



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. Hrishav Das

Title: Exploring the Diversity of Type Iax Supernovae: Insights from SN 2022eyw and Ongoing Studies

सार Abstract

Type Iax supernovae (SNe Iax; or O2cx-like SNe Ia) form a subclass of peculiar thermonuclear white dwarf explosions. Their occurrence rate is about 15-30% of the rate of normal SNe Ia. Unlike the relatively homogeneous population of normal SNe Ia, SNe Iax exhibit remarkable diversity in luminosity and spectral evolution. Their luminosity ranges from comparable to normal SNe Ia for bright events to extremely faint explosions like SN 2008ha. Detailed observations and modeling of these supernovae offer valuable insights into their progenitors, explosion mechanisms, and possible survival of bound remnants.

We present a detailed study of SN 2022eyw, based on extensive photometric and spectroscopic follow-up. Our study indicated that SN 2022eyw belongs to the brighter subclass of Type Iax SNe. We also highlight ongoing studies of SN 2025qe, an intermediate-luminosity Iax. Together, these objects help us probe the wide luminosity and ejecta parameter space of SNe Iax, enabling a comparative study of explosion energies, ejecta composition, and nucleosynthetic yields.

Probing this diversity is crucial not only for constraining explosion models and progenitor systems, but also for assessing whether SNe Iax can serve as alternative distance indicators. By systematically mapping the properties of faint, intermediate, and bright type Iax explosions, we can begin to uncover correlations that link different members of the subclass, offering new insights into thermonuclear supernovae as a whole.

मंगलवार Tuesday 23, सितम्बर September 2025

Venue: प्रेक्षागृह Auditorium

Time: 2:30 PM

सभी का स्वागत है All are welcome.