Hi-GAL

Herschel infrared GALactic Plane Survey

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Hi-GAL team

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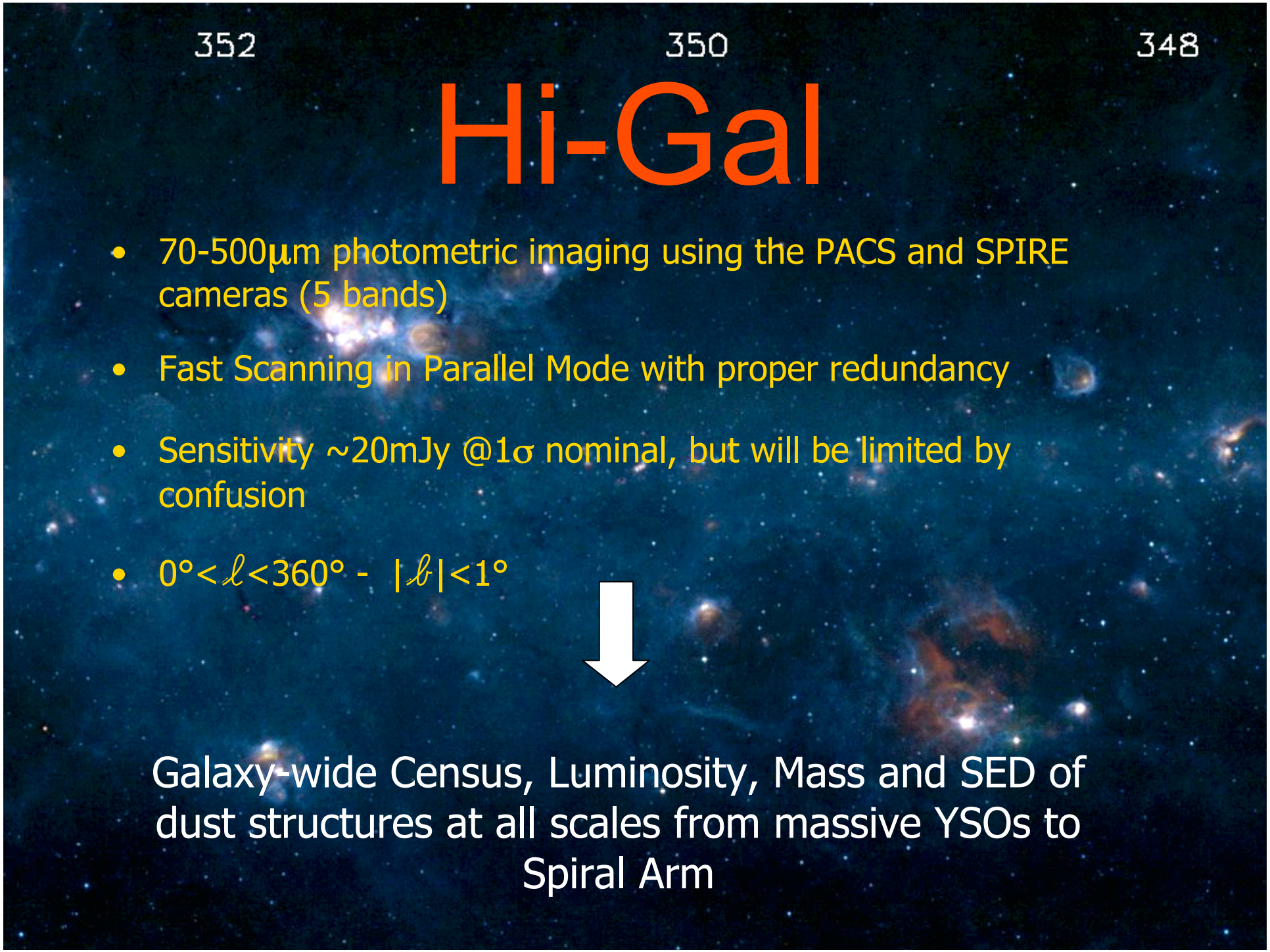
Toward a Predictive Model of the Galactic Engine

- Measure the star formation rate and history Galaxy-wide
- The High-Mass Star Formation Timeline
- Obtain the complete inventory of cold dust in the Galactic Plane
- Establishing the existence and nature of star formation thresholds as a function of ISM properties across a full range of galactocentric radii metallicity and environmental conditions
- Determining the relative importance of global *vs* local, spontaneous vs triggering, agents that give rise to star formation.
- Provide templates, recipes and prescriptions for Xgal science

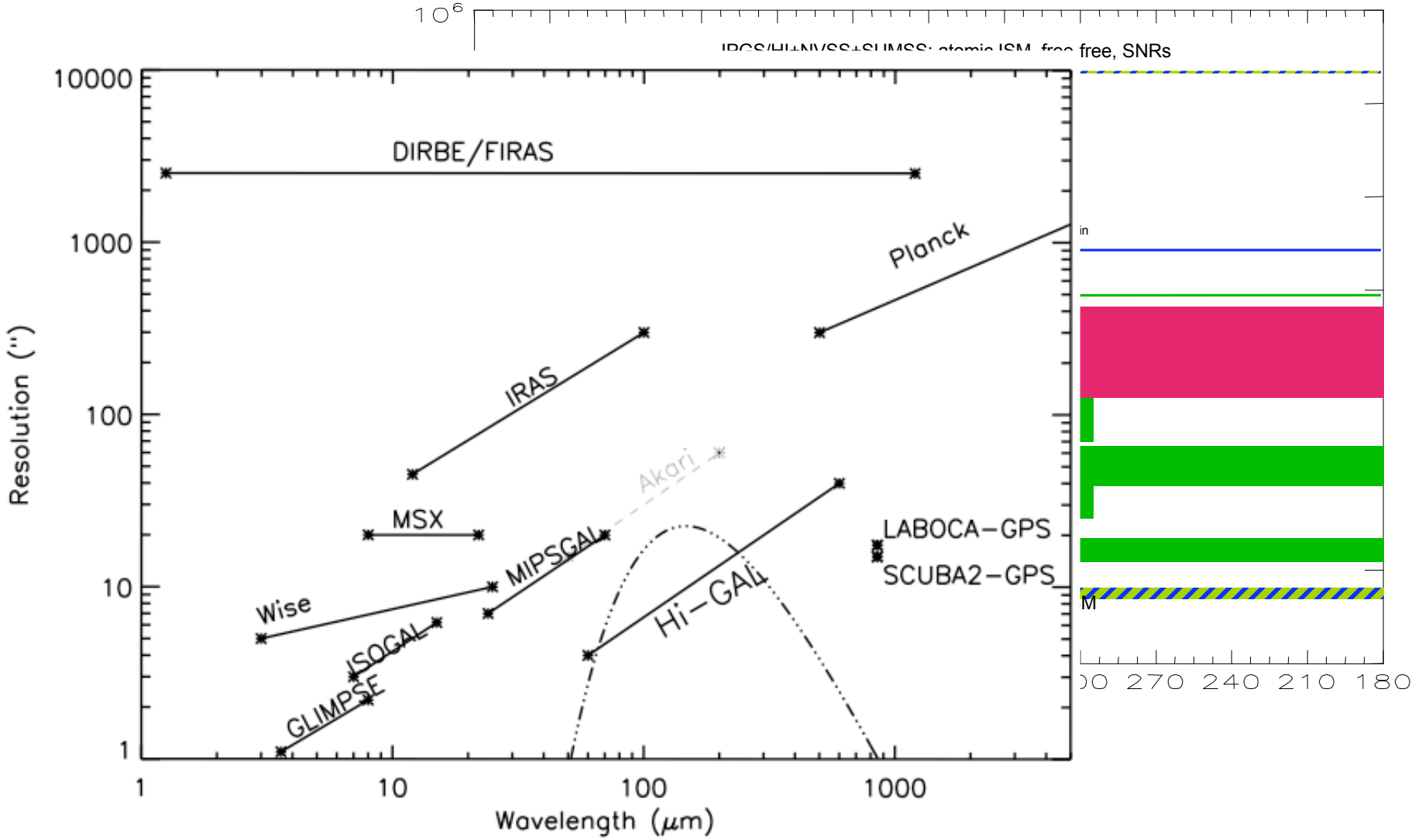


Hi-Gal

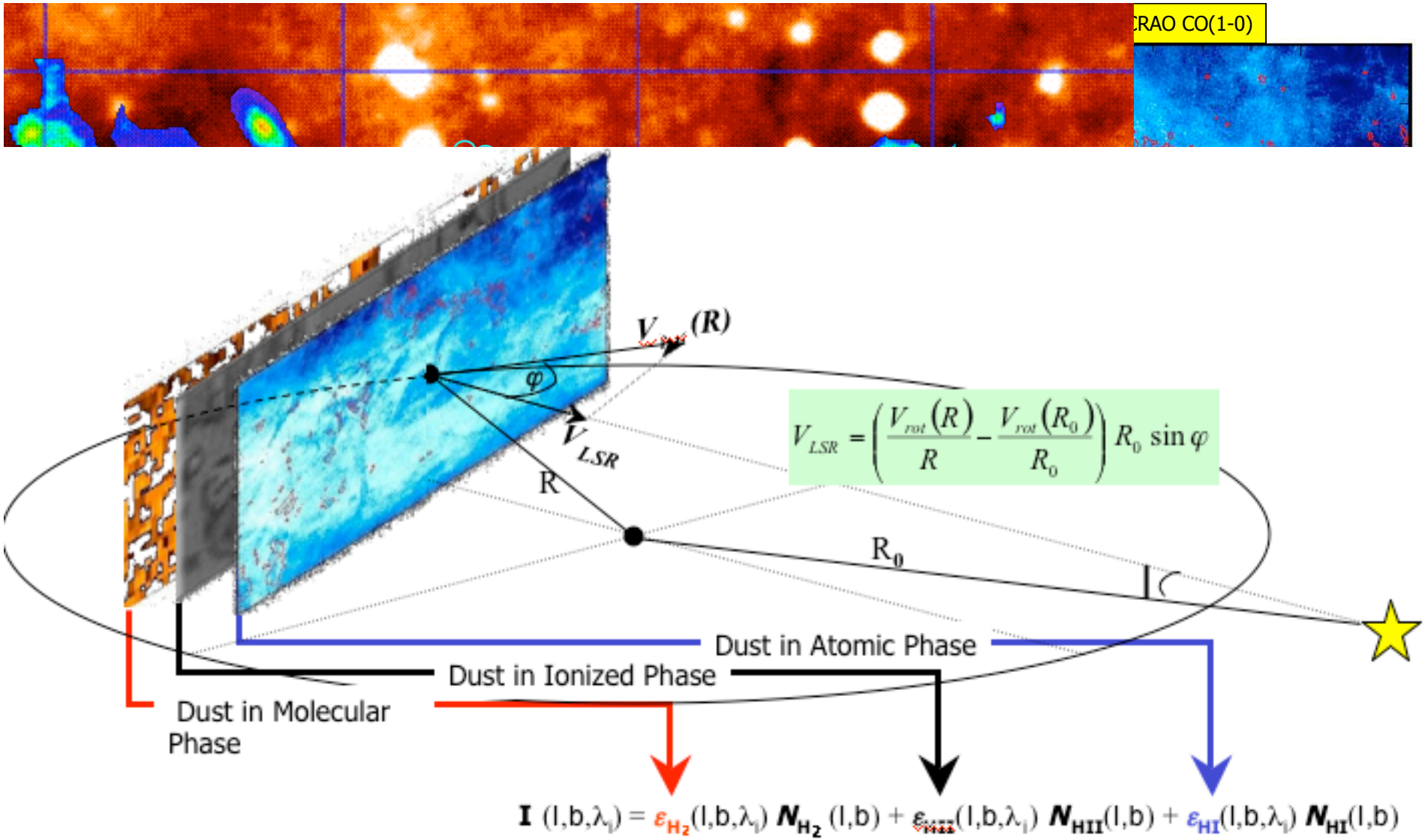
- 70-500μm photometric imaging using the PACS and SPIRE cameras (5 bands)
- Fast Scanning in Parallel Mode with proper redundancy
- Sensitivity ~20mJy @1σ nominal, but will be limited by confusion
- $0° < \ell < 360°$ - $|b| < 1°$

Galaxy-wide Census, Luminosity, Mass and SED of dust structures at all scales from massive YSOs to Spiral Arm

Hi-GAL in the context

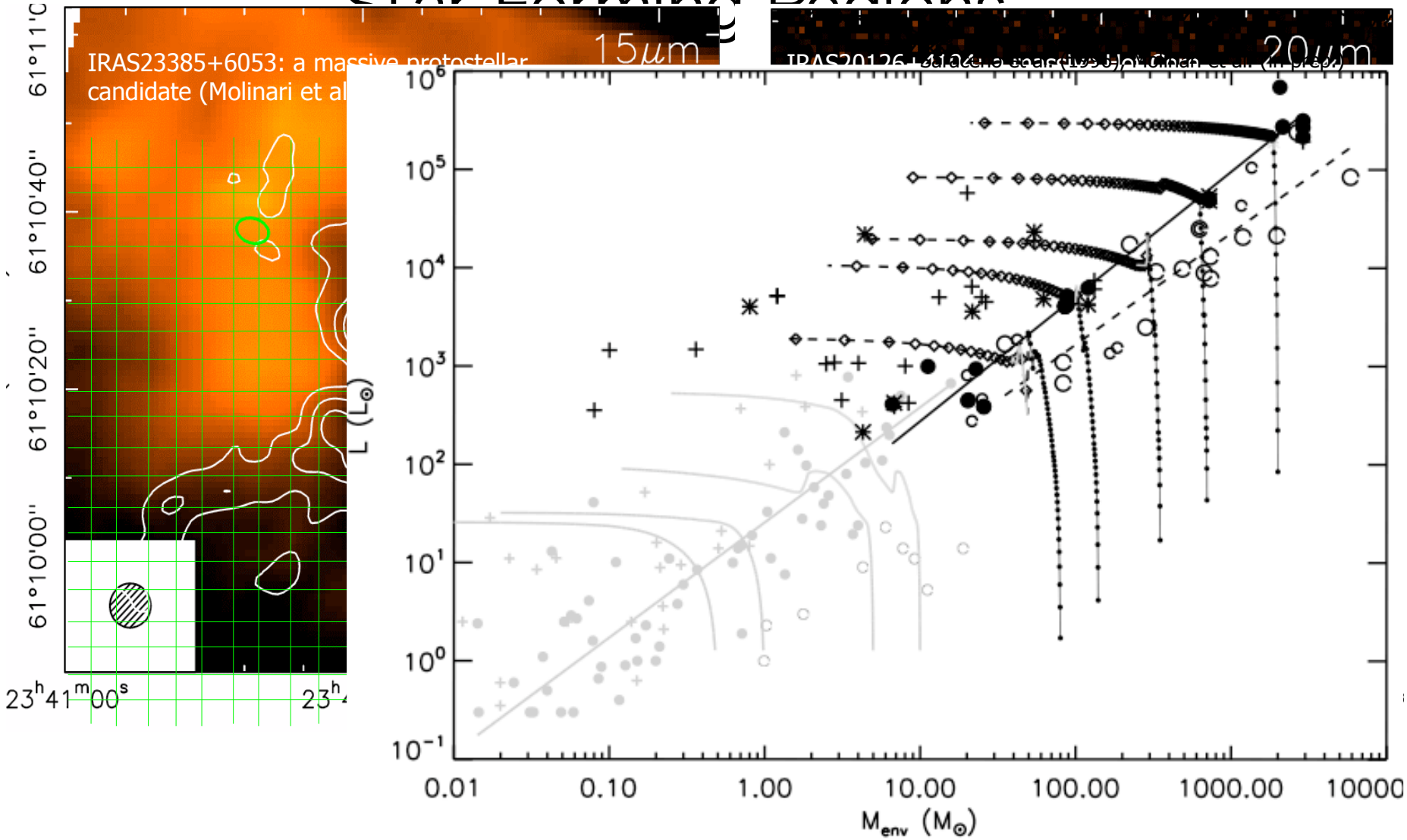


From COBE to Herschel



- Galactic Inversion to measure the 3-D distribution of dust physical properties in the molecular, atomic and ionized phases of the diffuse ISM

Broad Evolutionary classification of Star Forming Regions



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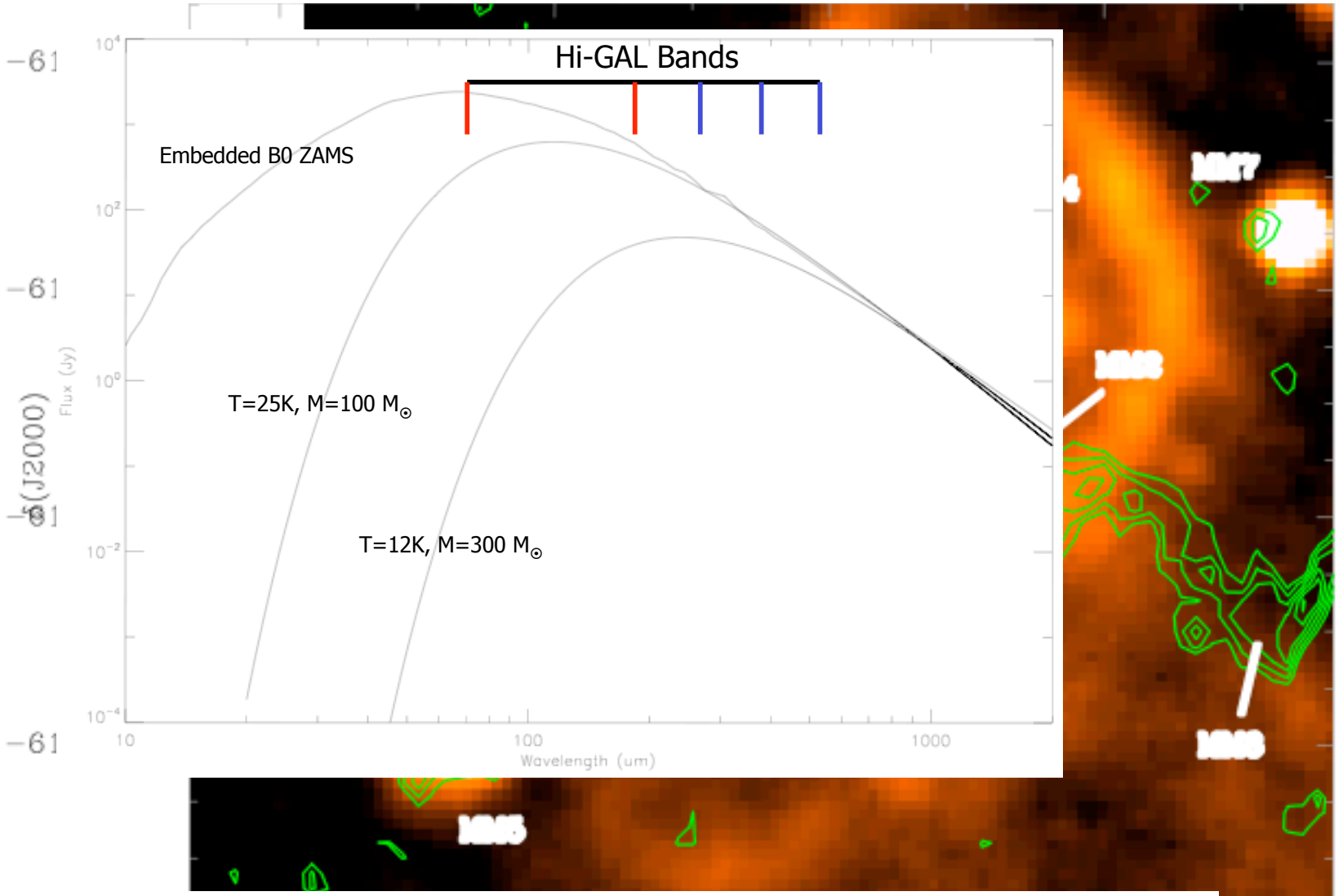

Hi-GAL will provide an extremely useful input catalogue to select object samples for ALMA studies

“Secondary” Science

- ALMA input catalogue
- Goldmine for Herschel follow-up (and ALMA and IRAM and JCMT and APEX and CARMA and SMA and…)
- Accurate foreground estimate for the interpretation of cosmological backgrounds
- Dust in SNRs
- Dust Life-cycle
  - High density, high irradiation, turbulent conditions, statistical significance
- Debris dust disks around MS stars
  - Unbiased statistics on frequency and mass as a function of star age
- Detection of detached dust shells around first ascent giant stars
  - Missing mass in AGB envelopes, limited to distant objects with unresolved envelope, detectable via long-wavelength excess.
- Detection of multiple shells around AGB stars, post-AGB objects and planetary nebulae, as well as around various classes of interacting binaries
- Detection of ejecta shells and swept-up ISM bubbles around massive stars
  - Complete census of WR and LBV stars
- Extinction maps
- Study of individual interesting Star Forming Regions (known or to be discovered)
- Nearby Low-Mass SFRs on the Galactic Plane
- …