Planck sources in the *Herschel*-ATLAS Phase 1 Fields

(Herranz et al., 2012, in preparation)

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and collaborators

Outline

- Planck-Herschel synergy
- ERCSC sources in the H-ATLAS Phase 1 fields
- Galactic cirrus contamination
- Photometric cross-check
- Planck/Herschel selection of high-z candidates
  - See J. Wardlow, D. Clements & L. Montier talks for more details about this topic.

Planck-Herschel synergy

HERSCHEL

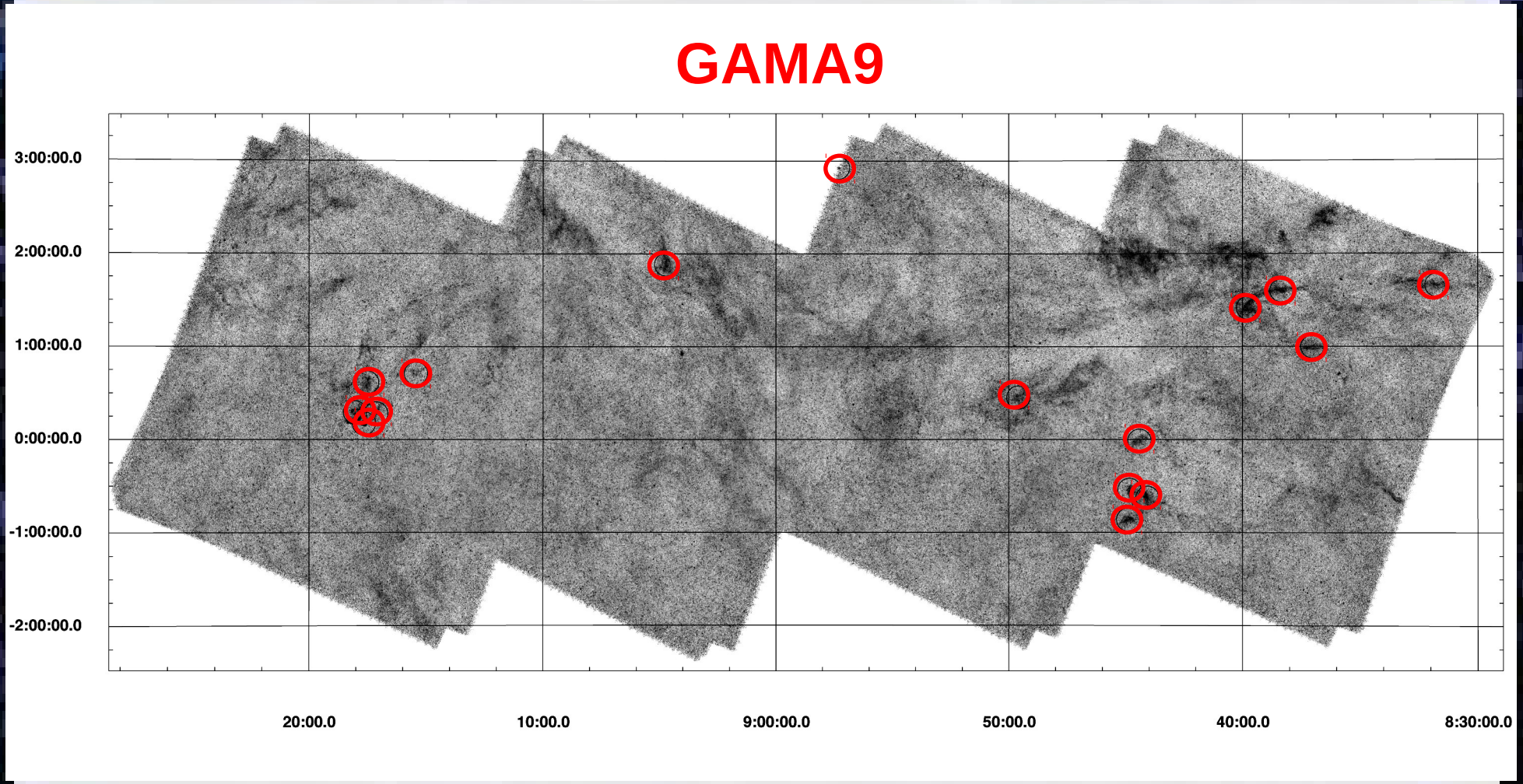
- High sensitivity
- High angular resolution
  - Ideal for follow-up
  - Effects of source confusion
  - Foreground characterization
  - Positional accuracy

PLANCK

- Good absolute calibration (CMB dipole)
- All-sky coverage
- Detection of bright flux density objects
  - Extreme objects
  - High redshift objects
    - Proto-clusters, lensed galaxies, etc

EXTENDED FREQUENCY COVERAGE: from 30 to 1200 GHz

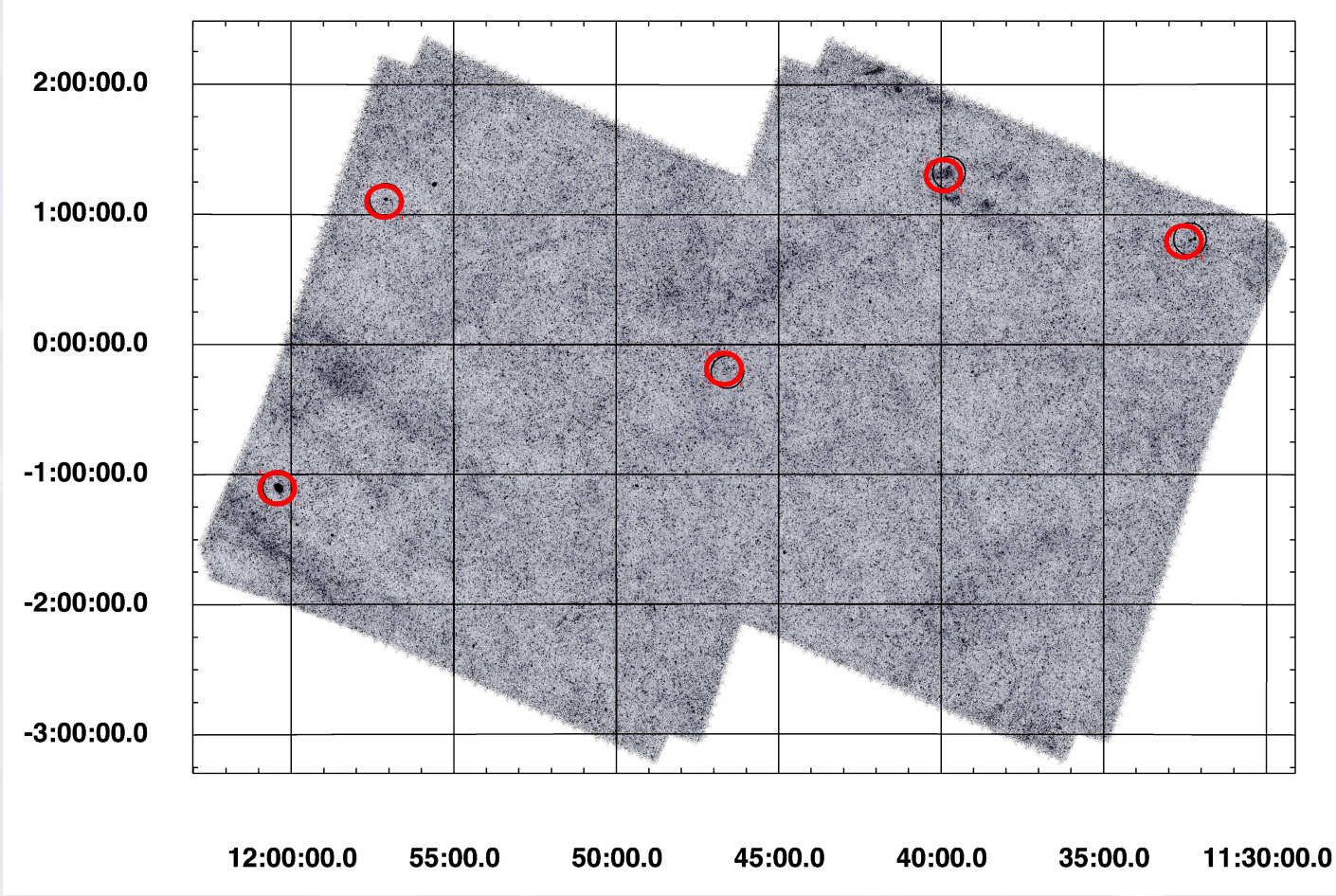
ERCSC sources in the H-ATLAS Phase 1



GAMA9: 15 Planck sources (all of them Galactic cirrus)

ERCSC sources in the H-ATLAS Phase 1

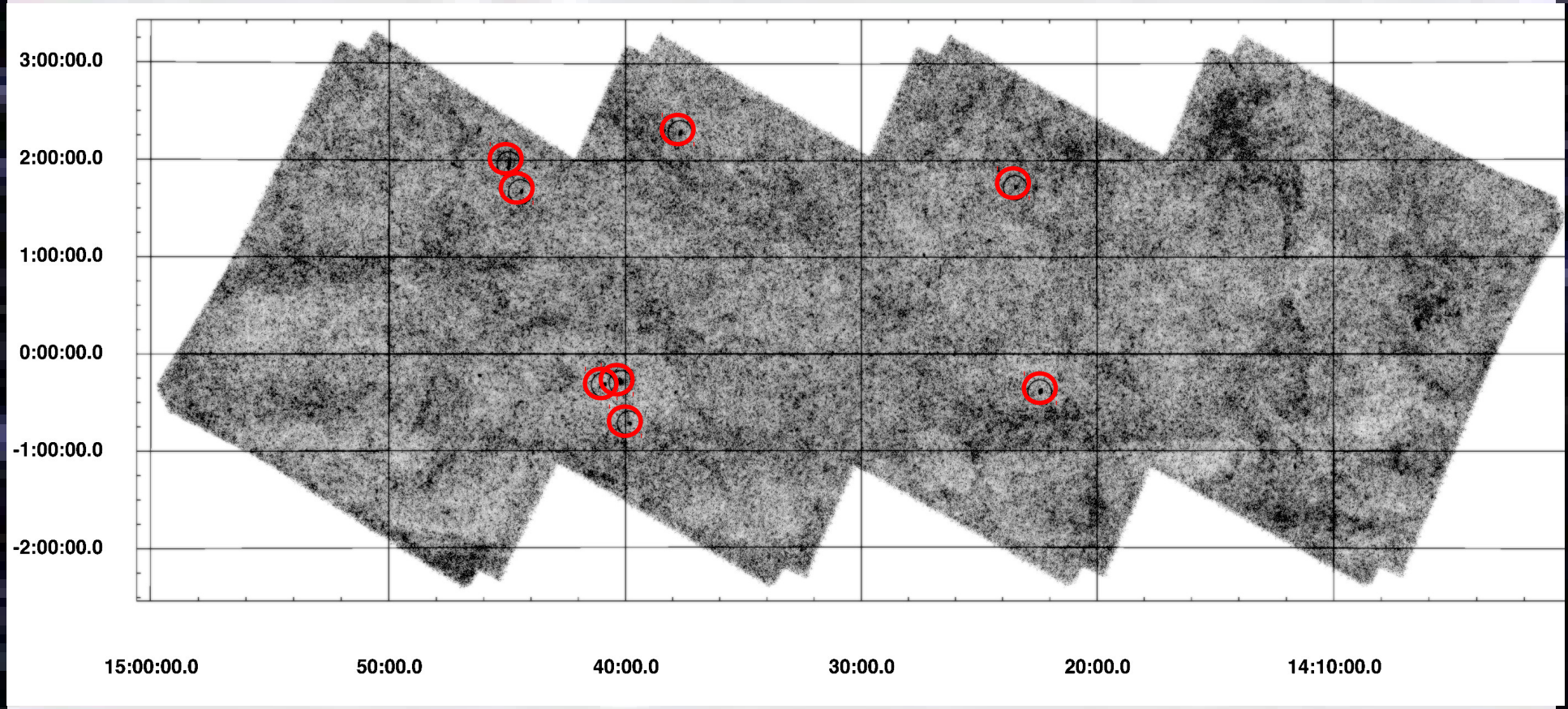
GAMA12



GAMA12: 5 Planck sources (one of them Galactic cirrus)

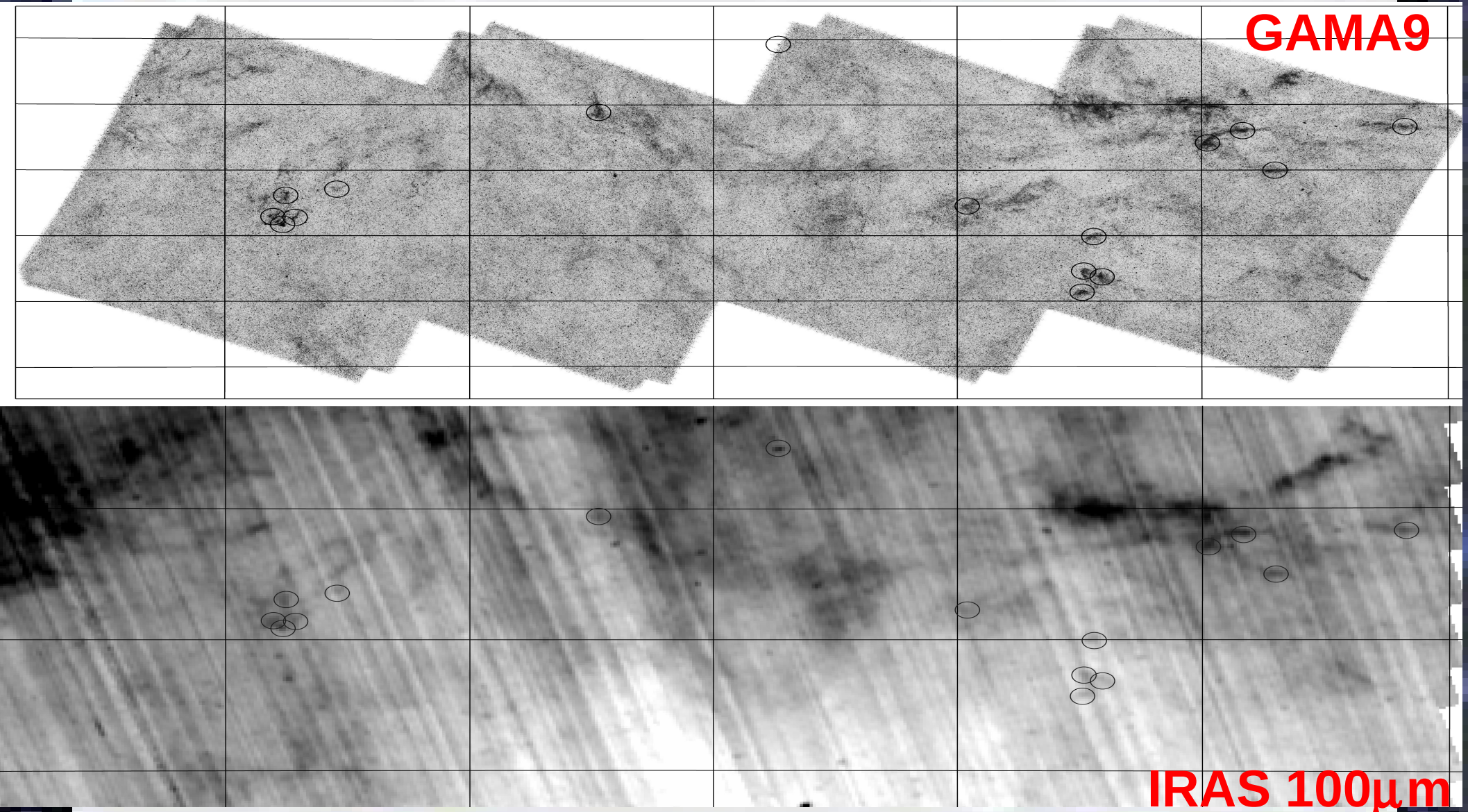
ERCSC sources in the H-ATLAS Phase 1

GAMA15



GAMA15: 8 Planck sources

Contamination by Galactic cirrus



Contamination by Galactic cirrus

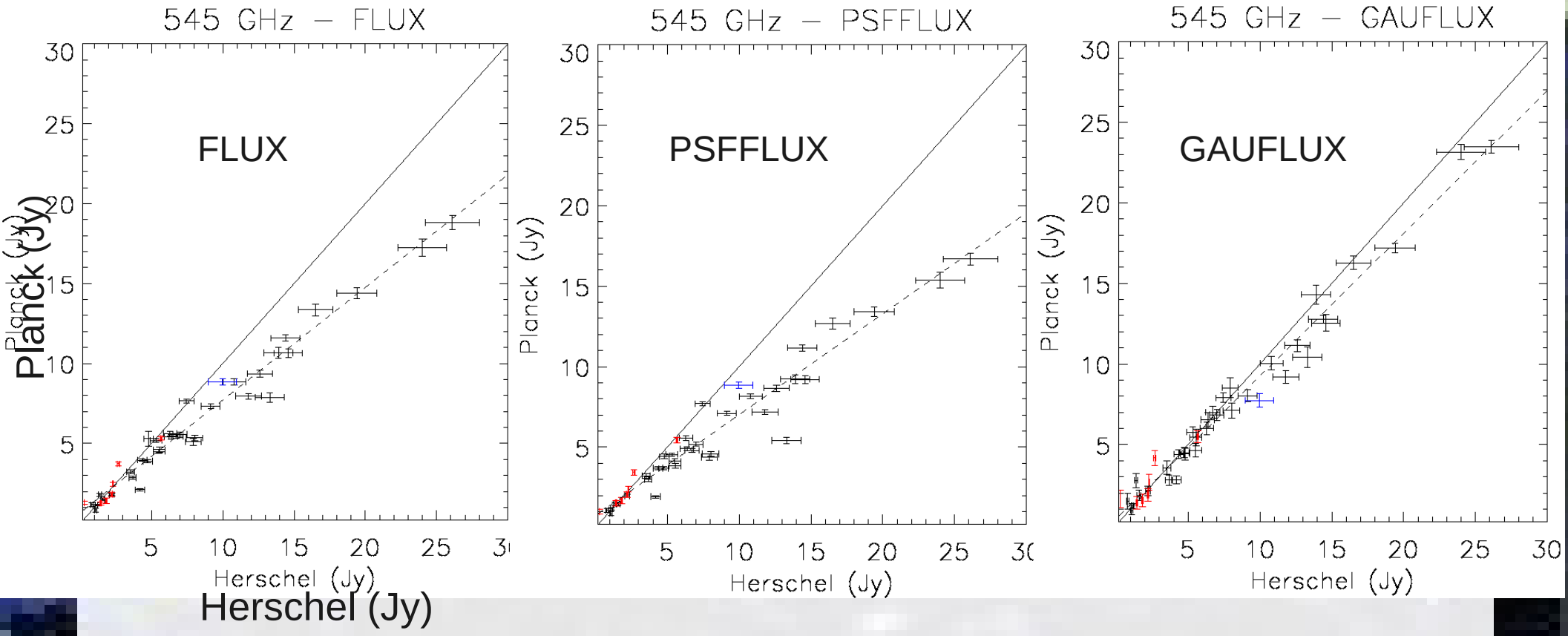
- 16 out of 28 ERCSC sources are likely to be associated to Galactic cirrus:
  - None of the 15 ERCSC sources in the GAMA-9 field has a plausible Herschel counterpart
  - One (out of five) ERCSC source in the GAMA-12 field has not a clear Herschel counterpart
- Most (but not all) cirrus-like objects have the ERCSC EXTENDED flag
  - But not all ERCSC flagged as EXTENDED are cirrus!
- Most (but not all) cirrus-like objects have high ERCSC CIRRUS flag
  - But not all ERCSC with high CIRRUS flag are cirrus!

Photometry cross-check

Caveats:

- Different angular resolution
  - Integrate over the *Planck* beam area
  - Weight for the *Planck* beam
  - Positions from *Planck*
- Different wavelengths
  - SED colour correction
- Different photometry extraction algorithms
  - GAUFLUX used for *Planck*

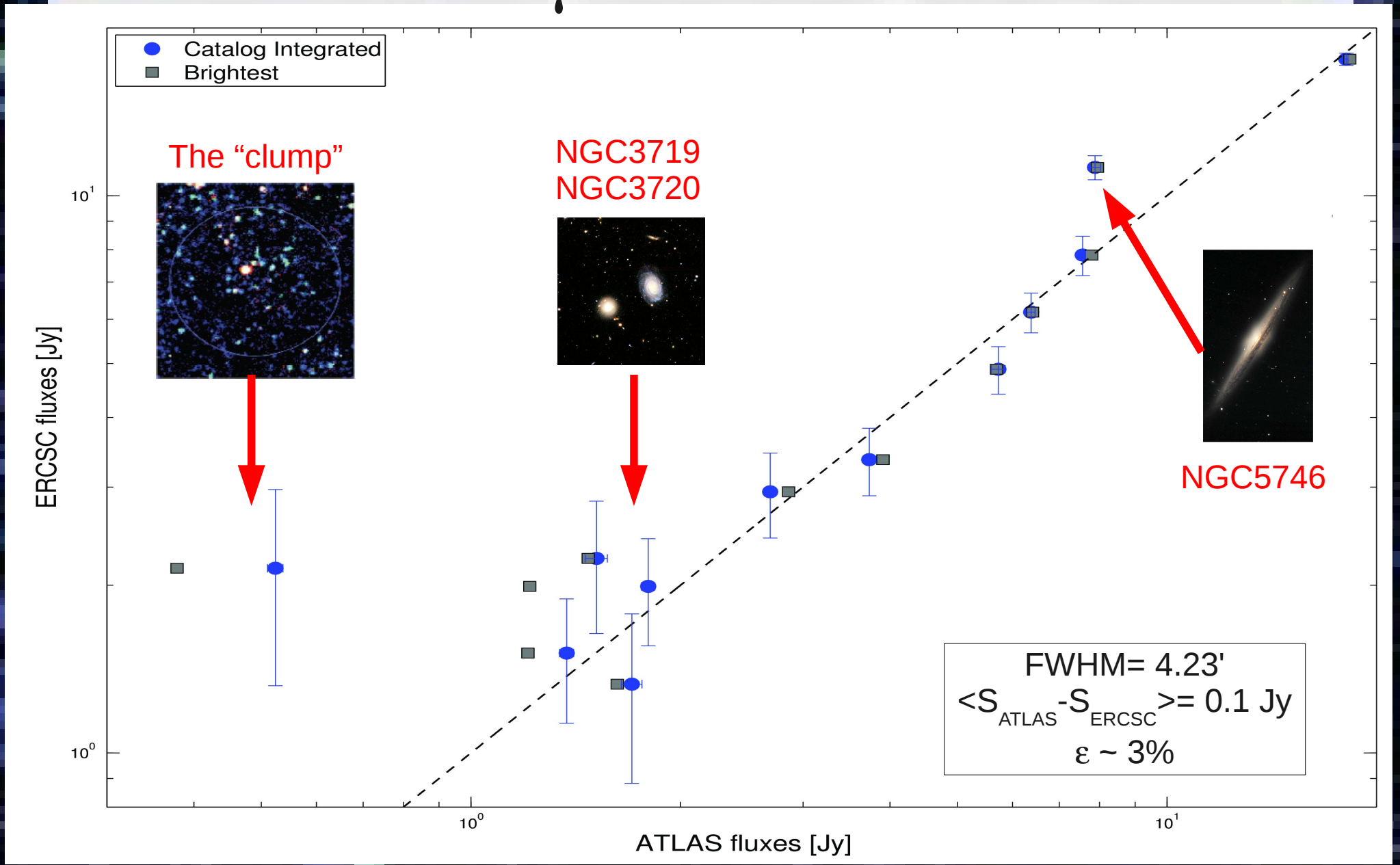
Planck vs Herschel photometry (545 GHz)



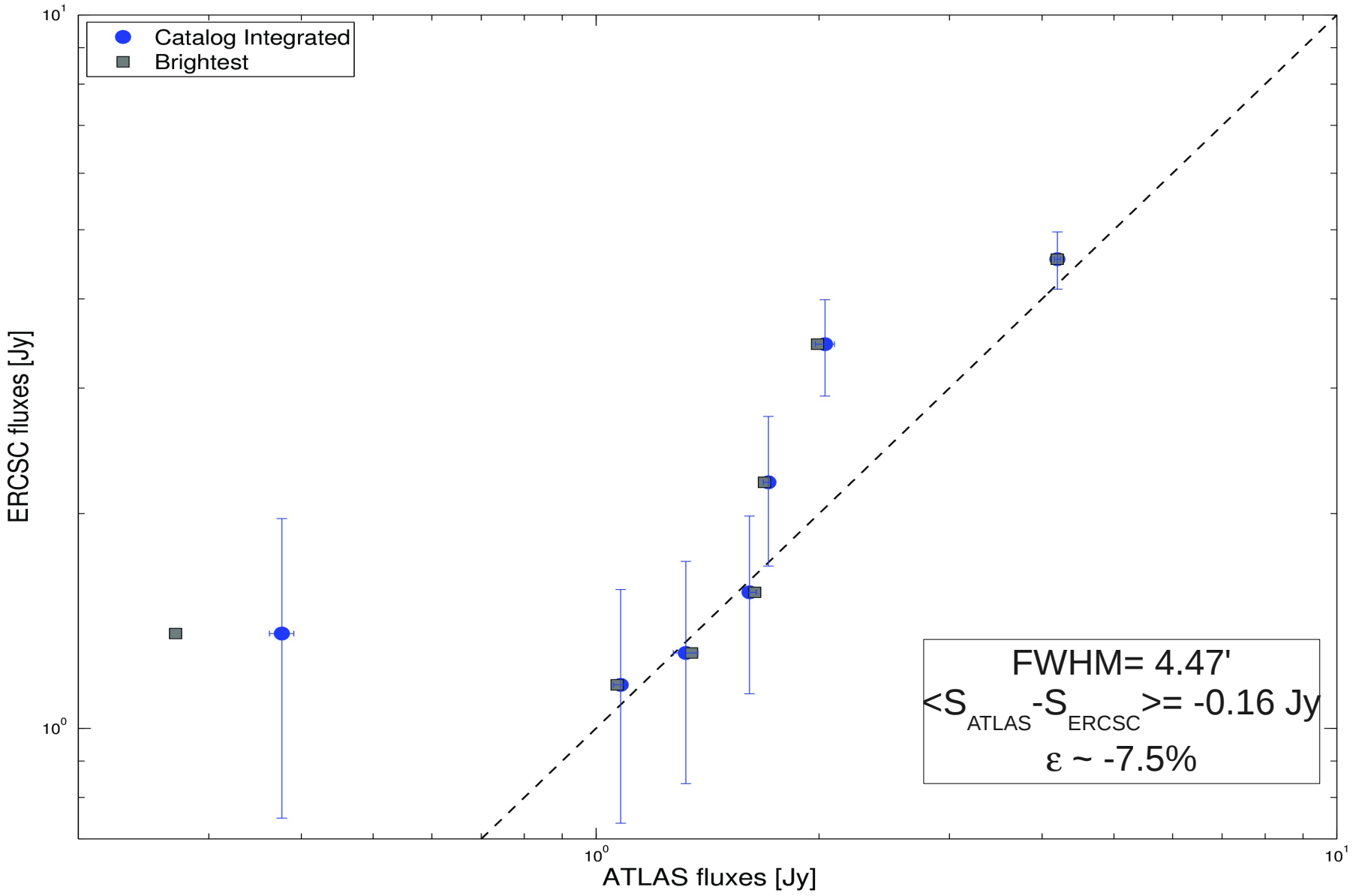
Galaxies at |b| > 20°and with EXTENDED=0 (42 objects).

Black points: KINGFISH (Dale et al. 2011); red points: H-ATLAS (Herranz et al. 2012). Planck data colour corrected according to the Explanatory Supplement (factor ~0.9 for the relevant spectral indices). Colour correction on Herschel data using the individual 500μm− 350μm spectral index. *Small impact of different estimators on source counts in the range considered in Hervé's presentation.* **Courtesy of M. Clemens (from de Zotti's talk)**

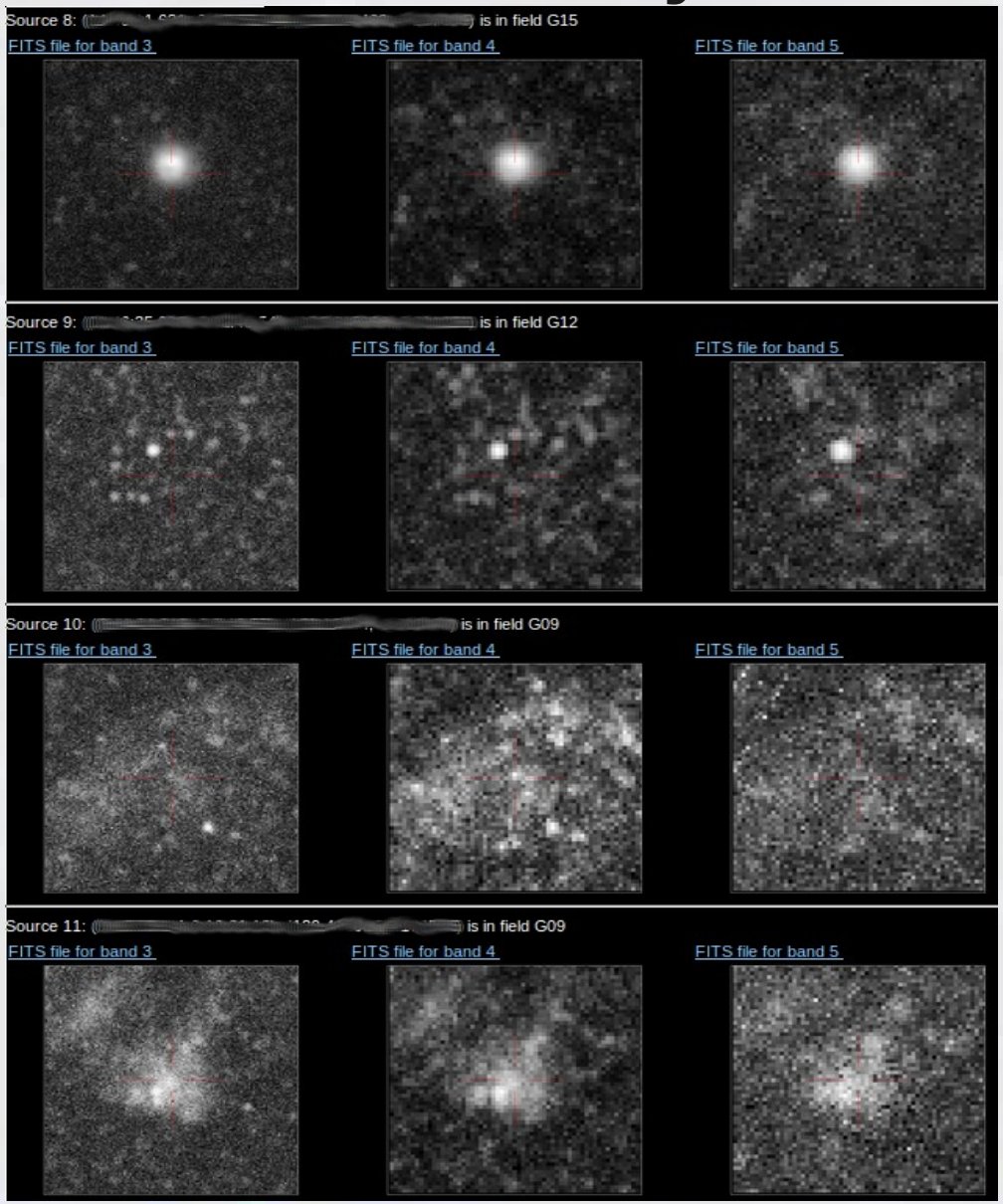
Photometry cross-check: 350μm/857GHz



Photometry cross-check: 550μm/545GHz



Planck/Herschel selection of high-z objects



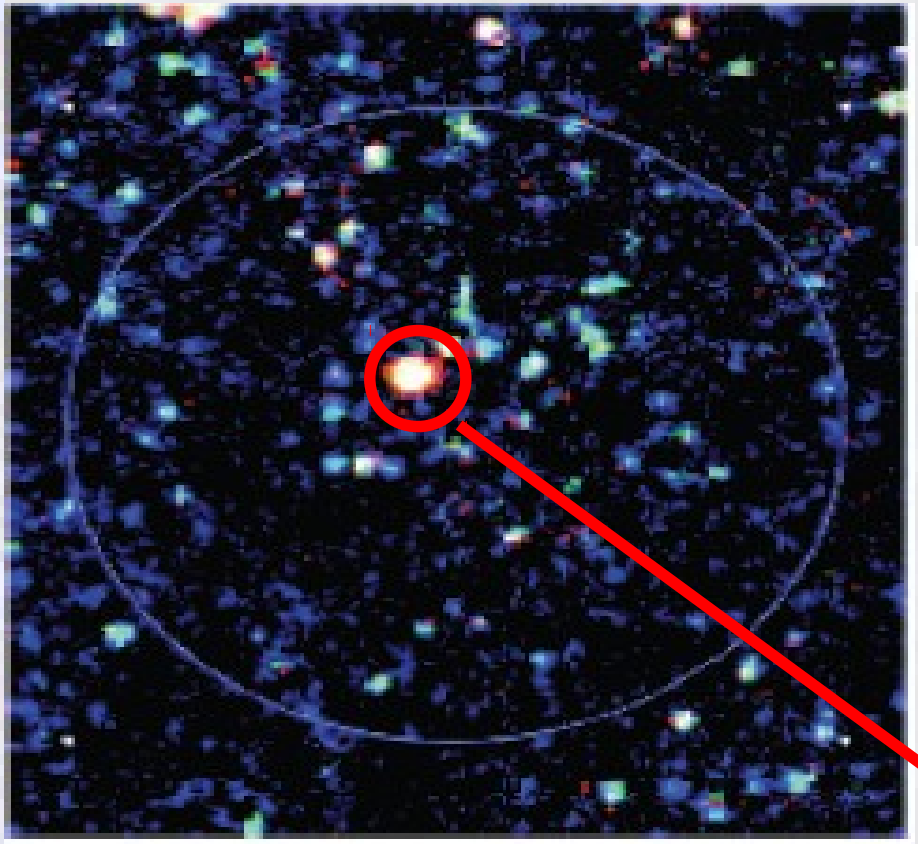
LOCAL GALAXY

The “CLUMP”

Galactic CIRRUS

Galactic CIRRUS

Planck/Herschel selection of high-z objects



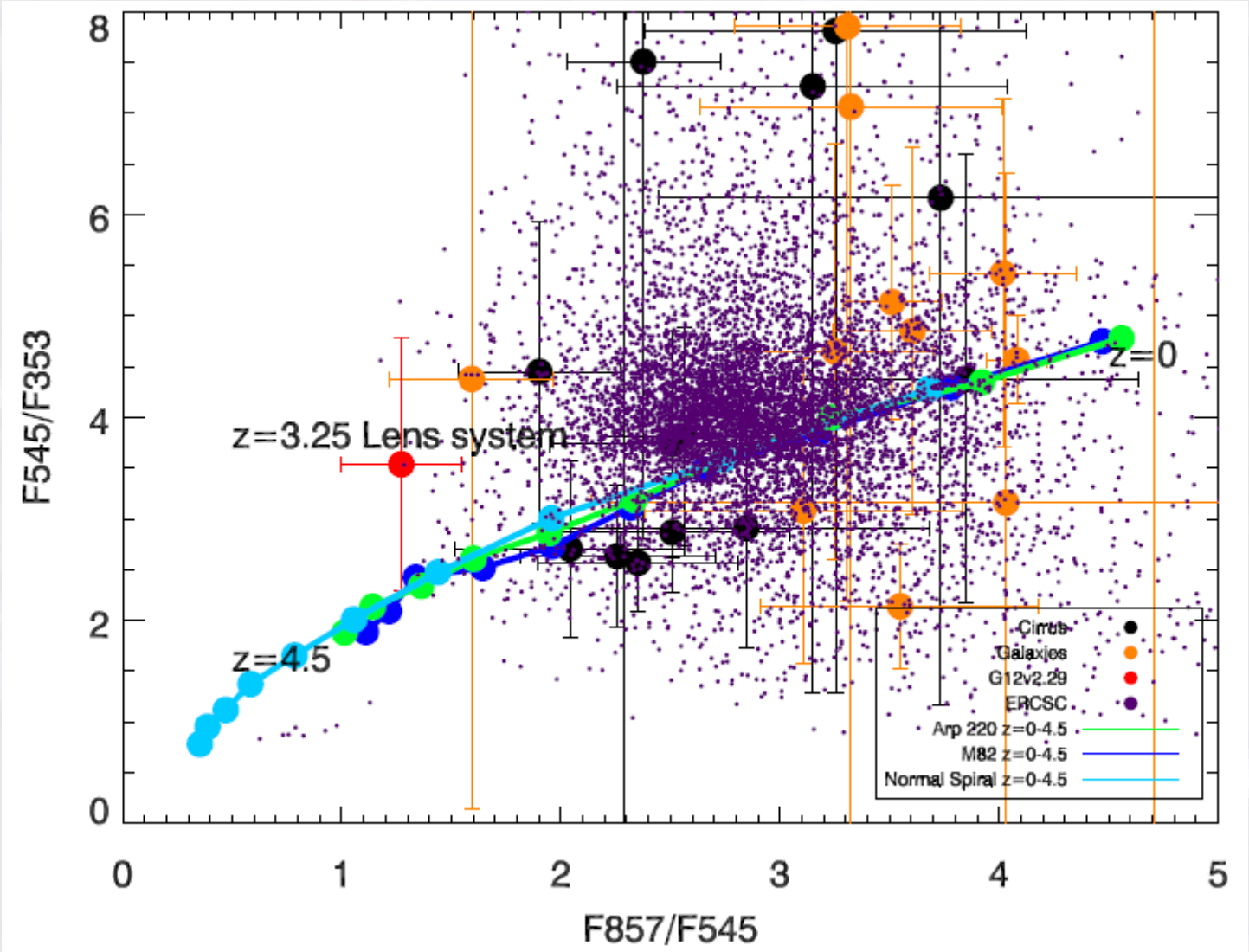
Blue:250μm ; Green:350μm ; Red:500μm

The “clump”

- S_{ERCSC}=2.15±0.83Jy vs S_{ATLAS}=0.52±0.01Jy (@857GHz)
- SDSS clump
- Boosting by a 2σ background fluctuation (Negrello et al. 2005)

A strongly lensed SMG!

Planck/Herschel selection of high-z objects



A strongly lensed SMG at z~3

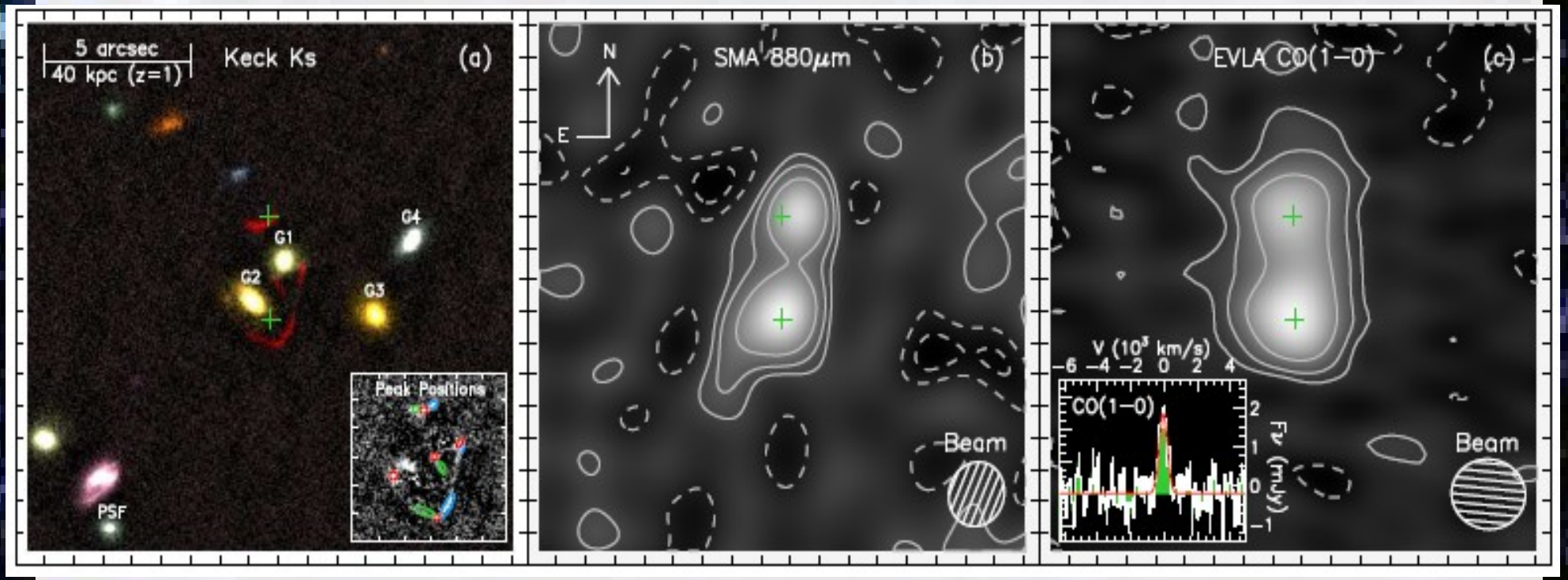


Figure from Fu et al. (2012; arXiv:1202.1829)
See J. Wardlow talk for more details...

Conclusions

- Contamination by diffuse Galactic emission is a serious problem in the ERCSC at high frequencies.
- Photometry: good agreement for S>1.5Jy @857GHz
- Although our poor statistics, source blending seems not a frequent problem.
- The clump: physically related to the strongly lensed galaxy, probably because it's the lens.

See Herranz et al. (2012) for more details...