: **Effect of quantum gravity on specific heat of solid**. The European Physical Journal Plus **138**(10), 943 (2023) <https://doi.org/10.1140/epjp/s13360-023-04585-y>

Theses

- May 2022 **Effect of Gravity in Quantum Mechanics** *India*
MSc Physics, Banaras Hindu University, Varanasi
- **Abstract:** All possible theories of quantum gravity suggest the existence of a minimal length. Therefore, the usual Heisenberg uncertainty principle (HUP) is replaced by a more general uncertainty principle known as the generalized uncertainty principle (GUP). The dynamics of all quantum mechanical system gets modified due to GUP. In this work, we consider various quantum mechanical phenomena and review the correction to their respective Hamiltonian and energy levels. GUP modified quantization of a particle inside a box potential indicates that the space is quantized in the units of $\alpha_0 l_p$ predicting an upper bound of the GUP parameter α_0 . Furthermore, the modified Landau levels, simple harmonic oscillator (SHO) and Lamb shift also results in an upper bound of the GUP parameter. Apart from these, we review a relativistic quantum mechanical phenomenon, Dirac oscillator under the effect of magnetic field which is non-oscillating at a certain value of magnetic field even under the effect of gravity.
 - **Technical Skills:** Mathematica, LaTeX.
 - **Soft Skills:** Time Management, Presentation skills, Thesis writing.

Additional Education

Summer Schools

- May 2021 - Jun 2021 **Introductory Summer School in Astronomy and Astrophysics** *India*
The Inter-University Center for Astronomy and Astrophysics, IUCAA, Pune
- Jun 2017 - Jul 2017 **Cotton University Astronomy & Astrophysics Summer School 2017** *India*
Department of Physics, Cotton University, Guwahati

Diplomas & Courses

- Apr 2024 - Jul 2024 **Japanese Training for Advanced Studies (JTAS)** *Japan*
Kyushu University, Fukuoka
- Aug 2021 - Oct 2021 **Introduction to Research** *India*
NPTEL Course (Funded by the Ministry of HRD, Govt. of India)
- Jan 2021 - Apr 2021 **Electronic Theory of Solids** *India*
NPTEL Course (Funded by the Ministry of HRD, Govt. of India)
- Jul 2019 - Jul 2020 **Post Graduate Diploma in Computer Application (PGDCA)** *India*
NECEP Institute of Management & Technology, Assam

Professional Training

Conferences

- 18 - 21 Feb 2025 **KEK Theory Meeting on Particle Physics Phenomenology, 2025** *Japan*
High Energy Accelerator Research Organization, KEK, Tsukuba
Presented a talk on pseudo-Nambu-Goldstone-boson as a Dark Matter Candidate.

Seminars

- Nov 2013 **National Seminar titled "Plasma Science and Technology"** *India*
Sponsored by UGC and organized by Dept. of Physics, Nabajyoti College, Assam
Student participant, no talk presented

Extra Information

Computer Skills

Programming Fortran, Python, C/C++, LanHEP, CalcHEP, micrOMEGAs
Miscellaneous LaTeX, Linux, Shell (Bash/Zsh), Git.
Softwares Mathematica, Stellarium.

Languages

Assamese Native
English Fluent
Hindi Fluent
Japanese Intermediate