

Classifying Galactic Protostars

- **Locate and characterise SFR and YSOs**
 - Galactic (evolution, planet formation...)
 - Cosmological
- **Heavily obscured**
 - Multi- images and spectra
 - Arcmin extent, milli-arcsec resolution
- **Classify to help understand**
 - Star formation rate
 - Initial mass function

- **Class 0 condensations within a hot core**
 - few 10^4 yr, more massive evolve faster
 - gravitational heating, FIR/(sub-)mm
 - H₂O and CO lines in ISO LWS spectra
- **Class I accretion disc $10^5 - 10^6$ yr**
 - low mass still obscured, ionised (micro-)jets
 - faint hardened x-ray
 - no H₂O in ISO LWS spectra
 - high mass brighter/warmer IR, molecular outflows
- **Class II-III pre-main-sequence stars with discs**
 - H₋ (accretion), warm IR excess, disc winds
 - T Tauri stars bright soft x-ray (fast rotation)
 - higher mass H AeBe stars faint/no x-ray

- **VO Tools**

- Direct archive access (IVOA protocols SIA, SSA)
 - ISO images and spectra
 - XMM multi-energy images
- SpecView (collaboration with STSCI)
- VOPlot (collaboration with VOIndia)
- Hierarchical access to public & local data (IDHA tree)
- Select from CGPS 3D datacubes (CO, HI, IRAS)
- Derive properties by mathematical manipulation
 - catalogue data
 - user measurements

- **Galactic Science Problems**

- YSO age/mass in Chamaeleon (established SFR)
- Age/nature of young embedded YSO in NGC1333
- Search for SFR e.g. CO outflows in Galactic Plane

- **YSO age/mass in Chamaeleon**
 - YSO seen in 2MASS;
 - ISO detections suggests which are Class I/II
 - JHK colours - some indication Class I/II/III but overlap, ambiguous for high-mass stars
 - XMM colour sorts low/high mass, low mass age
- **Young embedded YSO in NGC1333**
 - Invisible at optical or even μm
 - ISO detections - segregate Class 0/I/II
 - Water, CO spectral lines, colour
 - Confused/obscured - high-res MERLIN data
 - proplyd-like young low-mass microjet
- **CO datacubes in Galactic Plane**
 - Locate candidate high-mass YSO jets