

Colloquium

Understanding How Stars Form in Our Galaxy: Observational Insights and Infrared Instrumentation

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Stars are ubiquitous and fascinating, as are the processes that govern their formation. Understanding how stars form in the Universe is one of the central questions of modern astrophysics and has far-reaching implications across multiple areas of astronomy. A significant fraction of young stars exhibit episodic brightening events on human timescales. These events leave profound imprints on the star-disk system by altering the temperature structure, chemistry, mineralogy, mass assembly, and long-term evolution of the disk. Such events, commonly known as *accretion outbursts*, provide a unique window into how our own Sun may have assembled its mass and how the surrounding protoplanetary disk — the birthplace of planets — was transformed during its early evolution. However, outbursts are intrinsically rare: only about 150 have been documented over the past eight decades, making each event an invaluable laboratory for studying disk-mediated accretion in real time. In this talk, I will present results from nearly two decades of systematic monitoring using Indian telescopes, addressing the physical mechanisms that trigger these outbursts, probing otherwise unresolved inner-disk dynamics, and tracing the evolution of disk physical conditions during these episodes. I will also discuss our instrumentation developments at TIFR, particularly the ground- and balloon-borne facilities that have enabled key advances in star formation research.

Tuesday, Mar 10th 2026

16:00 Hrs (Tea / Coffee 15:45 Hrs)

Auditorium, TIFRH