

# Rishik Perugu

UG Fourth Year

Indian Institute of Science

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## EDUCATION

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### Indian Institute of Science

B.S.(Research) in Physics, CGPA: 9.1/10

Bangalore

2019–Current

### Sri Chaitanya Narayana Jr College

Intermediate/+2, Marks: 980/1000

Hyderabad

2017–2019

### Shine High School

Matriculation, CGPA: 9.8/10

Warangal

2016–2017

## PROJECTS

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### Supersolidity in extended bose hubbard model

May 2022 - Current

Guides: *Dr. Andreas Haller and Prof. Thomas Schmidt, DPhyMS, University of Luxembourg* (Bachelor's thesis)

- The goal of this thesis project is to understand supersolidity in the extended Bose Hubbard model and rigorously derive it
- Investigating ways to rigorously derive the supersolid phase using techniques such as dmrg, abelian bosonization

### Molecular Aggregate Photophysics

June 2021 - May 2022

Guide: *Dr. Jayashree Nagesh, IISc Bangalore*

- Investigated the effects of inter-molecular charge transfer, vibrations, finite temperature, disorder in molecular aggregates using the Holstein Hamiltonian framework
- Using this framework, investigating the aggregation effects in DPP core molecules to gain insights about the packing aspects, the type of interaction etc that gave rise to the observed spectra

### Plasma Physics

Feb 2021 - Sept 2021

Guide: *Prof. Animesh Kuley, IISc Bangalore*

- Studied basics of plasma physics and analytically solved for the trajectories of charged particles in electromagnetic field in various configurations
- Studied and implemented numerical methods to solve for the trajectories of charged particle in electromagnetic field such as Euler method, RK methods, Boris Push method

## POSITIONS OF RESPONSIBILITY

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### Decoherence Coordinator

Pravega '21

Among a group of 45 people of Science and Tech Pravega '21 team

July 2020 - August 2021

#### – Spooky Quizzes

Organized two rounds of quizzes spanned over 6 weeks where about 200+ high school and UG students participated in these physics based quizzes

- **Coherence Lecture Series**

Organized 10 lectures where eminent physicists from all over the world talked about their research work and/or their areas of expertise

- **Decoherence 2021**

Organized the physics flagship event of Pravega for the year 2021. There were about 700 registrations across India, few from universities abroad. I was involved with the organization and question making for the competition.

## SCHOLASTIC ACHIEVEMENTS

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- Recipient of the prestigious **KVPY Fellowship and Scholarship** by DST, Govt. of India 2019–Current
- Secured **ALL INDIA RANK 135** in **JEE ADVANCED** examination among 0.16 million candidates 2019
- Secured **ALL INDIA RANK 147** in **JEE Mains** examination among 1.2 million candidates 2019
- Bagged **37th rank** in **TS EAMCET** examination among 0.14 million candidates across TS and AP 2019
- Bagged **62th rank** in **AP EAMCET** examination among 0.18 million candidates across TS and AP 2019
- Achieved **AIR 8 (NISER)** in **NEST** examination among 0.04 million candidates 2019
- Achieved **AIR 12 (UM-DAE CEBS)** in **NEST** examination among 0.04 million candidates 2019

## TECHNICAL SKILLS

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- **Programming:** C, Python, MATLAB, Octave, Julia
- **Packages and Tools:**  $\text{\LaTeX}$ , Matplotlib, NumPy

## KEY COURSES UNDERTAKEN

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- **Maths:** Real analysis, Linear Algebra, Multivariable Calculus, Probability and Statistics
- **Physics:** Mechanics, Electricity and Magnetism, Thermal and Modern Physics, Intermediate Mechanics, Oscillations and Waves, Intermediate Electromagnetism and the Quantum Physics of Radiation, Intermediate Thermal Physics and the Physics of Materials, Introduction to Quantum Measurement and Control, Classical Mechanics, Quantum Mechanics 1, Mathematical Methods of Physics, Nuclear and Particle Physics, Quantum Mechanics 2, Statistical Mechanics, General Relativity, Condensed Matter Physics 1, Introduction to Materials for Quantum Technologies
- **Misc:** Computers in Chemistry

## EXTRACURRICULAR ACTIVITIES

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- Volunteered for an event called Exhibition in Pravega '20, Annual Cultural, Science and Tech fest of Indian Institute of Science, Bangalore
- Demonstrated Chladni plates experiment during Open Day 2020, Indian Institute of Science, Bangalore. Approximate footfall was 50k
- Participated in many Annual Science Fairs during my schooling