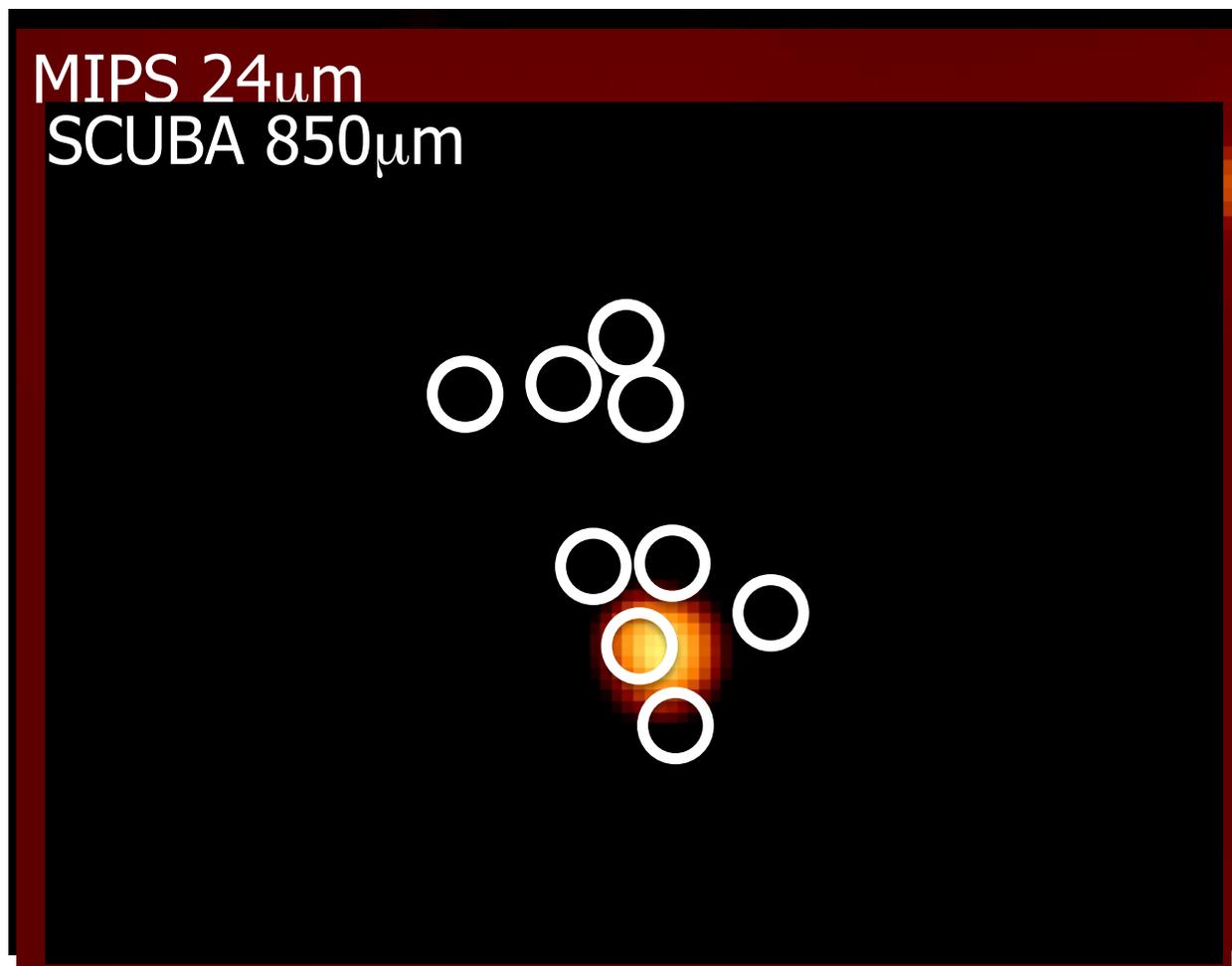


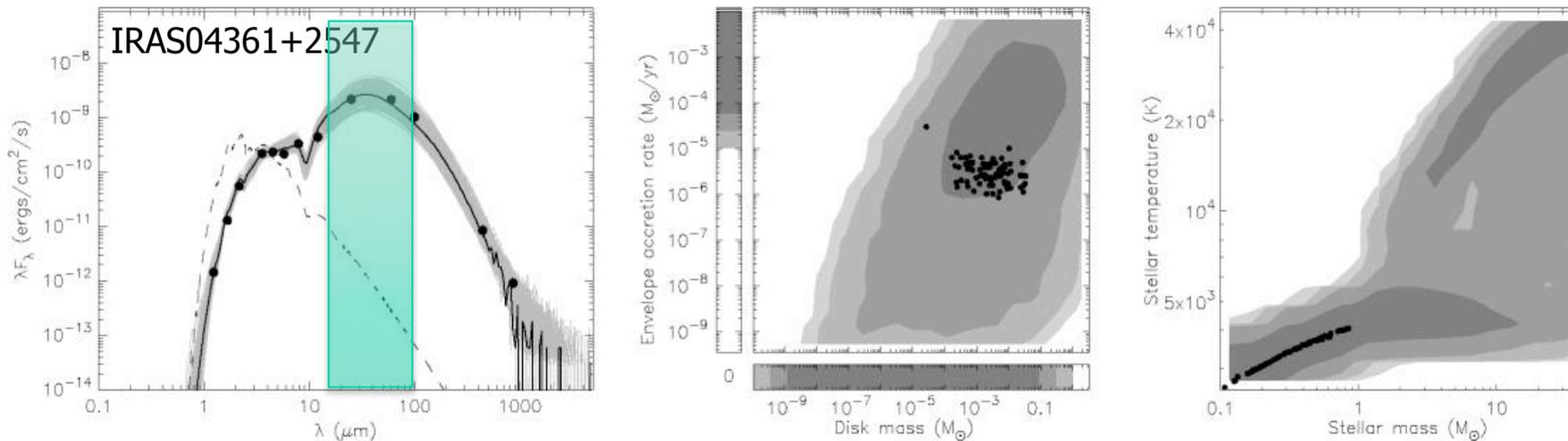
# The continuum ZOO in Intermediate Mass SFRs



- Intermediate and High-Mass SFRs are systems where YSOs with very different SEDs coexist.
- Is the SED shape an age indicator ?
- Herschel is doing much especially in nailing down  $L_{\text{bol}}$
- ....however, the  $\lambda < 70\mu\text{m}$  range is the critical one to constrain the SED models

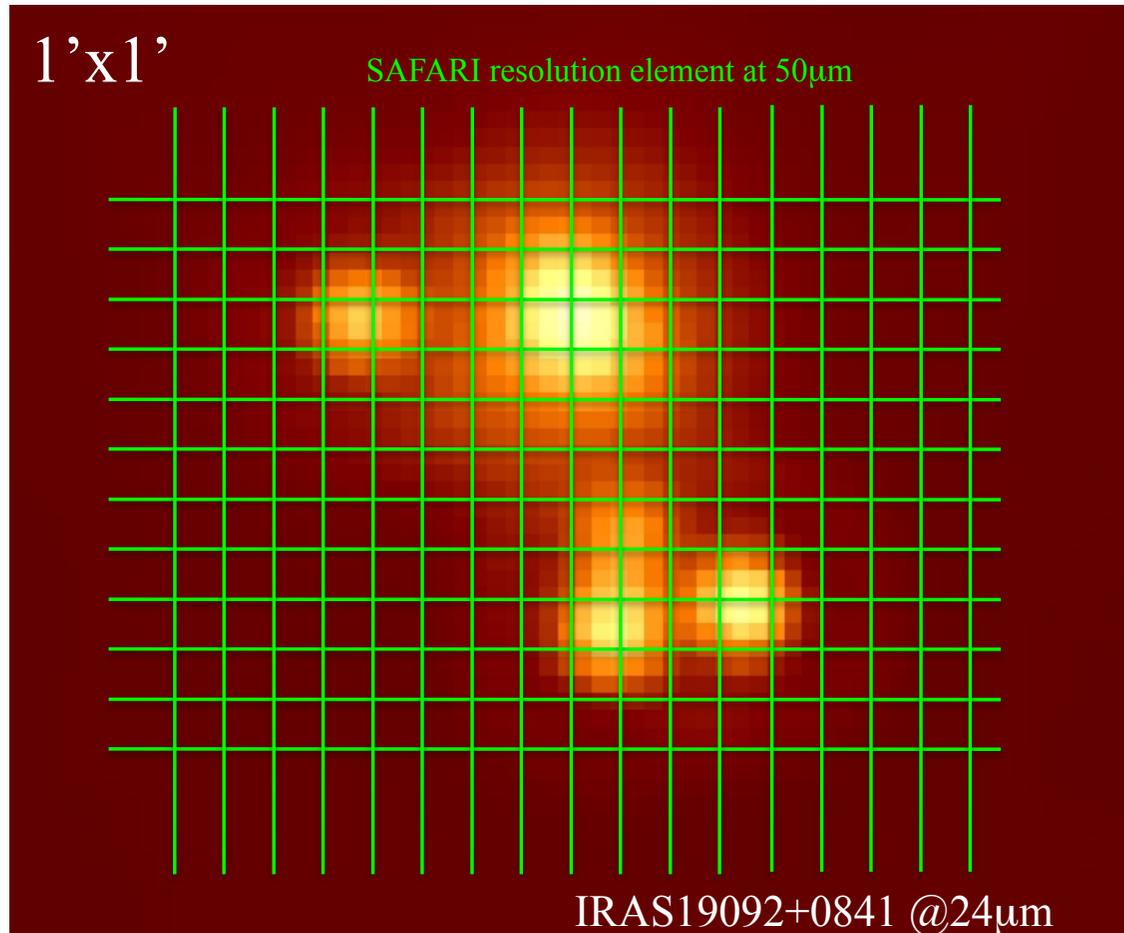
# Nailing down the SED modeling of YSOs

Robitaille et al. 2007



- SED models now take by far more input parameters than available data: 3D geometries, scattering, holes, clumpiness, etc.
- Order-of-magnitude uncertainties in several critical parameters still in the Spitzer/Herschel era.
- SAFARI, as a high-sensitivity k-points SED-machine, will enter the era of spatially-resolved high-precision SED modeling.

# Intermediate Mass SFRs



- One-shot demographic in intermediate and high-mass SFRs.
- Luminous YSOs are often resolved down to few  $10^{-2}$  pc (less than half of SAFARI res. at 50 $\mu$ m at 5kpc): spatial resolution is a limitation ( $d \leq 1$ kpc ?)
- Saturation Problems: are NDF filters still an option ?

# Hi-GAL is pushing Galactic Star Formation into the Mega-Cloud era: are we ready for the consequences ?

- How do filamentary molecular clouds form ?
  - Role of turbulence (?)
  - Is WNM pressure confinement important to keep clouds confined till thermal instability, and then gravitational instability, take over ?
  - Do we understand the  $\text{HI} \rightarrow \text{H}_2$  transition ? HISA, HINSA,  $\tau_{\text{HI} \rightarrow \text{H}_2}$
  - Do converging flows really exist ? are they relevant (i.e. is this the way molecular clouds form fast ) ?
  - Role of magnetic field in channeling ISM onto the filaments.

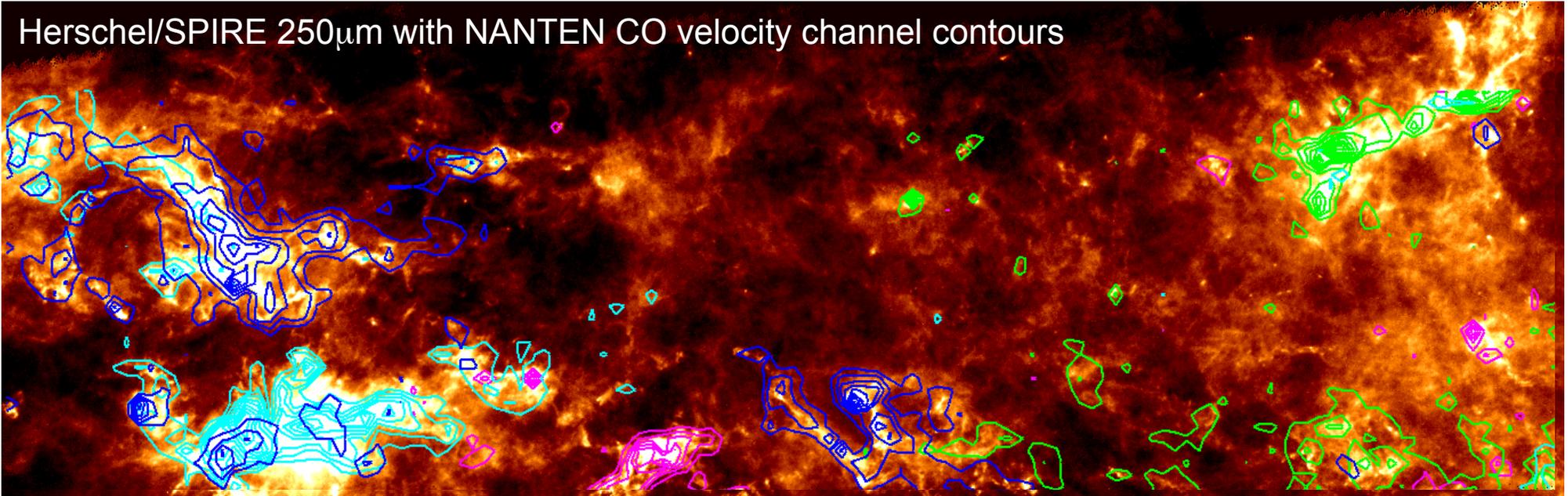
## • Sensitive large-scale spectroscopic mapping (on and around the filaments)

- low  $[v_s, n_0]$  shock tracers: low-J CO, SiO, [SiII], [OI], [CII], [NII]... to see if converging flows shocks really exist (e.g. Jimenez-Serra+ 2010 on G35.39, Schneider+ 10 on DR21): good for SPICA/SAFARI...CCAT ?
- Chemistry evolution ISM  $\rightarrow$  Filaments  $\rightarrow$  Clumps: ices vs gas species: OH, H<sub>2</sub>O, CO, CH<sub>3</sub>OH...
- atomic and  $\text{HI} \rightarrow \text{H}_2$  tracers to evaluate the role of turbulence and WNM pressure confinement: CI, CO, NII, ...
- Sensitive large-scale continuum polarimetry mapping

# A first look at the Outer Milky Way

$$218^\circ < l < 226^\circ$$

Herschel/SPIRE 250 $\mu$ m with NANTEN CO velocity channel contours



The Outer Galaxy is really THE unique place where the star formation process can be studied on different spiral arms relatively free of confusion

Elia et al., 2013 subm.

