

Research & Research Training Office

Faculty Seminar

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Abstract:-

Infrared and Millimetre-Wave Astronomy: Recent Highlights and Future Prospects

The birth of stars, be it within molecular clouds of our own Milky Way or the spiral arms of external galaxies, is typically hidden from direct view by an obscuring layer of dust and gas from which the star feeds its growth. As the protostar develops this layer transforms from an essentially spherical distribution into a disk morphology. Such disks are commonly inferred around young stars, and are likely the sites for planet formation.

Circumstellar disks can be observed in the thermal infrared and millimetre wavelength regimes because dust is not as efficient in blocking such radiation, and indeed heated dust emits at such wavelengths. So both the structure of star and potentially planet forming regions, as well as the nature of the dust itself, can be inferred from observations in the infrared to millimetre regimes. Further, many molecular rotational and ro-vibrational transitions occur in this spectral region, allowing the study of the chemistry and kinematics of star and planet formation.

I will explain the rationale behind observing at thermal infrared and millimetre wavelengths, the techniques and types of instrumentation utilized, and present some recent highlights across a range of astronomical discipline areas, spanning the solar system to cosmology. This will include a selection of my own results obtained with collaborators using new instruments on large ground-based telescopes, e.g. Gemini, space-based infrared observatories, and the Australia Telescope Compact Array. Finally, I will look into the future to see what it may hold in terms of new observing facilities, and the questions which they will be able to address.