



भारतीय ताराभौतिकी संस्थान
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Ph.D THESIS DEFENCE

Name: Mr. Vikrant Vinayak Jadhav, IIA – JAP, Student

Title: "Panchromatic study of star clusters: binaries, blue lurkers, blue stragglers and membership".

Research Supervisor : Professor Annapurni Subramaniam, IIA
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सार Abstract

Binary systems can evolve into immensely different exotic systems such as blue straggle stars (BSSs), yellow straggler stars, cataclysmic variables, type Ia supernovae depending on their initial mass, the orbital parameters and evolution. The aim of this thesis is to understand the demographics of post-mass-transfer systems (BSSs, white dwarfs and blue lurkers) present in the open clusters and how they are formed. First, we identified the cluster members using Gaia EDR3 data in six open clusters. Two of the clusters, M67 and King2, were studied in detail using UVIT, Gaia, GALEX, 2MASS and other archival photometric data. The comprehensive panchromatic study showed that (i) there is a robust mass-transfer pathway for BSSs, and blue lurkers in M67, (ii) at least 15% of BSSs in King 2 were formed via binary mass transfer. We also created a homogeneous catalogue of open cluster BSSs using Gaia DR2 data. The analysis of 868 BSSs across 208 clusters showed that (i) BSS frequency increases with age, (ii) there is a power-law relation between cluster mass and maximum number of BSSs, (iii) the formation mechanism of BSSs is dominated by binary mass transfer (54-67%) though there exists a 10-16% chance of BSSs forming through more than 2 stellar interactions. This study demonstrates that there exists an extensive variety in the demographics of binary products, and the UV observations are vital for their detection and characterisation.

मंगलवार Tuesday 5, जुलाई July 2022

Venue: Online

Time: 2:30 PM

सभी का स्वागत है All are welcome

Microsoft Teams meeting
Join Link:

https://teams.microsoft.com/l/meetup-join/19%3ameeting_NGE5M2IxZDEtNDcxZS00YmYwLWI2N2MtN2I3MmU4YmI5ZmM5%40thread.v2/0?context=%7b%22Tid%22%3a%226f15cd97-f6a7-41e3-b2c5-ad4193976476%22%2c%22Oid%22%3a%22e71a175b-a803-4c41-bc1f-558cc32b28b8%22%7d