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Astrophysics)

Title: Observational insights into the nature of short-plateau
Type II supernovae

Time: 10:00-10:30, 20 February (Thursday), Shanghai time

Host: Dong Lai

Location: Online

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Meeting ID: 561900233 (no password)

Abstract:

Type II-P supernovae (SNe) were canonically established with a typical plateau length of 100 d, which is still a kind of ‘magic number’ for most of these SNe observed in nature. However, time and again, theoretical works have shown a great diversity in plateau lengths ranging from tens of days to more than 150 d. Longer plateau SNe have earlier been studied in several works, yet, the short-plateau SNe were missing from the observational scenario. My doctoral thesis is based on detailed studies on four rare short-plateau SNe: SN 2018gj, SN 2020jfo, SN 2021ww, and the decadal SN 2023ixf. The plateau lengths of these SNe vary from 65 d to 75 d. We attempted to constrain various observational and physical properties associated with these events using ground and space-based multiwavelength observations. We further modeled these events by performing 1D hydrodynamical simulations to ascertain their explosion parameters and progenitor properties. The progenitors of short-plateau events were earlier thought to be high-mass red supergiant stars, going through an evolutionary process with standard mass loss prescription. Our study revealed a large diversity in the progenitors of these events, indicating that the short-plateau events can come from a wide range of red supergiant stars with elevated mass loss.

Biography:

My name is Rishabh Singh Teja. I am currently working as a postdoctoral researcher after my thesis submission (thesis submitted in October 2024) at the Indian Institute of Astrophysics. I completed my B.Sc (Hons.) and M.Sc in Physics at the University of Delhi with the university gold medal in the latter. I have qualified several national exams following my M.Sc (CSIR-NET/JRF, GATE), which is required to enter into a Ph.D. program with a fellowship, in India. I specialize in multiwavelength observations (UV+Optical+NIR) and hydrodynamical modeling of core-collapse supernovae, specifically Type II events. My other interests lie in observing and studying other interesting transients. Apart from this, I have actively participated in various outreach activities, including the starting of the Institute's e-magazine ‘DOOT,’ where I served in editorial roles including Chief-Editor.