



**S N BOSE NATIONAL CENTRE  
FOR BASIC SCIENCES**

*Block JD, Sector III, Salt Lake, Kolkata 700 106*

## **DEPARTMENTAL SEMINAR**

# **Department of Astrophysics and High Energy Physics**

**04<sup>th</sup> January, 2024**

**12.00 noon**

**FERMION / ONLINE**

### **SPEAKER**

**Dr. Rajorshi Bhattacharya,  
Ph. D at Physics with Astrophysics Concentration,  
University of New Mexico**

### **TITLE OF THE TALK**

**Evolved Stars: Distance estimates using  
infrared data and Machine Learning**

### **ABSTRACT**

The Bulge Asymmetries and Dynamical Evolution (BAaDE) radio-wavelength survey aims to present a comprehensive study of the inner regions of the Galaxy to improve our understanding of Galactic structure and dynamics, with a focus on the bulge stellar population distribution and age. The BAaDE survey consists of 28,062 infrared color-selected red giant stars, the majority of which are of Mira-type and lie on the Asymptotic Giant Branch (AGB). Approximately 10,000 of these stars have measured line-of-sight velocities determined from SiO maser lines. To optimize how these velocities are incorporated into dynamical models, and to allow any existing spatial separation between populations to be distinguished, 3D positions are desirable. Due to the sizeable AGB sample in our survey, we explore methods which can be consistently be applied to any AGB star within the full sample. We will first discuss an approach using distance-calibrated infrared (IR) Spectral Energy Distribution (SED) templates. We will then extend the discussion into how Supervised Machine Learning can be applied to our data set to predict certain stellar parameters.

### **HOST FACULTY**

**Dr. Ramkrishna Das, Associate Professor  
Dept. of ASTROPHYSICS AND HIGH ENERGY PHYSICS**

\*\*\*\*\*