



भारतीय खगोलभौतिकी संस्थान  
**INDIAN INSTITUTE OF ASTROPHYSICS**  
कोरमंगला Koramangala, बैंगलूरु Bengaluru – 560034.

**स्नातक अध्ययन मंडल Board of Graduate Studies.**

STUDENT SEMINAR  
(Part of Comprehensive Examination)

**Speaker:** Mr. Sujit Das

**Title:** Countdown to Explosion: The Final Centuries of Dusty Red Supergiants

**सार Abstract**

Red supergiants represent the final evolutionary stage of massive stars, which are known to end their lives as supernovae. However, their evolution in the final centuries remains mysterious and poorly constrained. Many supernovae show signatures of intense mass loss shortly before explosion, yet the underlying mechanism remains elusive. Red supergiants are understood to be embedded in dusty cocoons, and post-explosion supernovae often show evidence of dust formed prior to the explosion in stellar winds. In this study, we focus on: (a) how pulsation-driven mass loss and wind acceleration create phases of high-density circumstellar matter (CSM) surrounding red supergiant stars; (b) the mechanisms, timescales, and composition of dust formed in these stellar winds; and (c) how dusty winds from red supergiants impact the stellar spectrum. We develop a general theoretical framework connecting stellar evolution and dust formation, and apply our model to well-known supernovae such as SN 2023ixf, as well as Type IIn supernovae including SN 2005ip, SN 1998S, and SN 2020ywx.

मंगलवार Tuesday 17, फरवरी February 2026

**Venue:** प्रेक्षागृह Auditorium

**Time:** 11:00 AM

सभी का स्वागत है All are welcome.