
HERschel Inventory of The Agents of Galaxy Evolution (HERITAGE) in the Magellanic Clouds
Margaret Meixner (STScI)
And HERITAGE team

Thank You to the Herschel Mission Observatory Staff & Instrument teams

- Merci
- Gracias
- Grazie
- Dank u
- Vielen Dank

- For all their hard work to provide us with the opportunity for the longest wavelengths

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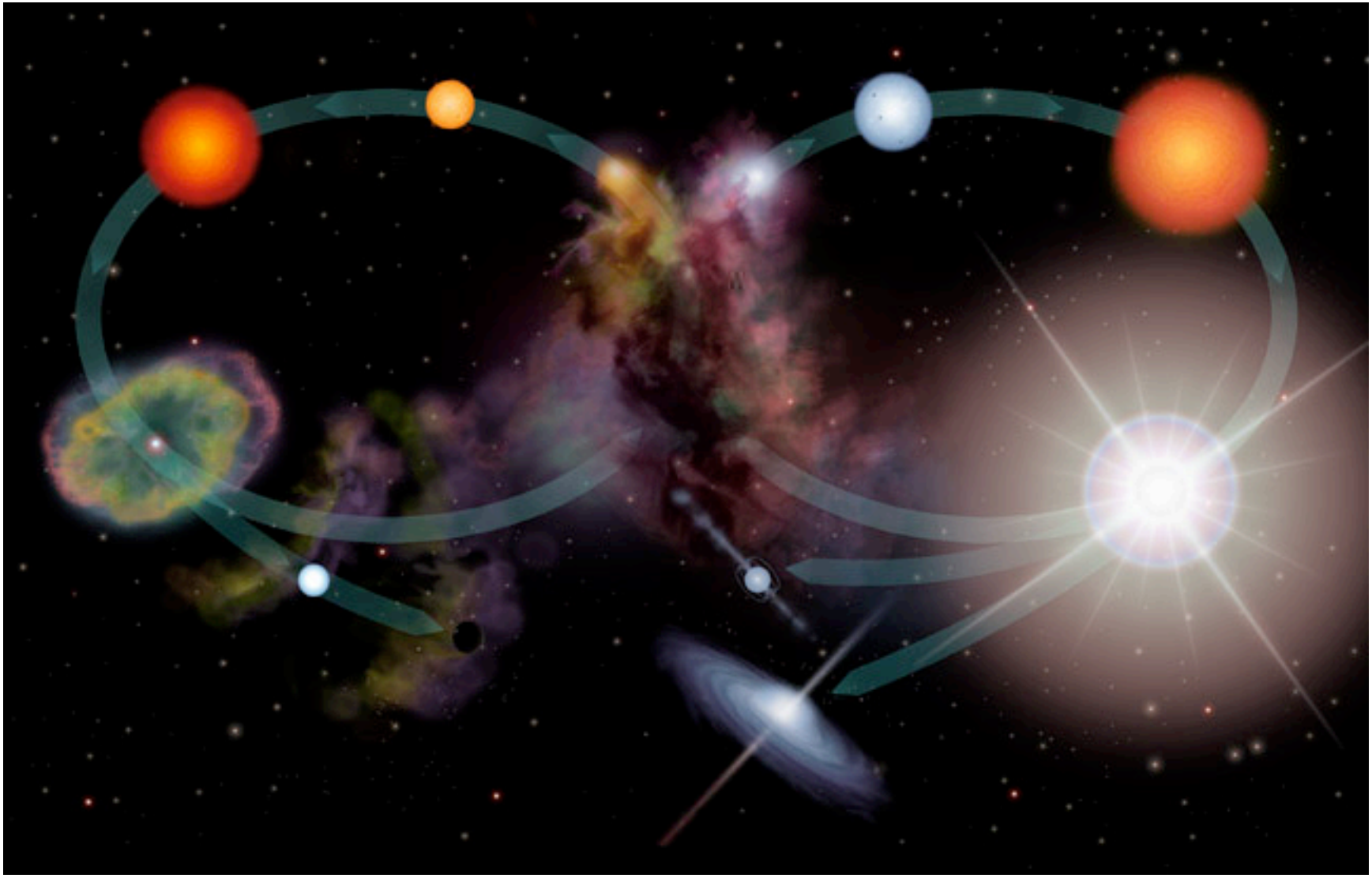
Goals of HERITAGE

- HERITAGE is a 238 hour Herschel Open Time Key Program.
- Study of Galaxy Evolution by studying the processes that cause it: Interstellar medium, star formation and stellar feedback. Follow onto Spitzer SAGE surveys.
- Mass census of all (esp. coldest) ISM dust
- Probe the most massive embedded young stellar objects
- Quantify the dust return from most massive evolved stars
- How? SPIRE and PACs parallel mapping of Large Magellanic Cloud and Small Magellanic Cloud
- Provides critical long wavelengths missed by Spitzer SAGE surveys of LMC and SMC.
  - PACS 100 and 160 microns
  - SPIRE: 250, 350 and 500 microns

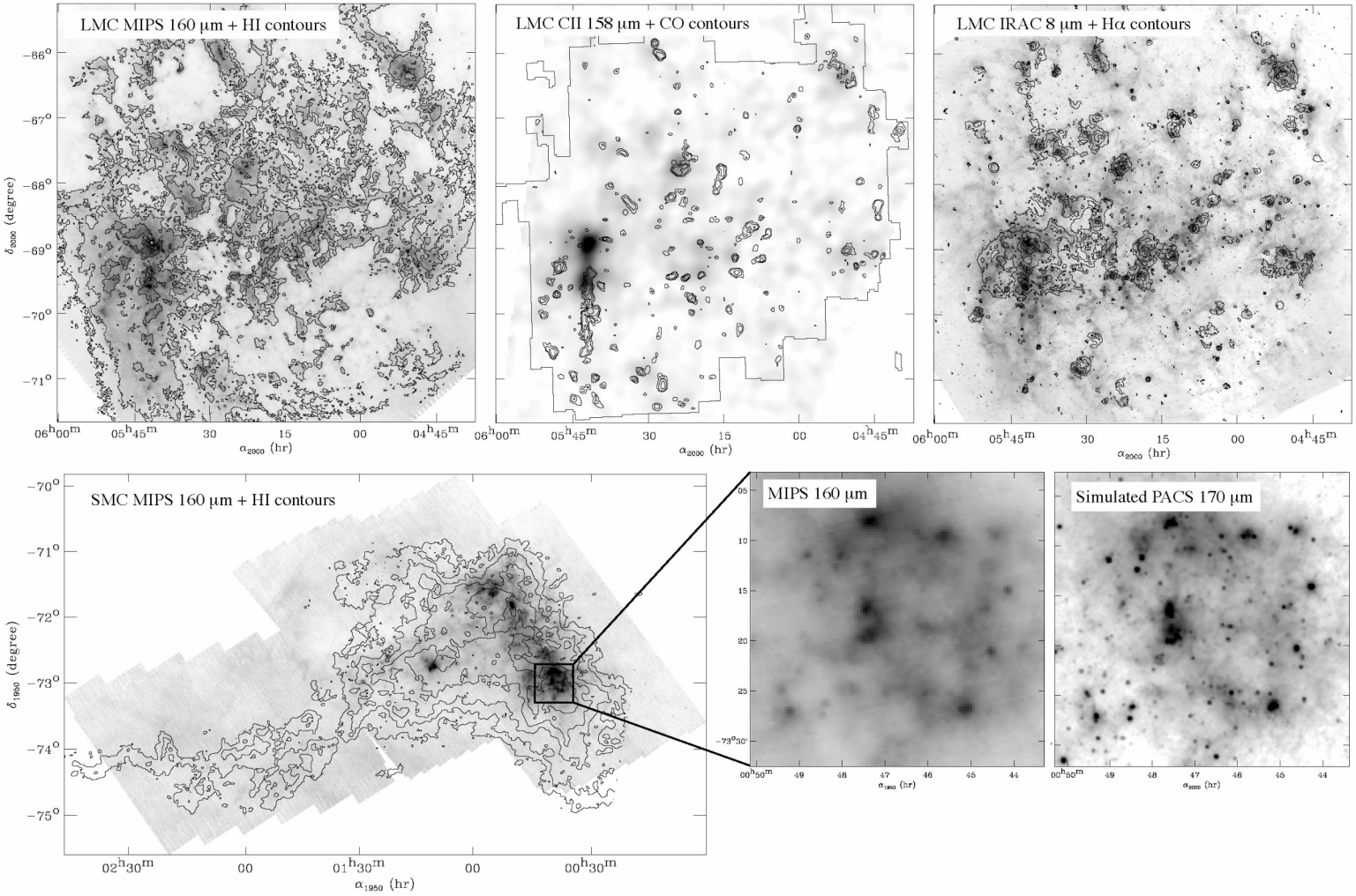
HERITAGE: Tracing the Lifecycle of Baryonic Matter:

Intermediate mass stars High mass stars

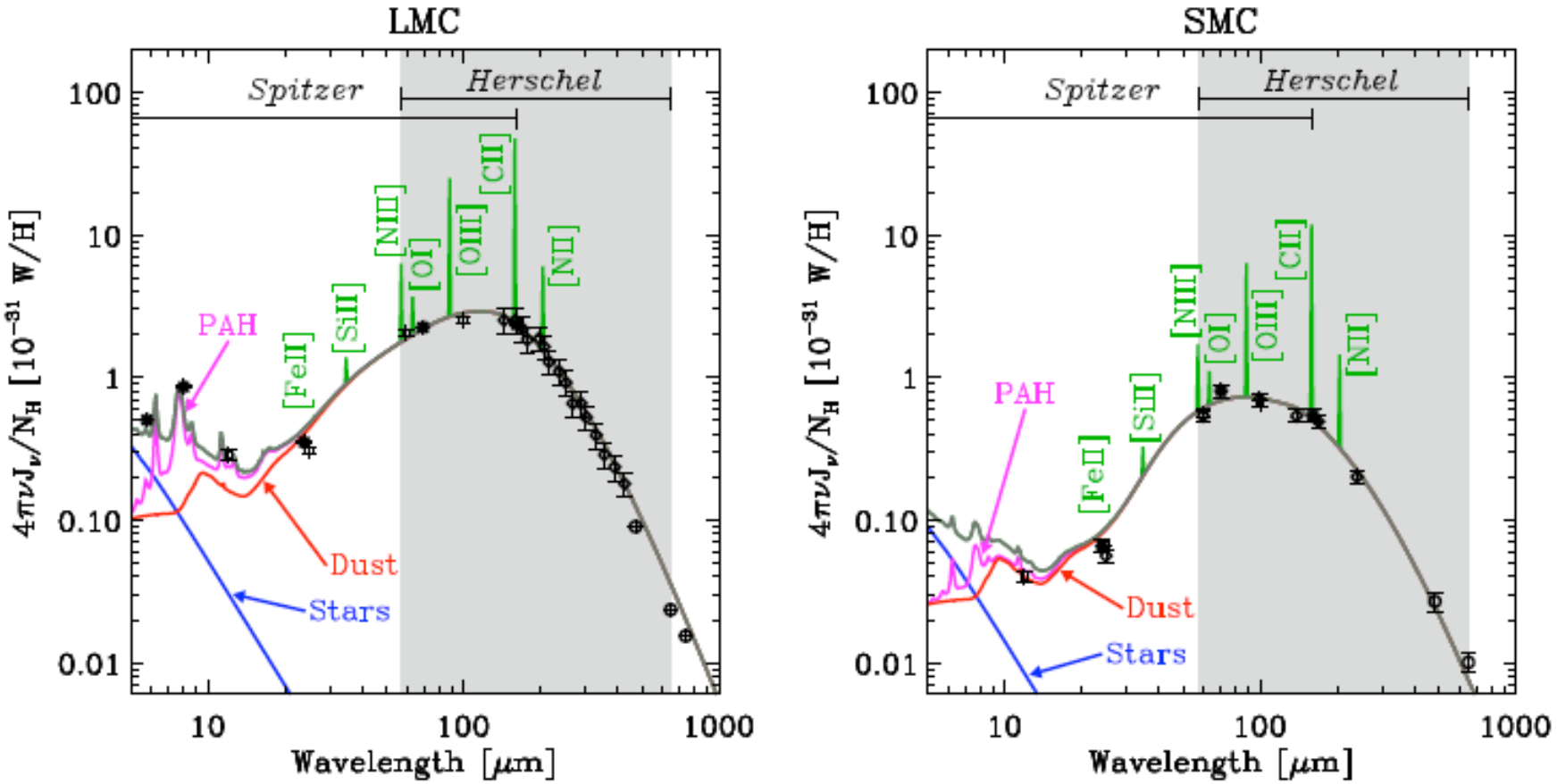


credit: http://hea-www.cfa.harvard.edu/CHAMP/EDUCATION/PUBLIC/ICONS/

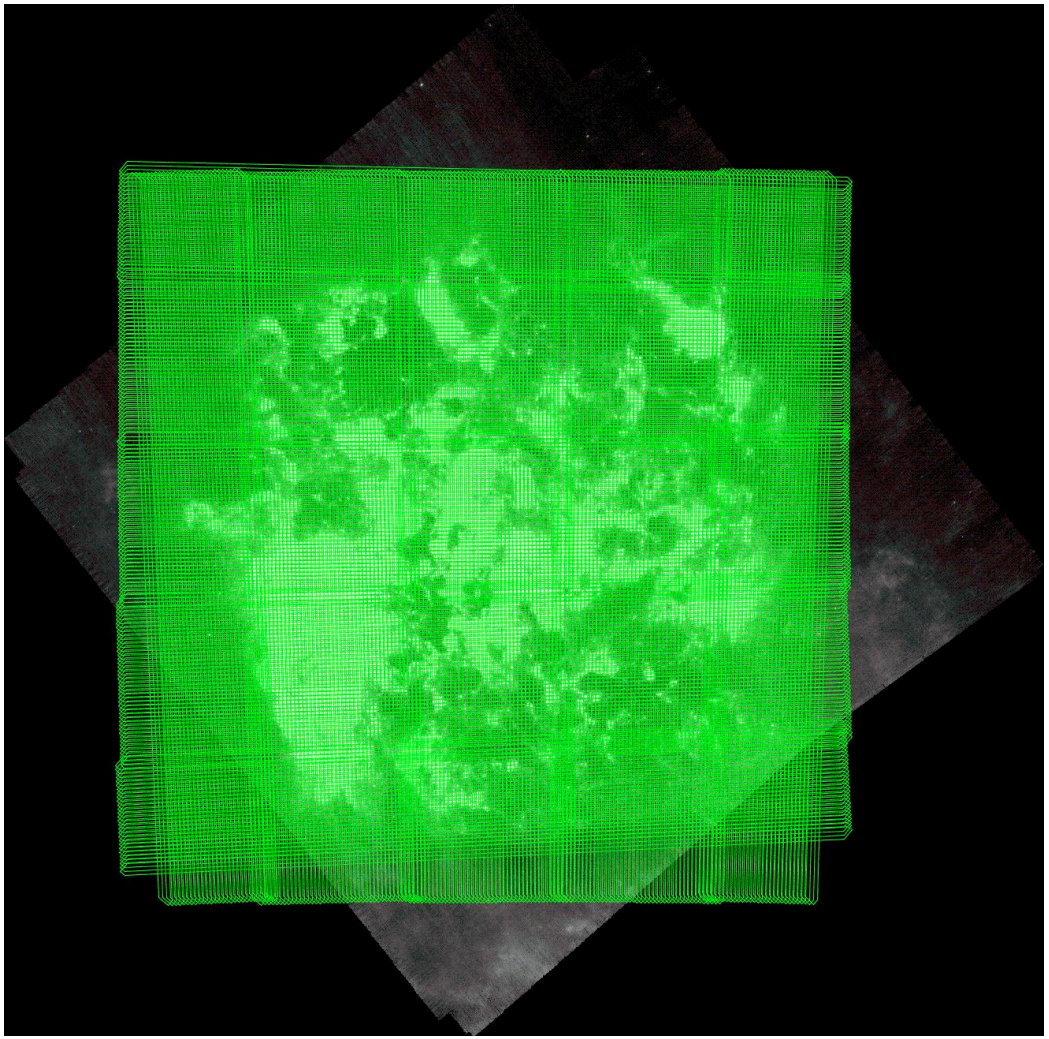
Context for HERITAGE



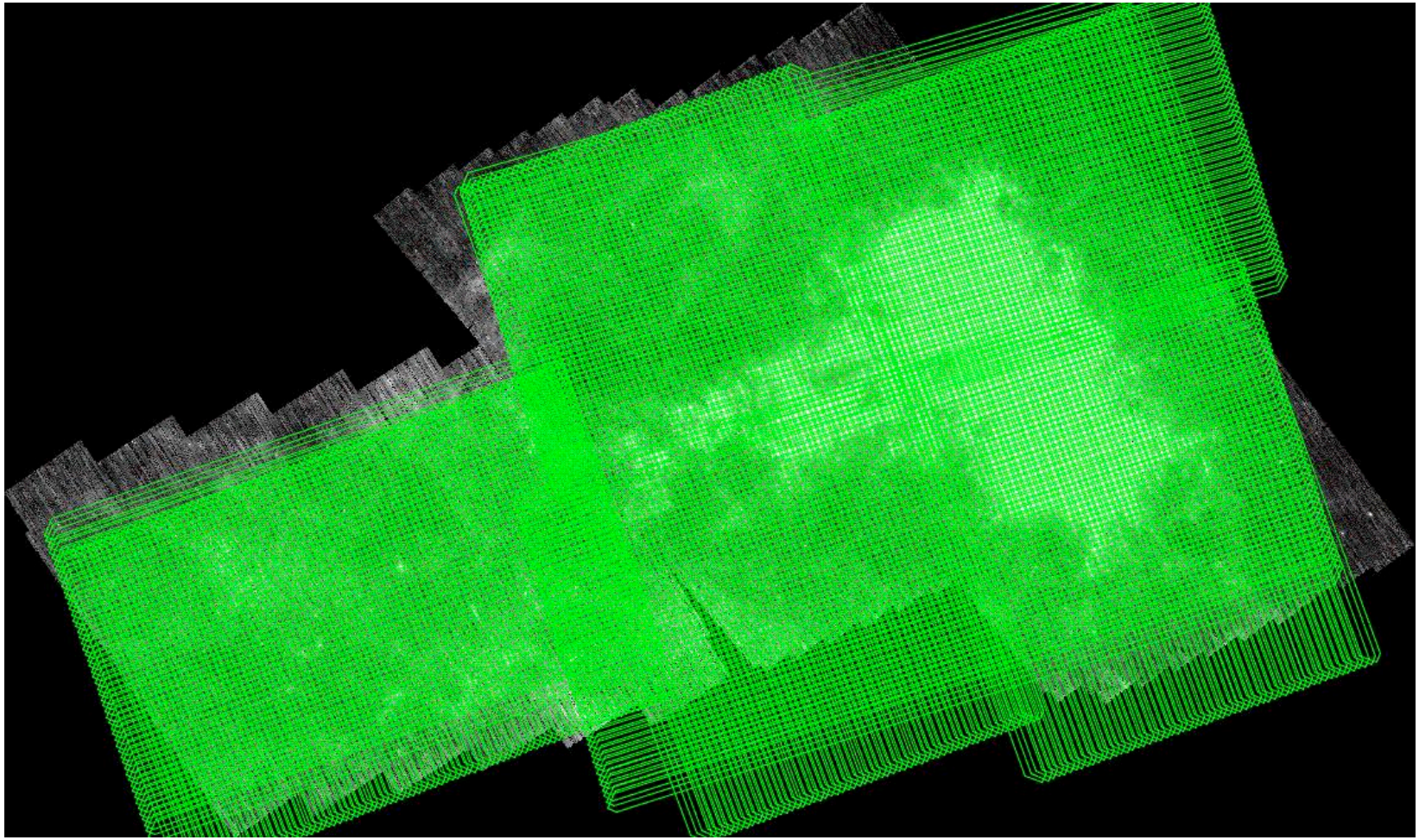
Herschel provides critical wavelengths, completing picture started with Spitzer SAGE survey of LMC and SMC



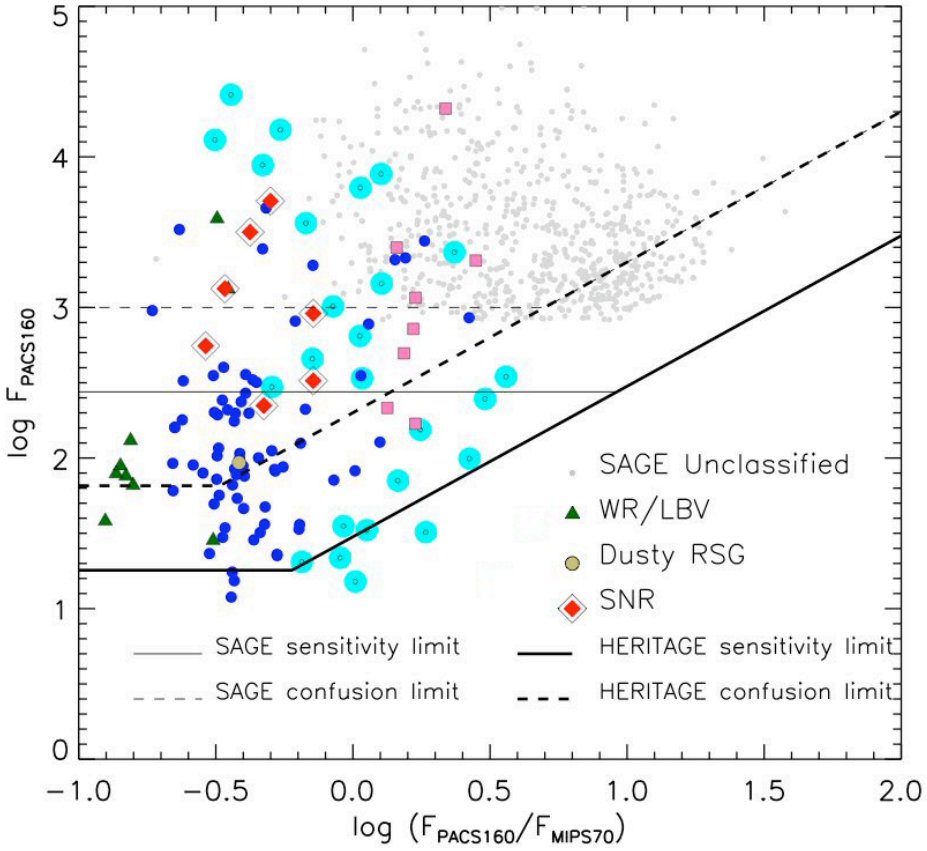
SPIRE coverage on SAGE-LMC 160 micron image

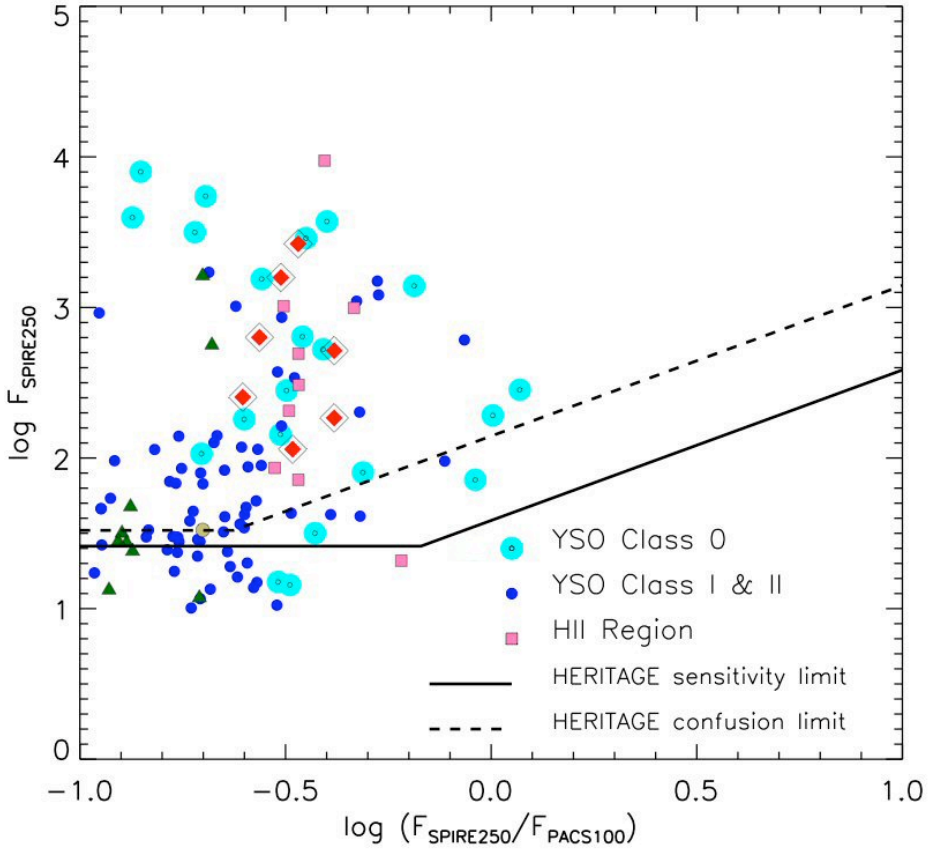


SPIRE coverage on SAGE-SMC 160 micron image



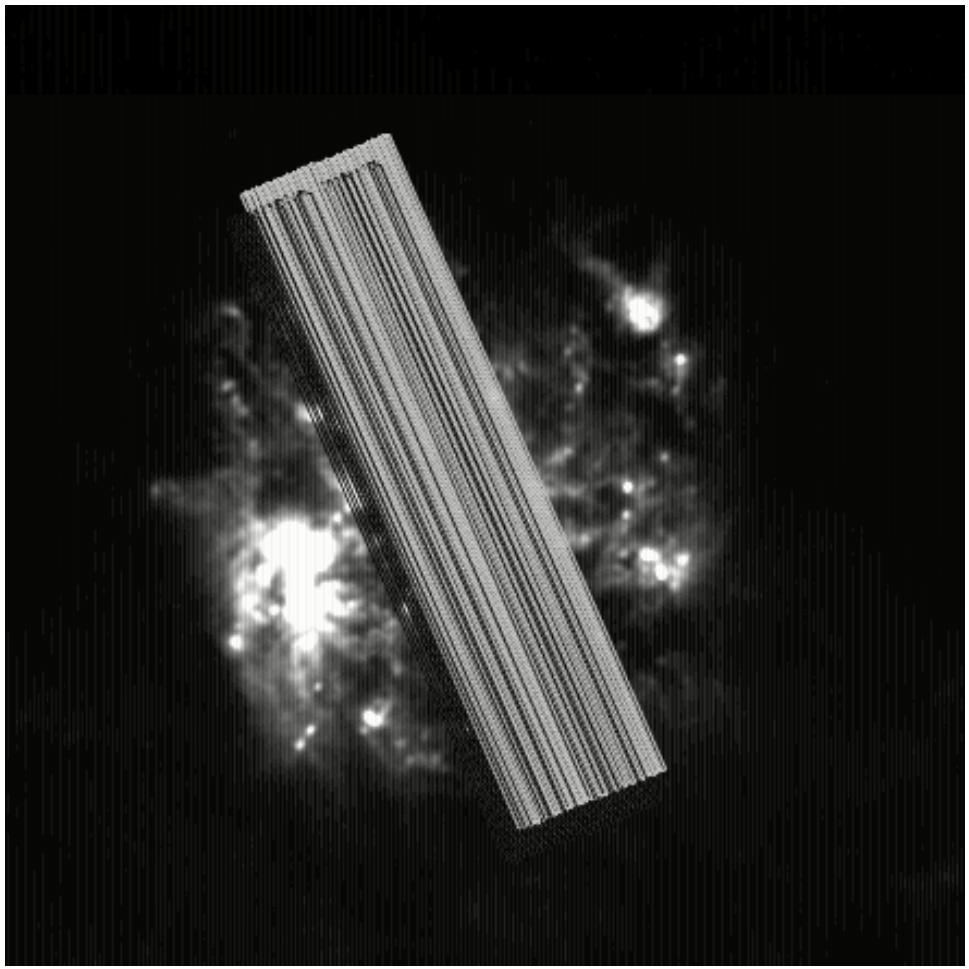
HERITAGE will detect the circumstellar dust from the most massive stars at all stages of their evolution.





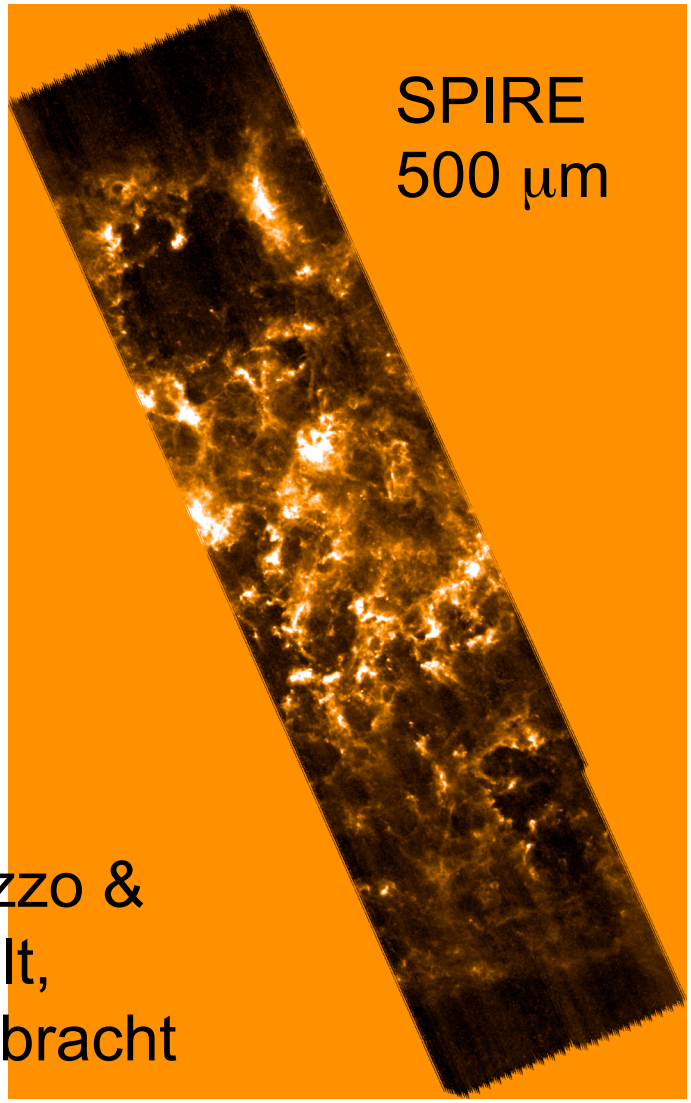
Srinivasan & Sewilo

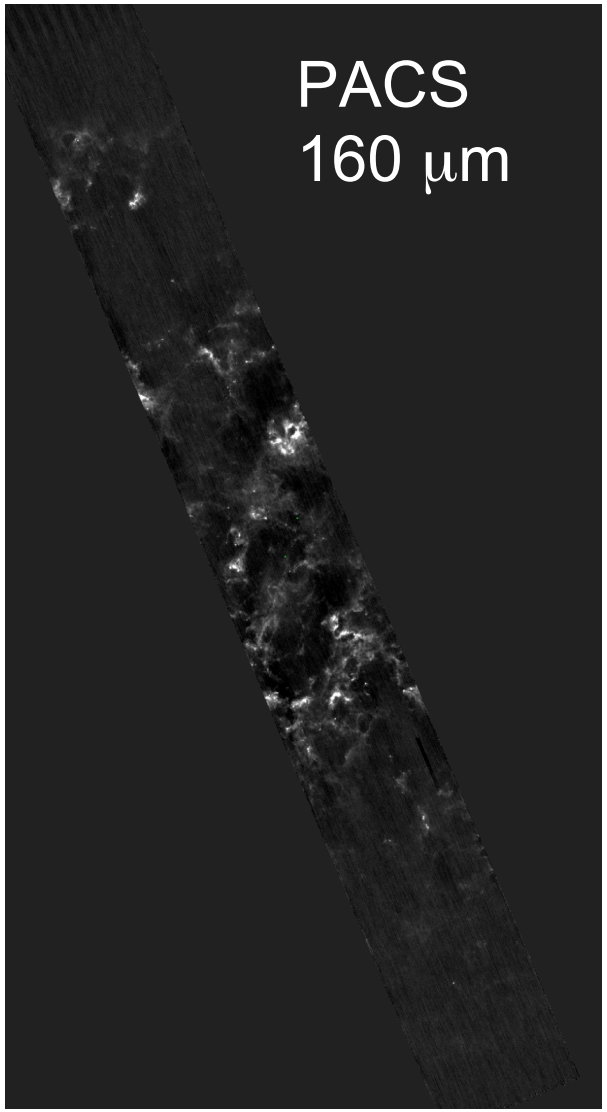
SDP for HERITAGE



- Nov. 23, 2009
- One slice through center of LMC.
- Changed one 18 hr AOR into two 9 hr AORs for new time limit on PACS.
- SPIRE & PACS parallel
- 100, 160, 250, 350 & 500 microns

Preliminary maps





Panuzzo & Misselt, Engelbracht

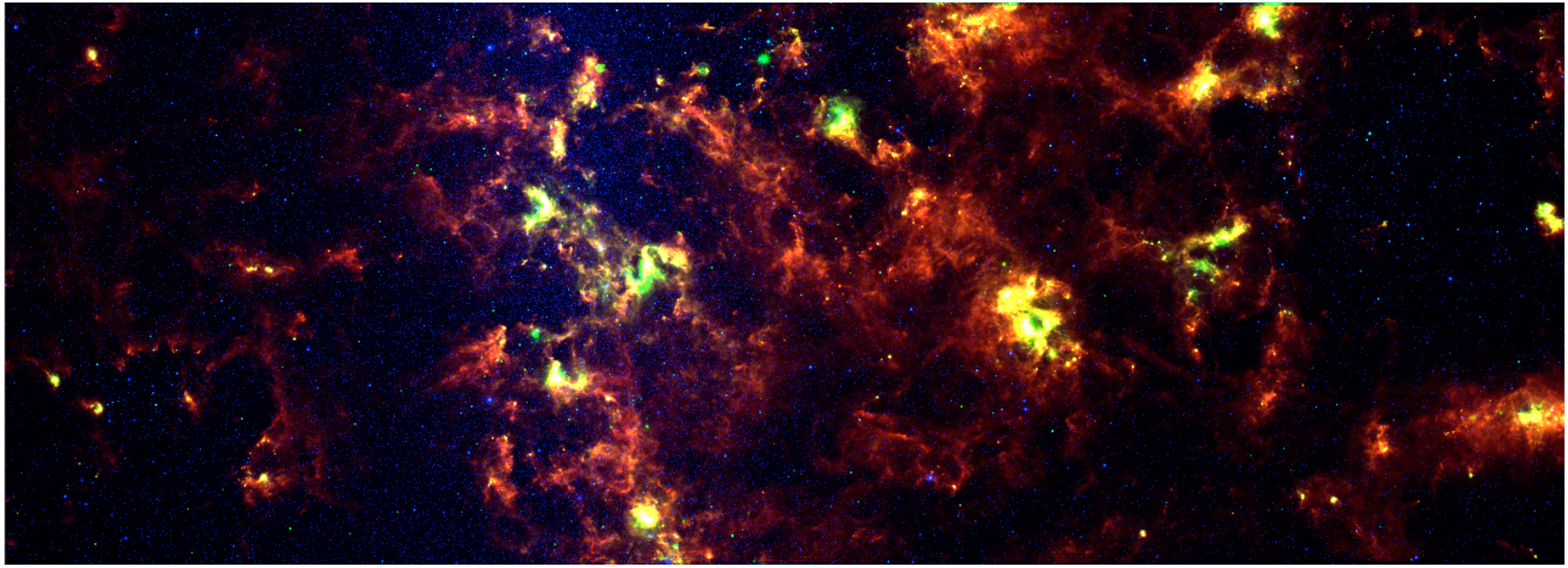
Sauvage & Duval, Gordon

HERITAGE SDP strip

IRAC 4.5 micron
stars

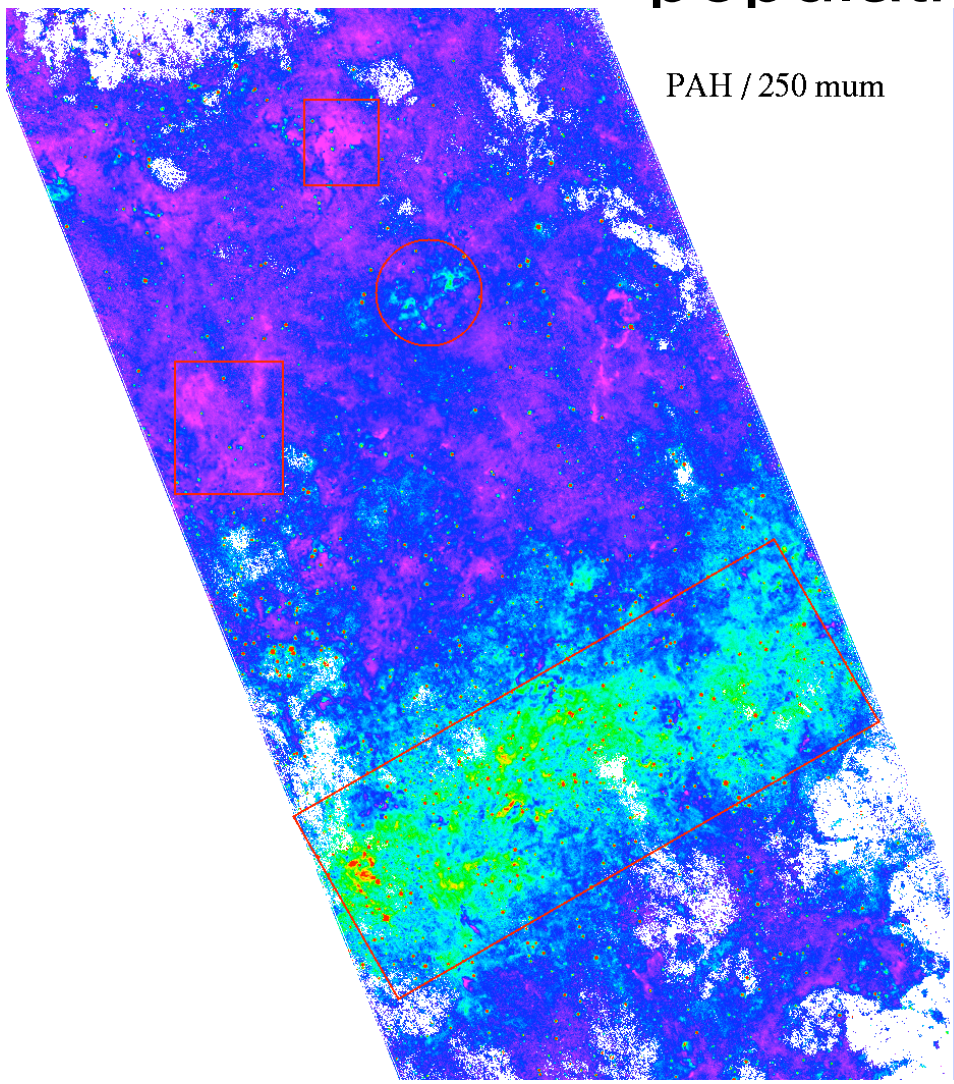
MIPS 24 micron
Massive star formation

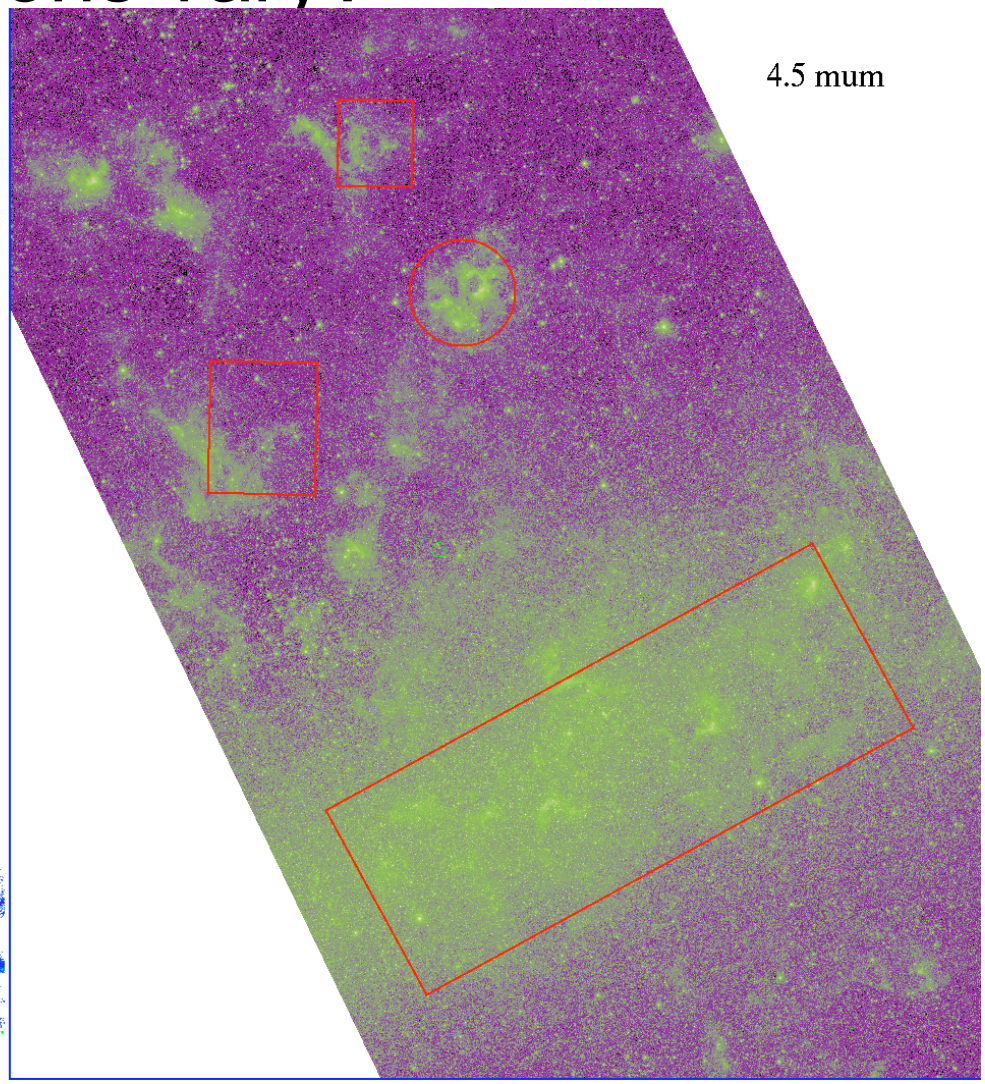
SPIRE 250 micron
ISM dust



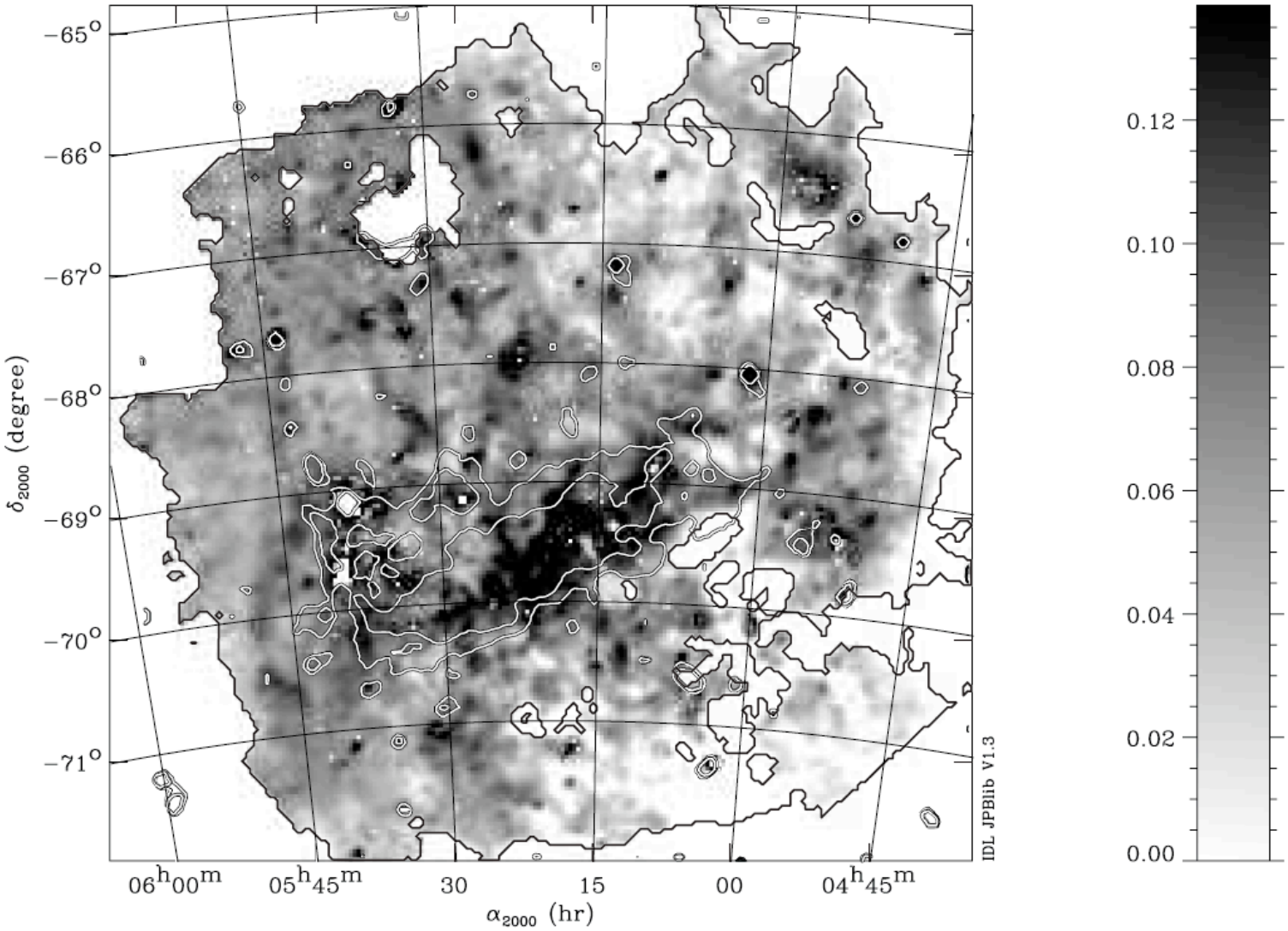
Panuzzo & Hony

PAH (8 micron) to 250 microns: Do dust grain populations vary?

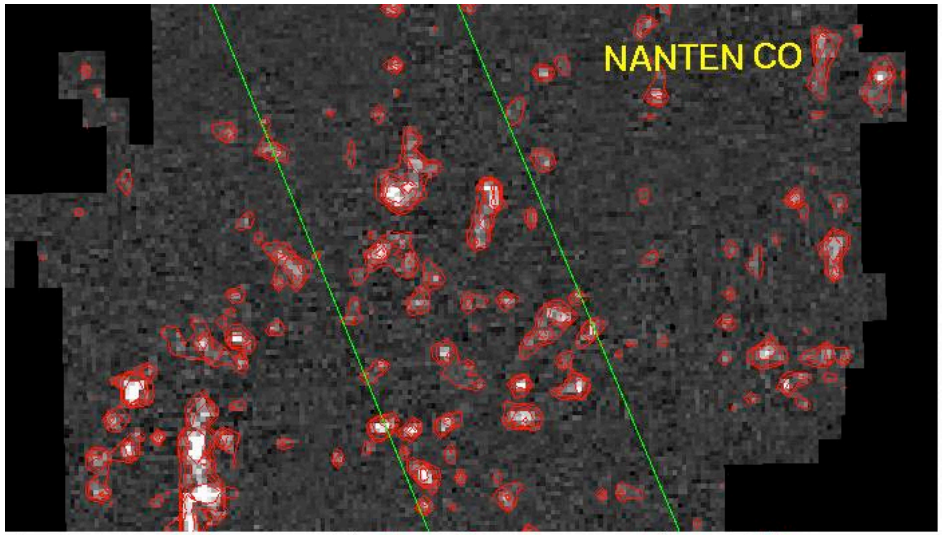


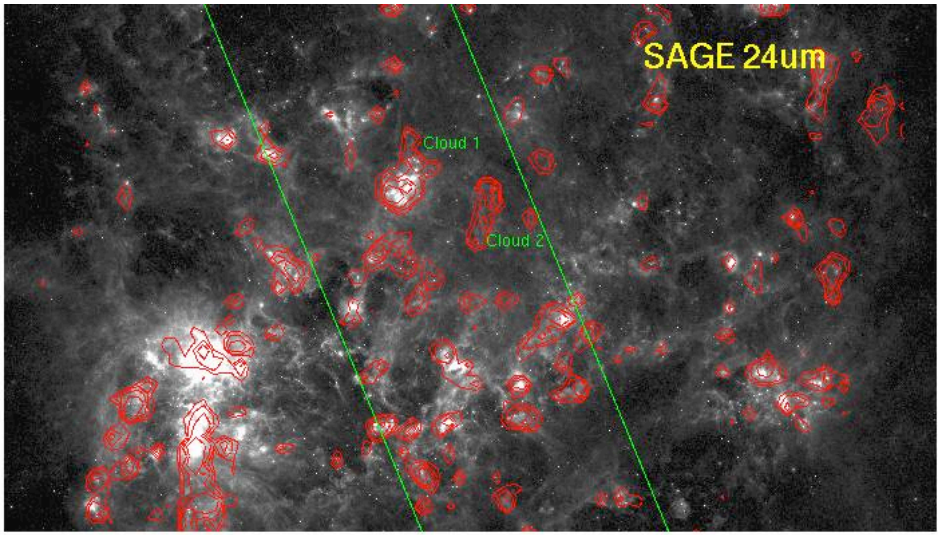


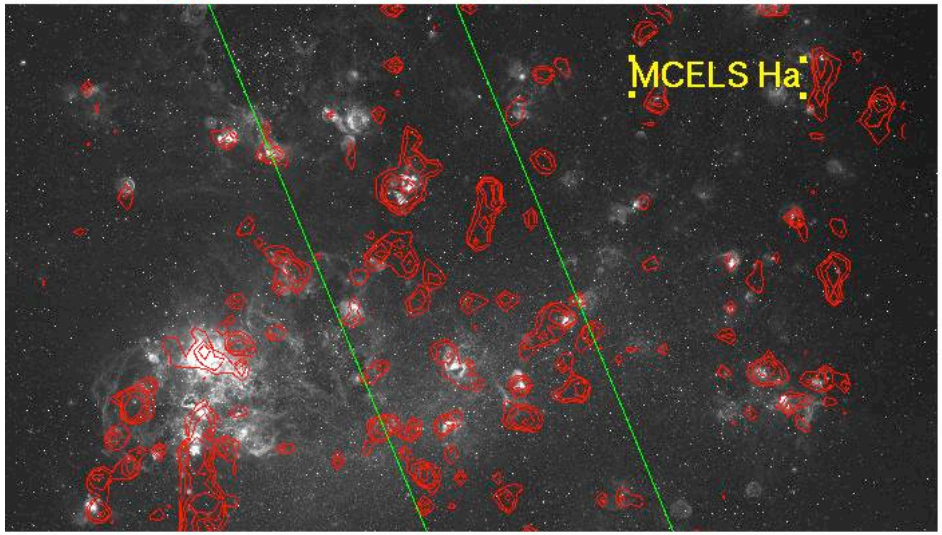
PAH/BG vs. 2MASS (contours) Paradis et al. (2009)



Dust & Gas



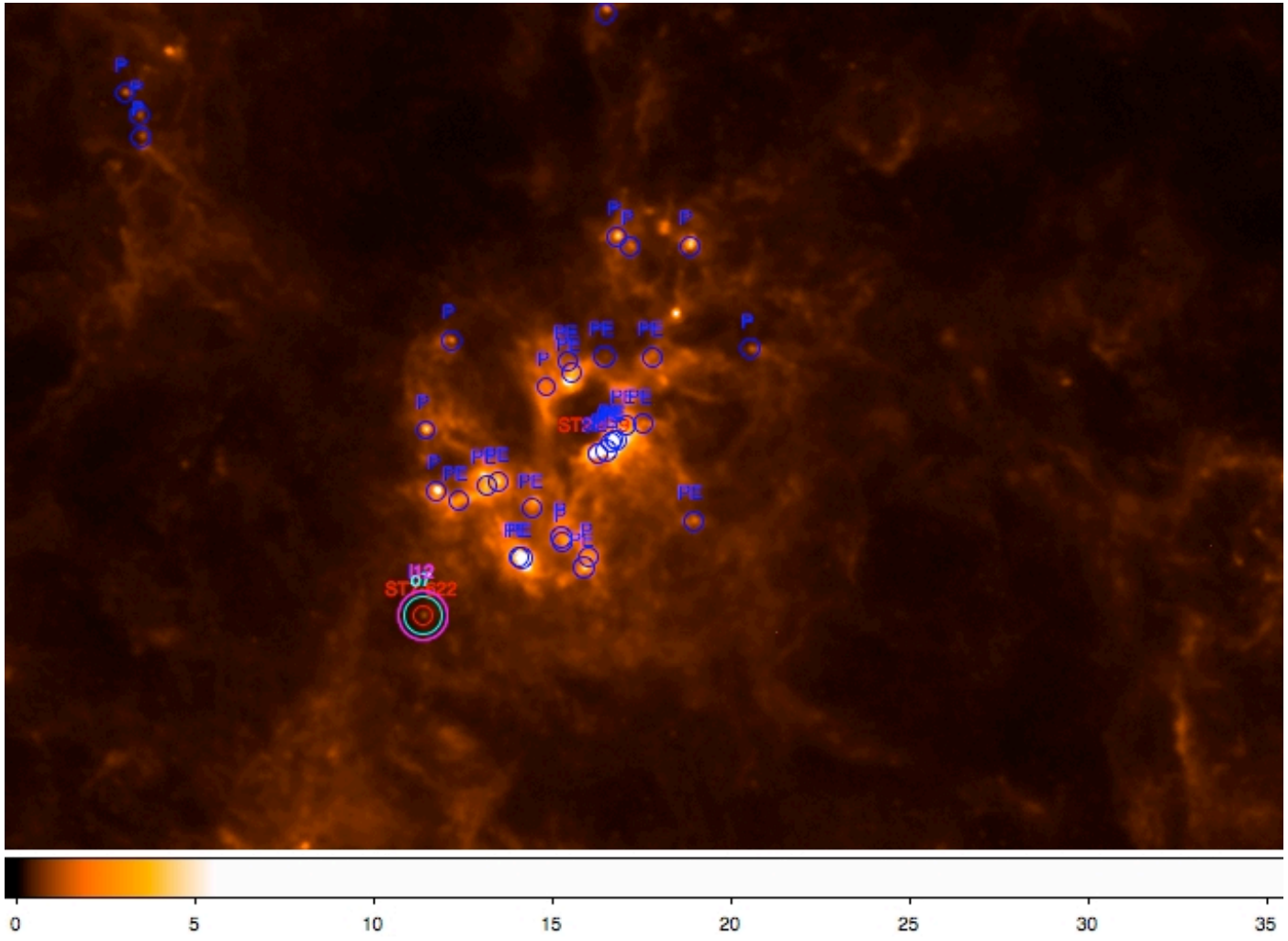




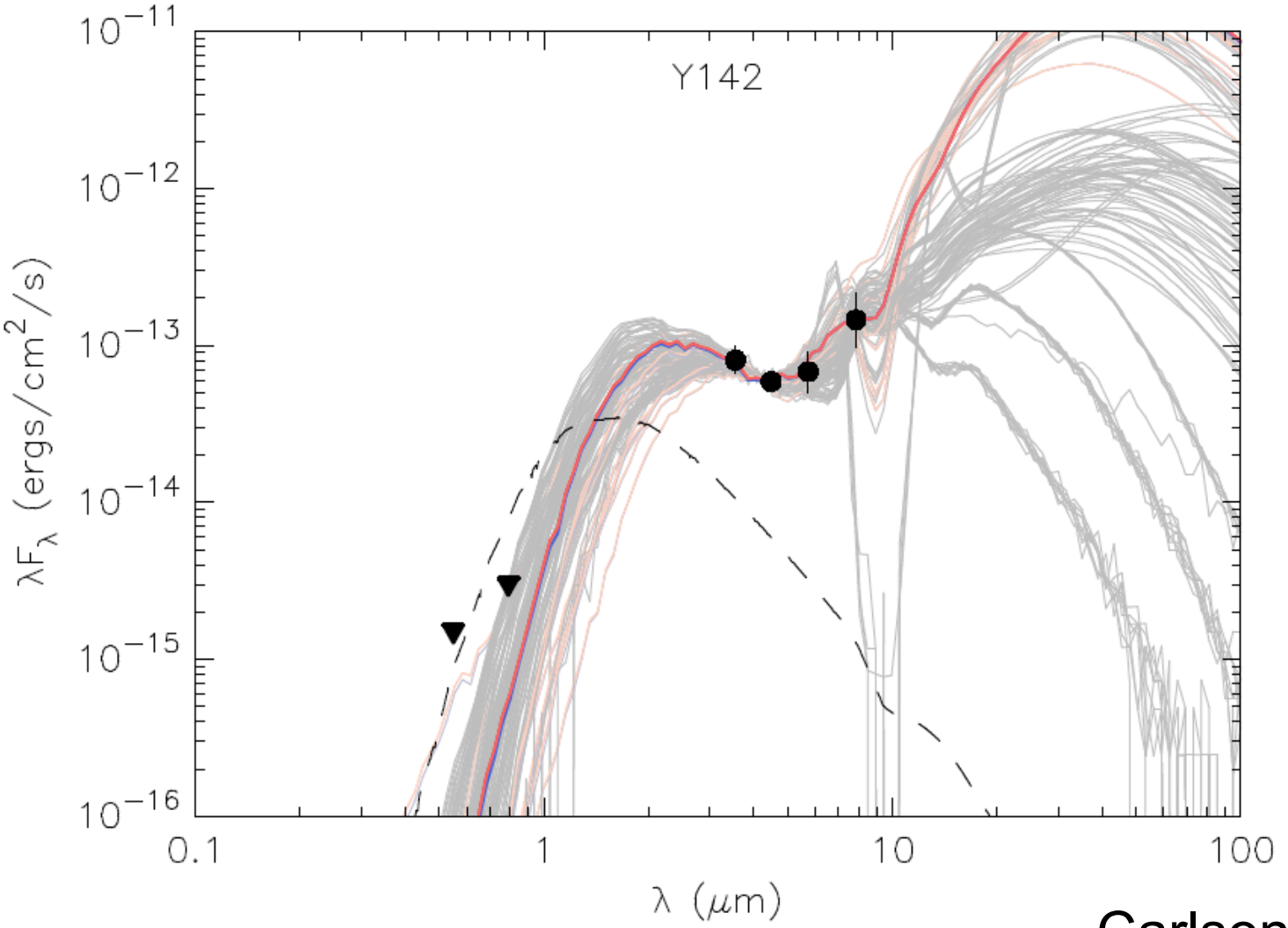
-Better dust mass estimate and Dust-to-gas mass ratio estimate

-search for cold dust, in CO clouds?
Bolatto, Gordon, Kawamura

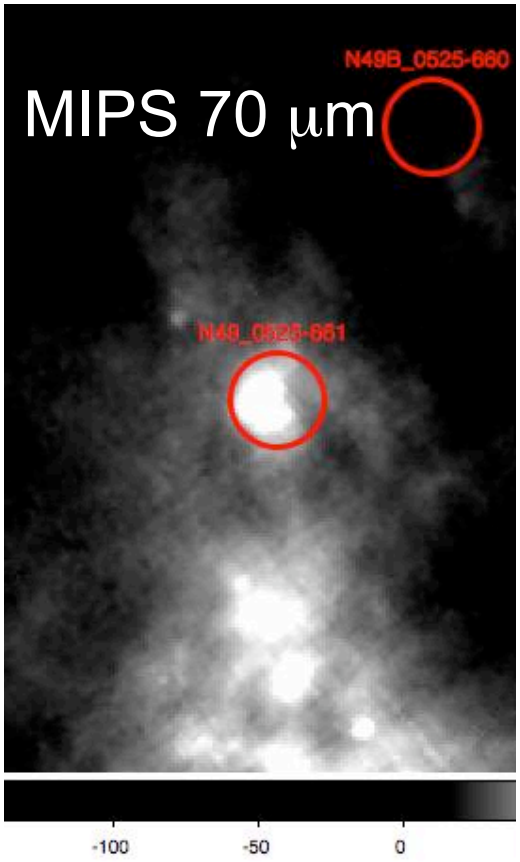
Massive YSOs: N44, SPIRE 250 microns

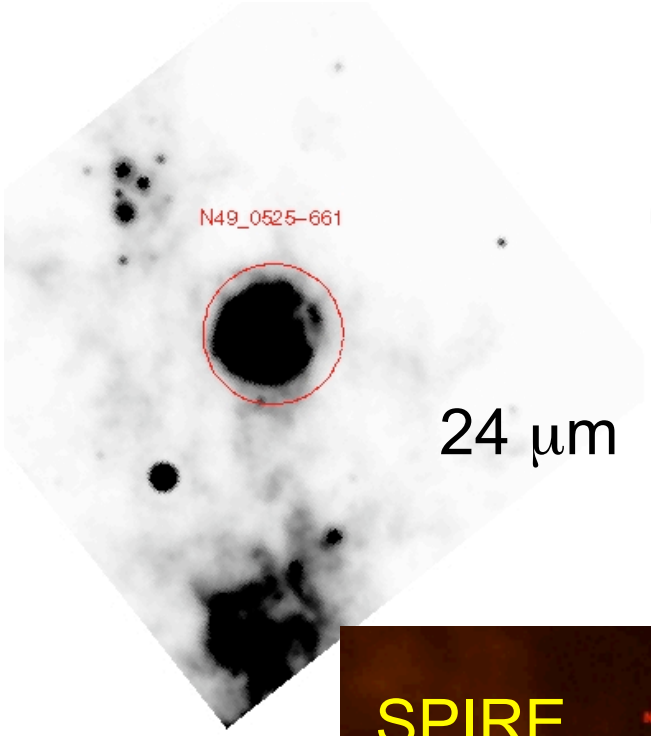


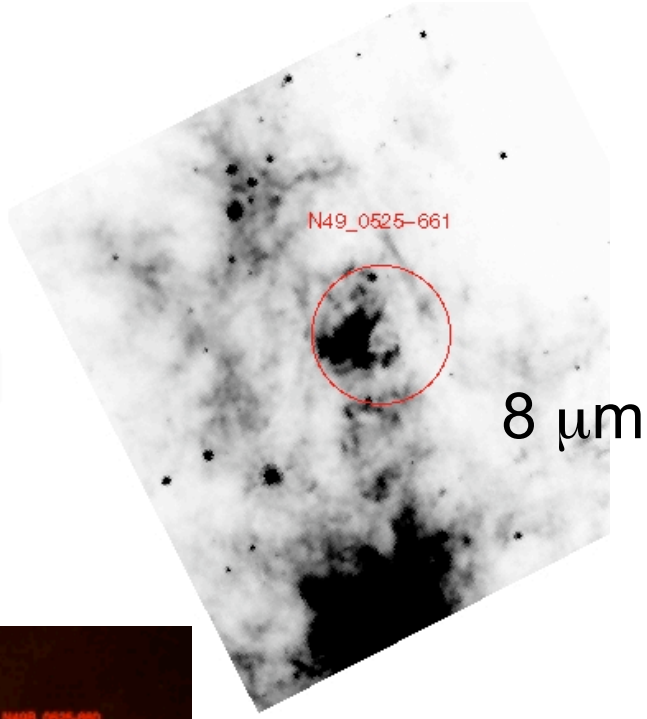
YSO SED: importance of longer wavelengths

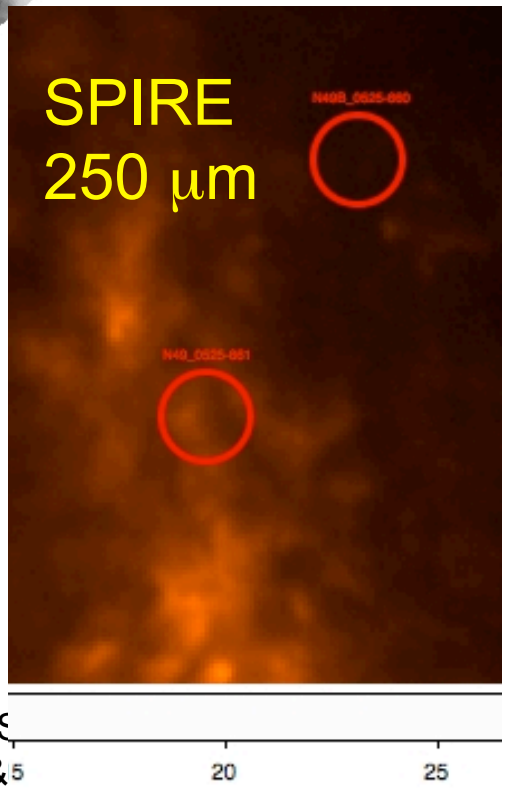


Carlson,
SMC NGC 602









N49: Supernova Remnant

Lessons Learned

- AORs must be < 9 hrs
- Calibration blocks are removed, all systems are go…
- PACS data processing, start at level 0, low surface brightness a challenge
- Observations looks very promising
- Potential papers on YSOs, ISM dust mass, SNRs and evolved stars from SDP
- Spectroscopic followup will be important
- More on HERITAGE at: sage.stsci.edu