Rohan Kumar

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Education

Jan 2022–Present **5 Year BS-MS Dual Degree**, *Indian Institute of Science Education and Research, Kolkata*.
CGPA: NA

2020 **Indian School Certificate Examination (12th Grade)**, *Hill Top School, Jamshedpur*.
Percentage: 87.25%

2018 **Indian Certificate of Secondary Education Examination (10th Grade)**, *Hill Top School, Jamshedpur*.
Percentage: 92.60%

Projects

Dec 2021 **Transit Photometry of Kepler-17**.
I performed the transit photometric analysis using the Kepler Telescope's data for the star Kepler-17 and detected an exoplanet around it. Through this process, I estimated the parameters of the exoplanet, i.e., time period of revolution, transit duration, and the orbital radius by fitting a Box Least Squares model on the phase folded lightcurve. I then determined the mass of the exoplanet using Keplerian Mechanics and the radius of the exoplanet using Stefan-Boltzmann Law. The final results matched the literature value with error of less than 8%.

Jul 2021 **Optical Spectral Analysis of M31**.
Analyzed the central region of M31 (Andromeda) using the Faint Object Spectroscope (FOV) of the Hubble Space Telescope (HST) in Optical wavelength and detected the absorption line of 3 elements Mg[I], Fe[I], Na[I] and later confirmed this by reviewing the literature data. I Also concluded from the spectra that older redder population II stars are present in this region with no active star formation going on as no Hα emission could be found.

Jun 2021 **Calculation of H_0 (Hubble's Constant)**.
Used the data of high redshift galaxies given by the Hubble Space Telescope to calculate the value of H_0 using Hubble's law.

Feb 2021–Present **AstroBytes (Observational Astrophysics Community)**.
Made an International discord community (currently over 450+ members) called 'AstroBytes' for professionals and amateurs alike to interact and ask queries related to observational astrophysics. I Conducted talks and hands-on sessions by professional astronomers to get school students and other amateurs involved in observational astrophysics.

Research Interests

- **Observational Astrophysics** - Interested in understanding the *Stellar Structures* using the spectroscopic and lightcurve data products. Characterization of the *Exo-Planets* using transit photometry and direct imaging methods. Understanding the evolution of *Stellar Clustres* using the photometric techniques.
- **Computational Physics** - Interested in using the Computational and Numerical methods to develop simulations and models which predicts the real-world observations of a physical and astrophysical systems.
- **High-Performance Computing** - Interested in the use of HPC clusters to solve physics and astrophysics problems.

Conference & Workshops

Sep 2021 **High Performance Computing for Astronomy and Astrophysics**, *SKA-India Consortium and IIT Kharagpur*.

Jun 2021 **Intro to Astro 2021**, *SETI*.

Technical Skills

- **Programming Languages**: Python (modules: NumPy, Matplotlib, Astropy, Lightkurve, SciPy, PyVO, Numba, Photutils), FORTRAN (Beginner), C (Beginner), JAVA (Intermediate), SQL, TeX
- **Astronomy Softwares**: TOPCAT, SAO DS9, Aladin, IRAF, PyRAF, ADQL, APT
- **General Softwares**: Linux (CLI and GUI), Git, Vim, LaTeX, MS Office, Jupyter Lab, Shell Scripting (Bash and Fish)

Awards

March 2022 **Brain It On 2.0**, *Hansraj College, University of Delhi*.
Physics and Electronics Quiz, **First** Position

Feb 2022 **Polaris**, *IIT (ISM) Dhanbad*.
Case study event, **First** Position

Dec 2021 **National Student and Space Challenge**, *IIT Kharagpur and Red Wings*.
Astronomy Data Analytics event, **First** Position

Aug 2021 **Cosmoquest**, *IIT (ISM) Dhanbad*.
Astronomy Quiz event, **Second** Position

June 2021 **Nakshatra (Astronomy Fest)**, *IIT Indore*.
Astronomy Crossword event, **Fifth** Position

Interests

Music, Ham Radio, DIY Electronics, Reading