

Astrophysics Seminar

Monday, September 8, 2014

The Millimetre Astronomy Legacy Team 90 GHz Survey (MALT90)

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Abstract:

I present results from the recently completed MALT 90 Survey, a multi-line survey of molecular emission from dense, high-mass star-forming clumps. MALT90 uses the Mopra 22-m telescope to map 16 molecular lines simultaneously toward a sample of 2,014 dense molecular clumps identified by the ATLASGAL 870 micron continuum survey. I will describe three results: (1) a technique to find distances and Galactic structure. The star forming cores delineate spiral arms, and we have discovered the heretofore missing segment of the Scutum-Centaurus arm on the far side of the Galaxy; (2) compelling evidence for changing physical and chemical conditions of star-forming clumps as they evolve from cold "pre-stellar" phase, to accreting "protostellar phases", and on to full-fledged high-mass main sequence stars. A preliminary evolutionary scheme based on mid-infrared properties is confirmed. The temperature increases monotonically, and we see significant changes in chemistry, in particular the HCN/HNC and N₂H⁺/HCO⁺ abundance ratios; and (3) the extension of the Gao and Solomon relation between molecular line and infrared luminosity, first established for entire galaxies, to the scale of individual cores.

3:15 pm

Refreshments
CAS Room 500

3:30 pm

Seminar
CAS Room 502

Next Week

- Alicia Soderberg
Harvard University
- Supernova forensics

