



भारतीय खगोलभौतिकी संस्थान  
**INDIAN INSTITUTE OF ASTROPHYSICS**  
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स्नातक अध्ययन मंडल **Board of Graduate Studies.**

STUDENT SEMINAR  
(Part of Comprehensive Examination)

**Speaker: Mr. Amrit Dutta**

**Title:** Photometric and Spectroscopic studies of a Core-Collapse Supernova SN 2025adje

### सार Abstract

Core-collapse supernovae (CCSNe) arise from gravitational collapse of cores of massive stars at the end of their evolutionary lifetimes. These events display a wide range of photometric and spectral properties, reflecting differences in progenitor structure, mass loss, and evolutionary history. Based on the presence/absence of hydrogen lines in their spectra close to peak brightness, they are classified into Type II/Type I. While Type Ia supernovae are associated with thermonuclear explosion of white dwarfs, all other types are associated with core collapse events of massive stars. With the help of detailed photometric and spectroscopic studies of these events various explosion parameters such as mass of  $^{56}\text{Ni}$  synthesized in the explosion, mass of the ejecta, explosion energy and properties of the progenitor star can be inferred.

In this work, results based on photometric and spectroscopic observations of hydrogen rich SN 2025adje, spanning approximately 130 days after discovery, is presented. The photometric observations were made with the GROWTH India Telescope (GIT) and Himalayan Chandra Telescope (HCT), while HCT is used for spectroscopic monitoring. We have also made use of the archival data obtained with Zwicky Transient Facility (ZTF). I will be briefly discussing the observations and data reduction techniques. The preliminary results based on the light curve analysis and spectral evolution of this supernova will be discussed. Future work will include detailed modeling of the light curve and spectra to better constrain the physical properties of the progenitor and the explosion parameters.

सोमवार Monday 30, मार्च March 2026

Venue: प्रेक्षागृह Auditorium

Time: 3:30 PM

सभी का स्वागत है All are welcome.