

IR COSMOLOGICAL SURVEYS: THE ROLE OF SPICA-SAFARI

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SPICA Workshop, Rome, 7-8 February 2013

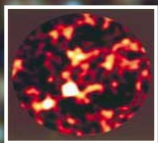
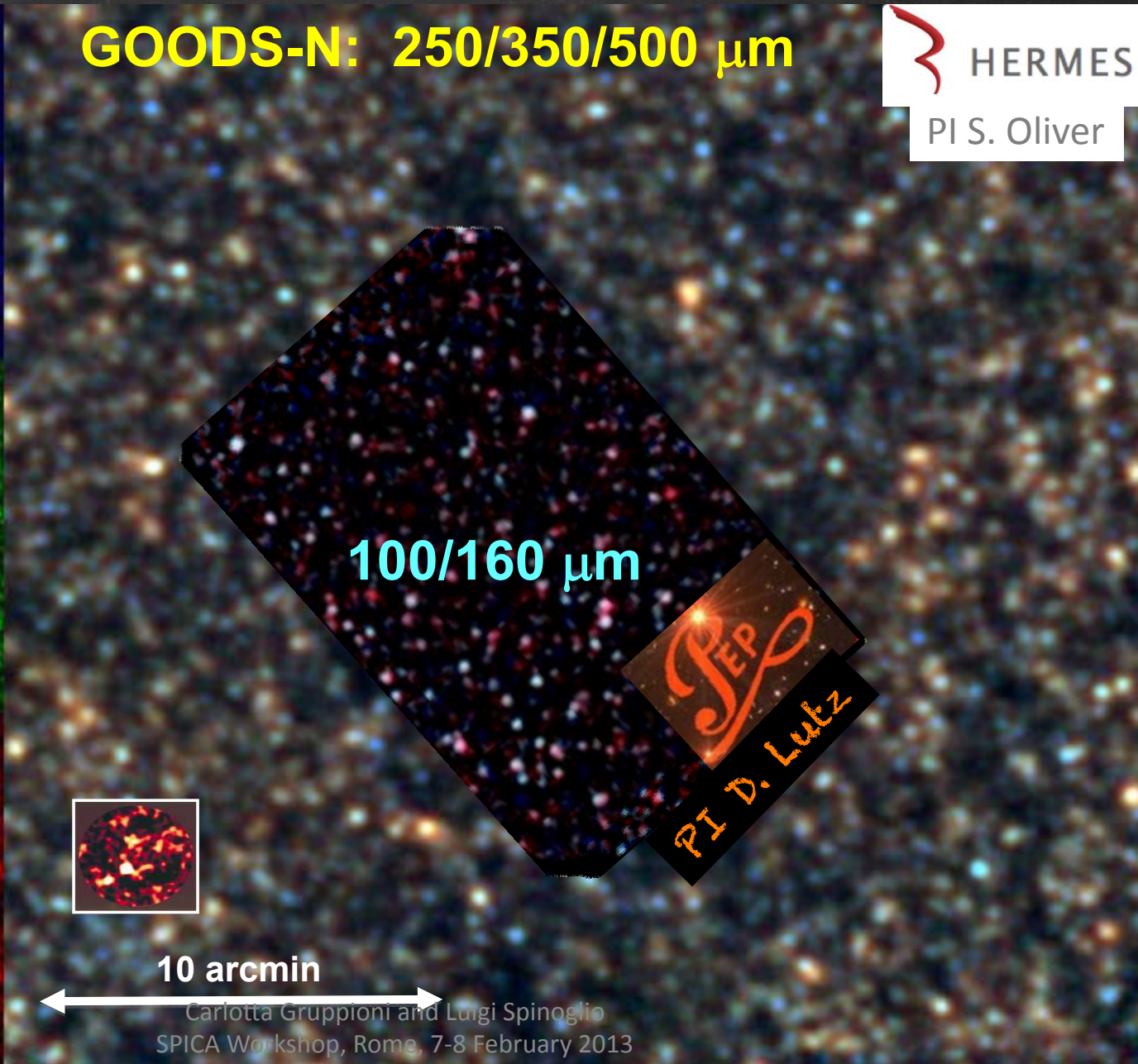
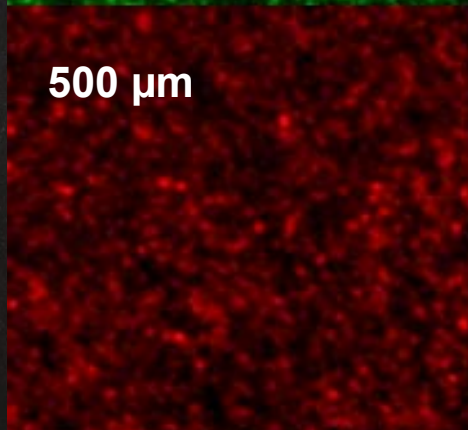
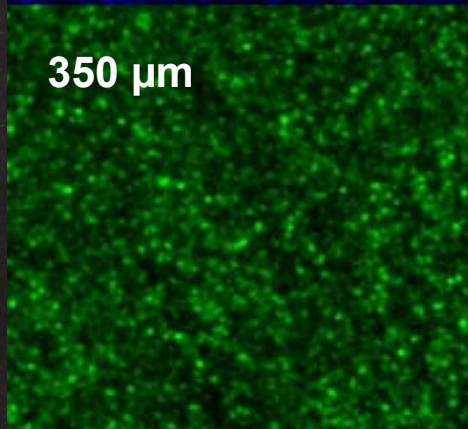
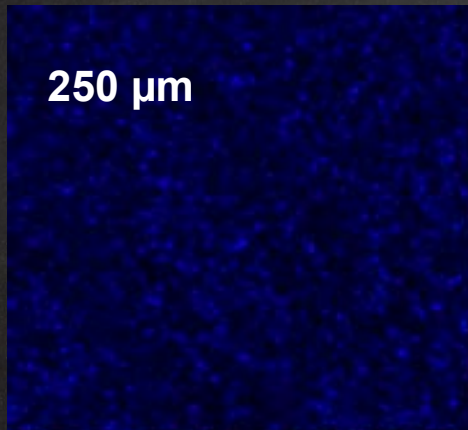
-Outline

- Photometric surveys with SAFARI will go deeper than Herschel: confusion will not affect the 48 μ m band and at 70 μ m SAFARI will go 2-4 times deeper.
- The main energy-generating mechanisms in galaxies are: black hole (BH) accretion and star formation (SF) and SF and AGN linked in a physical way (feedback) or in an evolutionary sequence
- MIR/FIR spectroscopy able to distinguish between BH accretion and SF, shown in the past by ISO and Spitzer. **Spitzer and Herschel spectroscopy together can trace the AGN and the Star Formation component, with extinction free lines, BUT ONLY IN THE LOCAL UNIVERSE**
- GALAXY EVOLUTION: the goal is to understand the history of the luminosity source of galaxies along evolution with far-IR spectroscopic cosmological surveys
- **SPICA will offer a unique opportunity to do this**
- FEASIBILITY: use galaxy evolution models linked to the observed IR-FIR counts (including Herschel) to predict the number of sources and their IR lines fluxes, as derived from observations of local galaxies.

Main Results from Herschel

 HERMES
PI S. Oliver

GOODS-N: 250/350/500 μm



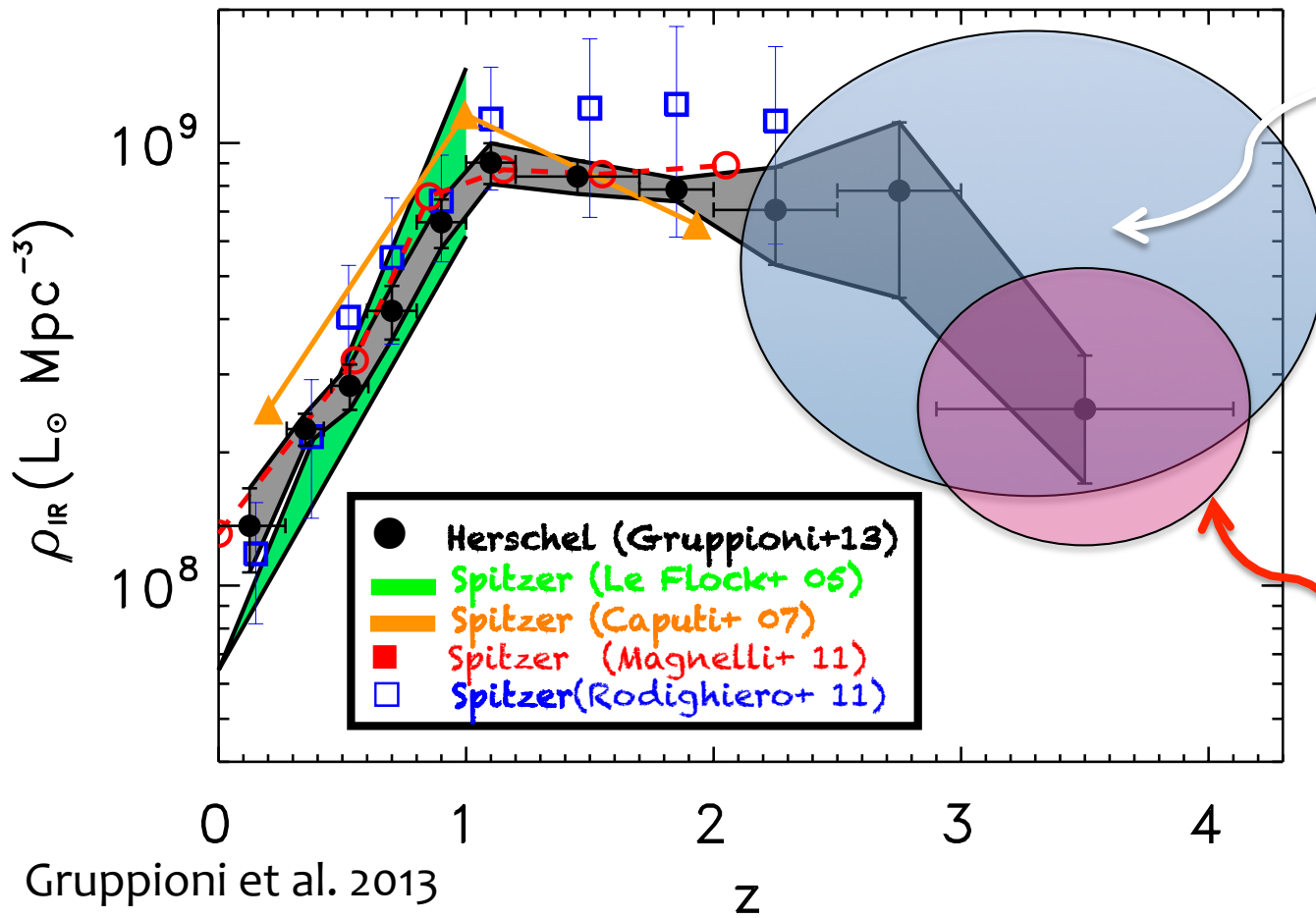
10 arcmin



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The Total IR Luminosity Density

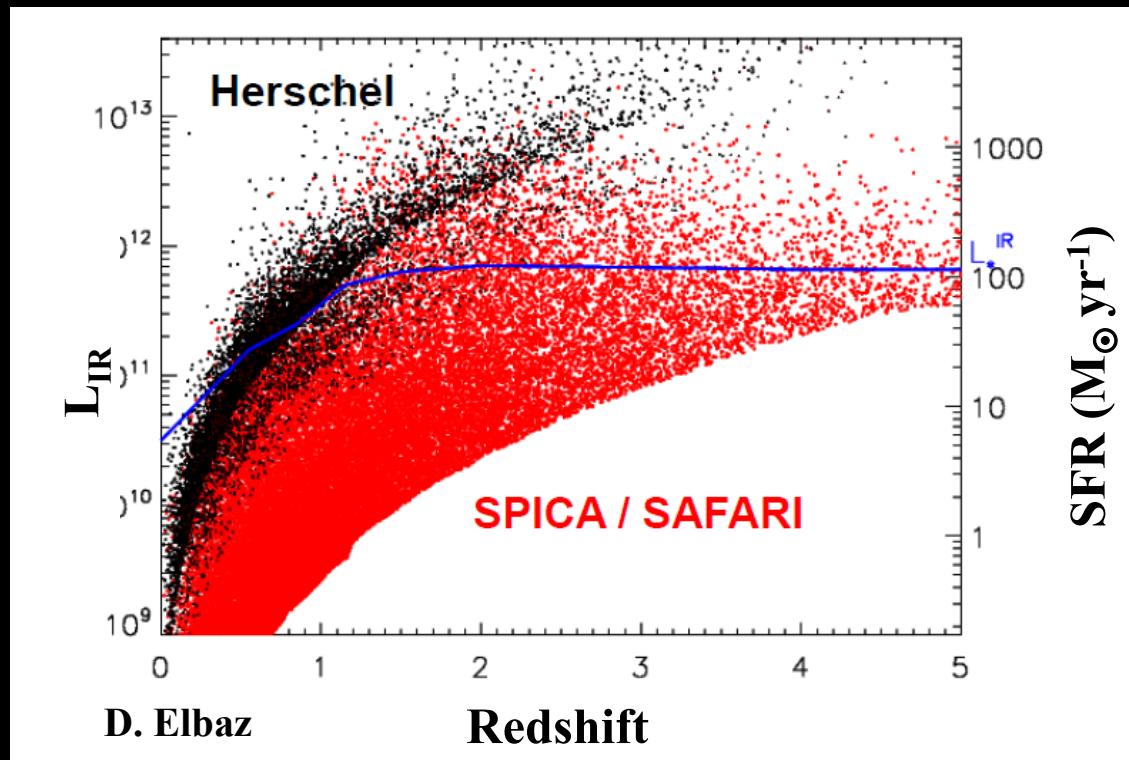
ρ_{IR} (\rightarrow SFR density)



Previously unexplored by IR surveys

Still very large uncertainties

SAFARI Deep Photometric Surveys



- High mapping speed
⇒ large area confusion
limited 70- μm survey
- Resolve 90% if CIB over
80% of Hubble time

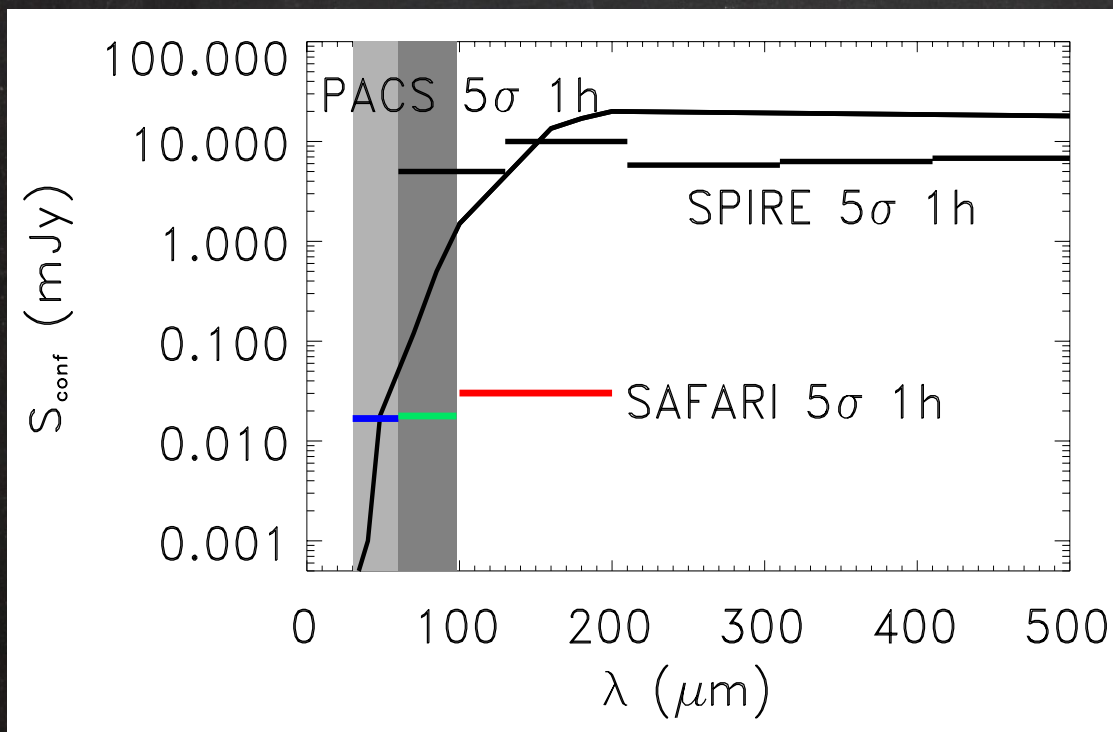
- Detection of galaxies with modest luminosity/SFR
 - $\sim 10^{10} L_{\odot}$ - comparable UV and FIR
 - Minimal contribution to CIB but responsible for most of the optical background

from Herschel to SAFARI

SAFARI goals:

- 1) Go to higher- z ($z > 3-4$)
- 2) Disentangle AGN from starburst activity

Main limit (photometric surveys) : source-confusion



SW: 34-60 μm (centred @48)
Not confused + NEW band

MW: 60-110 μm (centred @85)
Confused @ ~ 0.4 mJy
[Herschel(PEP) $\sim 1.1-1.6$ mJy @70,110]

LW: 110-210 μm (centred @160)
Confused @ $\sim 5-10$ mJy
Similar to Herschel