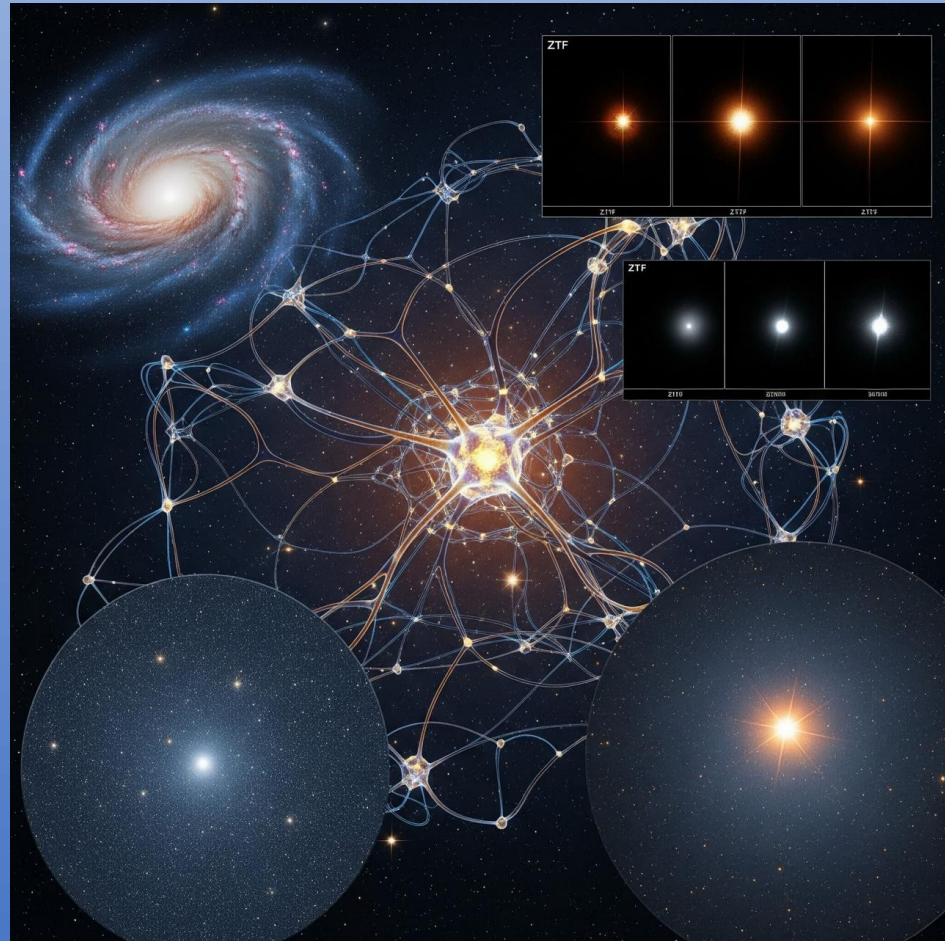


ML-Driven Time-Domain Strategy with Rubin, ZTF, and Roman

Dr. Ashish Mahabal (Caltech, Pasadena)

We propose a time-domain strategy that leverages data from Rubin, ZTF, and the Roman Space Telescope to enhance transient discovery and characterization. Rubin's deep, wide, and frequent coverage systematically identifies merging transients, while ZTF's rapid-cadence observations provide early alerts. Roman's high-resolution, infrared capabilities deliver complementary data on dusty or distant events. Our approach employs machine learning techniques for prompt classification and anomaly detection, allowing us to isolate unusual transients for targeted follow-up. We bring our experience from ZTF's ML efforts and ongoing classification work using simulated Roman data to benefit similar methodology development for Rubin's TVS and ISSC collaborations. The multi-wavelength observations across facilities will help build a robust catalog of well-characterized transients of varied types and advance our understanding of these events' underlying physics.



If time permits speaker will briefly touch upon ML aspects, he has worked on in aspects of cancer detection, and survivability aspects of bacteria and fungi in spaceflights, aspects that will be important to humanity as we slowly move towards becoming a space-faring civilization.



Ashish Mahabal is the deputy director at the center for data driven discovery, Caltech, USA, and an adjunct faculty at IUCAA, India. He received his PhD at IUCAA in 1998, and after a brief postdoc at PRL moved to Caltech in 1999 where he has been since. He has been the chair of the astoinformatics and astrostatistics commission of the IAU, currently leads ML for the ZTF survey, and the ML for Roman's RAPID team. In recent years he has extended his ML/AI expertise to medical data, and other areas like microorganisms. On a personal research level he is interested in variable astronomical objects, classification of all kinds, and in outreach (he recently led the development of ZARTH a game like Pokemon GO, but for astronomy). He also writes popular articles on astronomy and society, and is a published science fiction author in English and Marathi.

21st November, 2025 at 4:00 p.m.
(Hybrid), Lecture Theatre AG66, TIFR
YouTube Live:<https://youtu.be/wpcX5dBnSPo>



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