A Far Infrared View of the Lockman Hole from ISOPHOT

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Main problems with CAM and PHOT data

- Cosmic ray impacts (glitches)
- Slow response of the detector to flux variations (Transient behaviours)
- If data are not corrected for these effects false detections may affect source samples, especially at faint fluxes

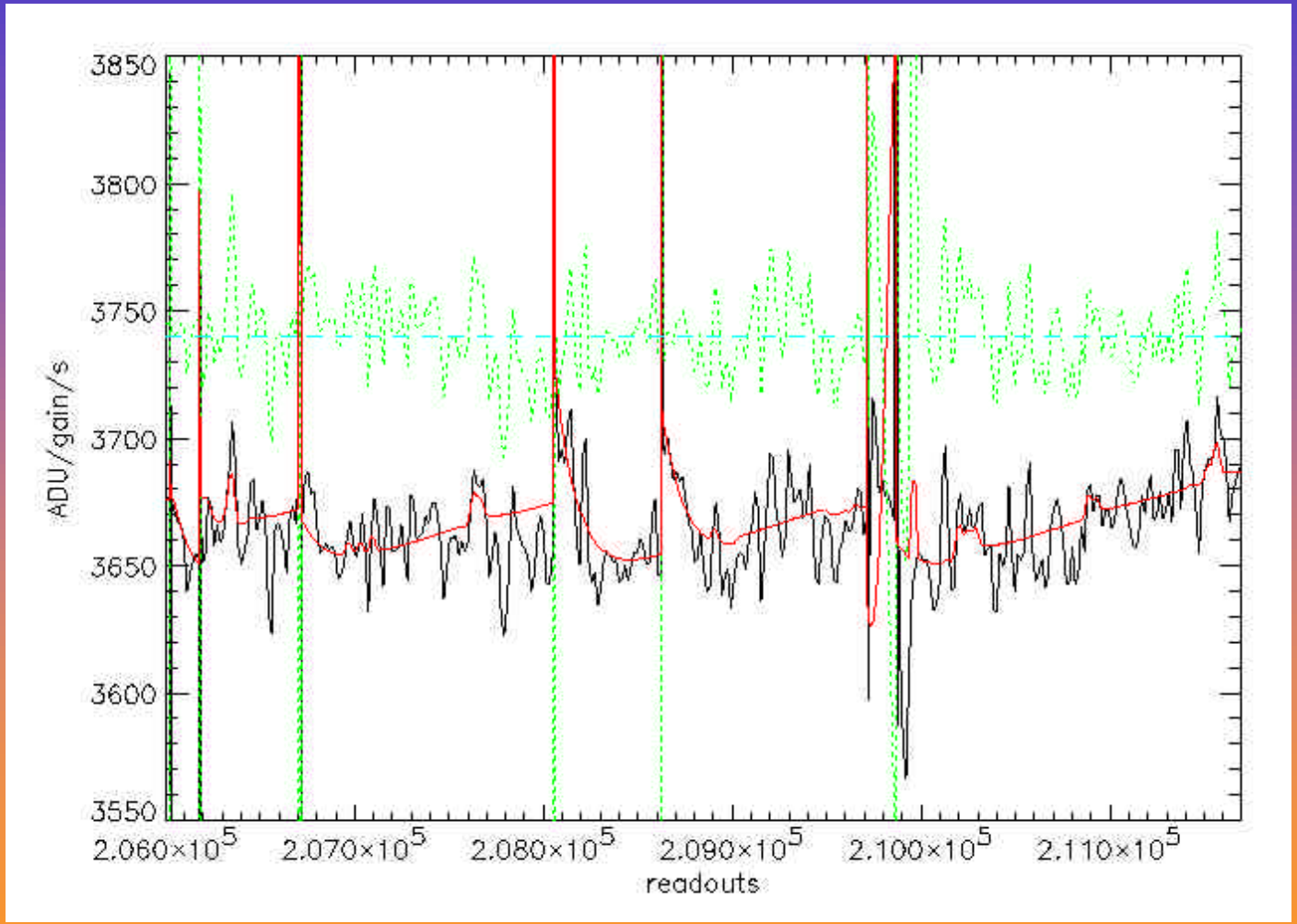
From
ISOCAM (Lari et al 2001.)
to
ISOPHOT (Rodighiero et al, in preparation)

- Same approach as for CAM 15 micron (description of the transient behaviours of the detector with a parametrized model).
- There are some differences. In particular we have to take into account the non linear response of PHOT C100.

LINEARITY

- The PHOT detector output suffers from some non-linear response of the Cold Readout Electronics. This results in ramps non-linearities that generally follow a fixed pattern for every detector pixel.
- We have computed a linearity correction depending on the voltage level and on the ramp position (from ELAIS S1 field).

Example of a temporal fit to the time history of a PHOT C100 detector pixel



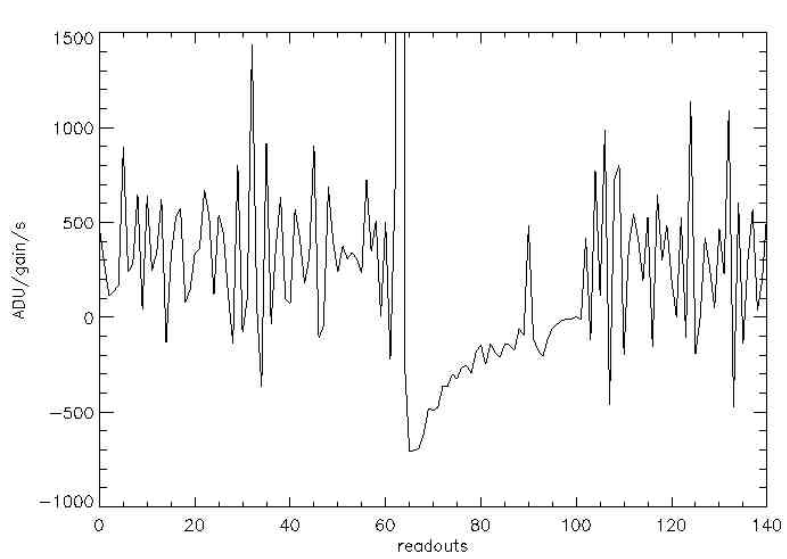
Signal

Time →

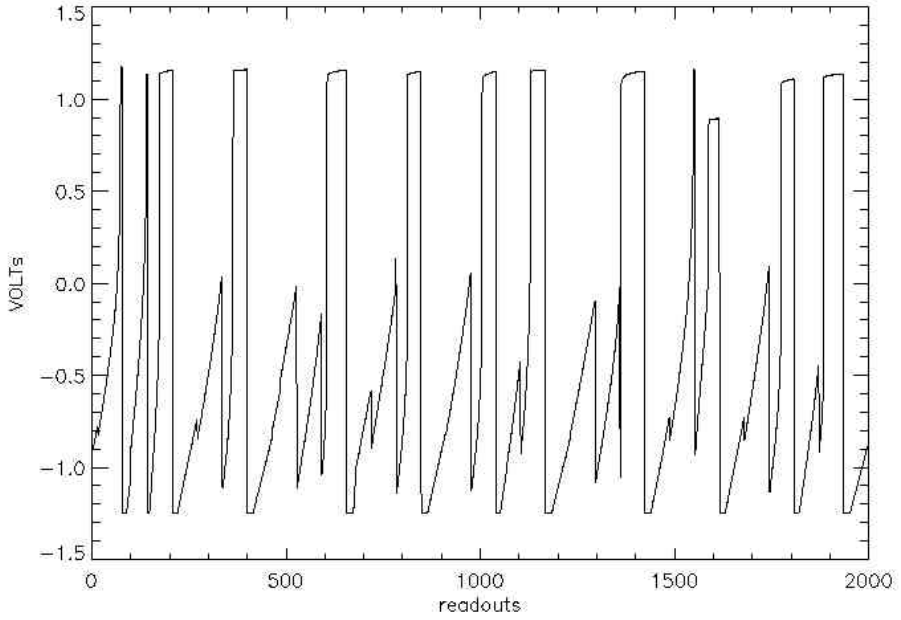
The C100 detector is sensible to quick flux variations (transients), and suffers for some saturations when cosmic impacts overtake his dynamical range

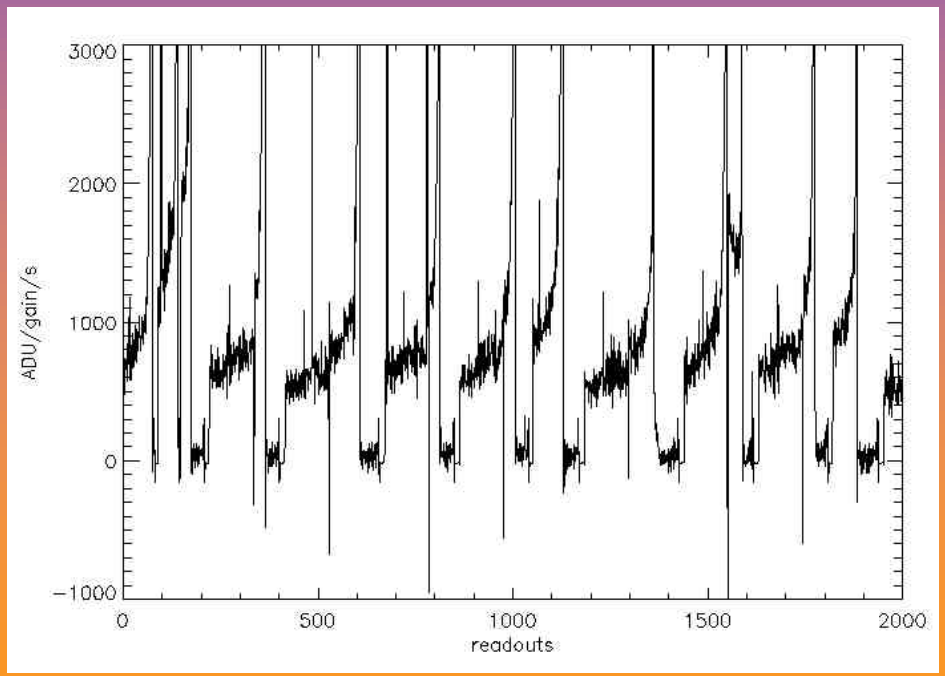
Examples of drop-outs

Single event



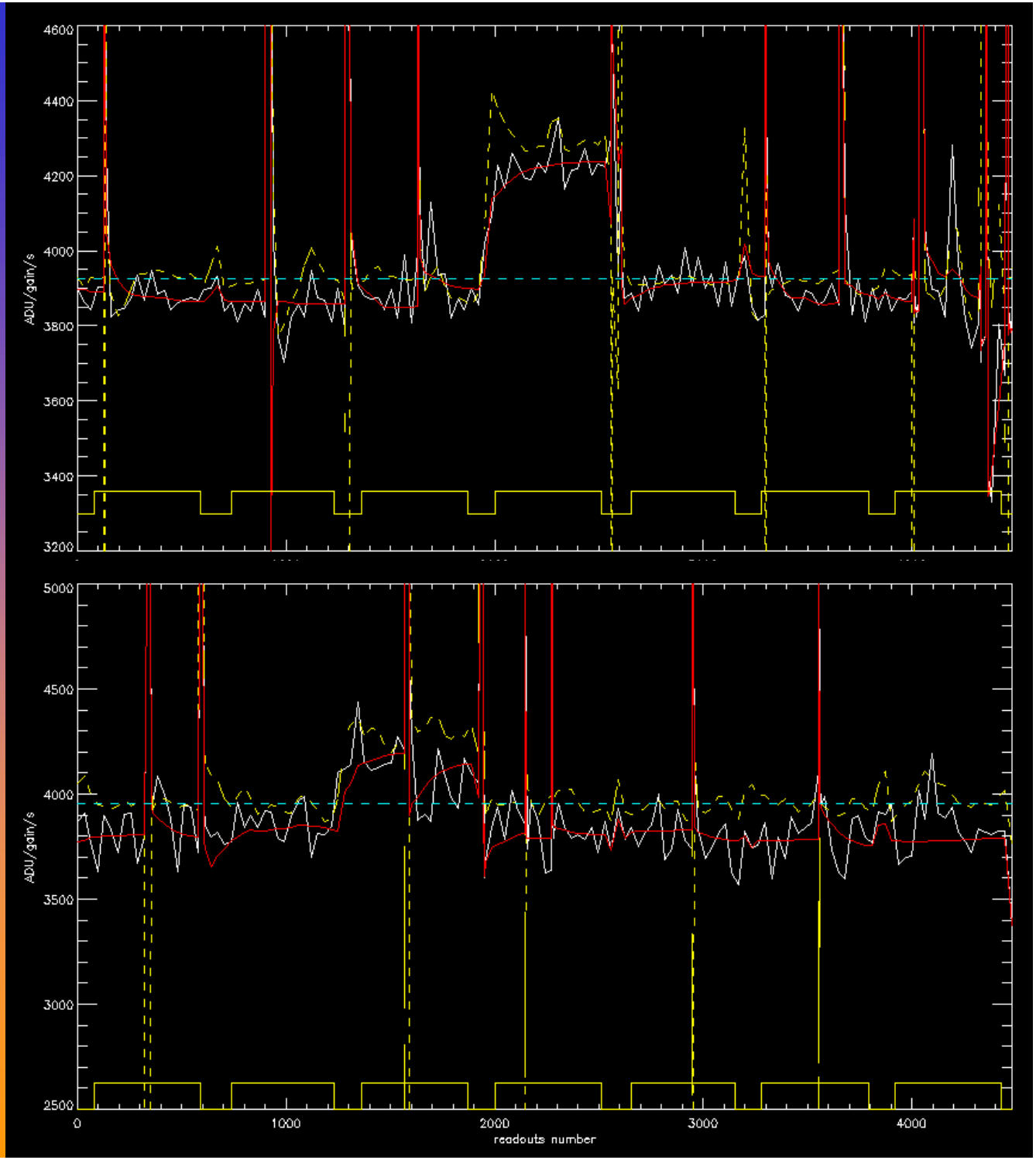
Repeated series



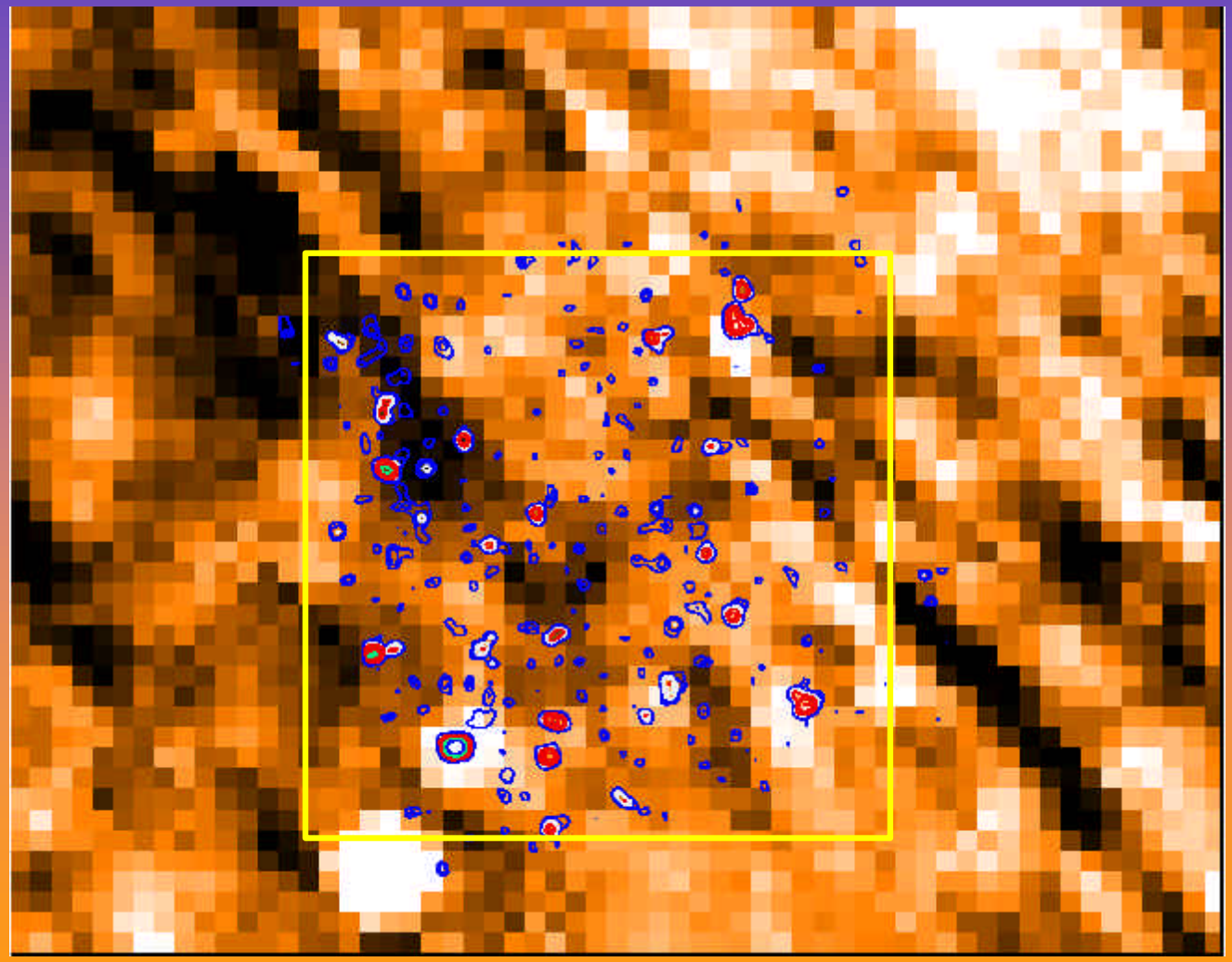


This data should be neglected !!!

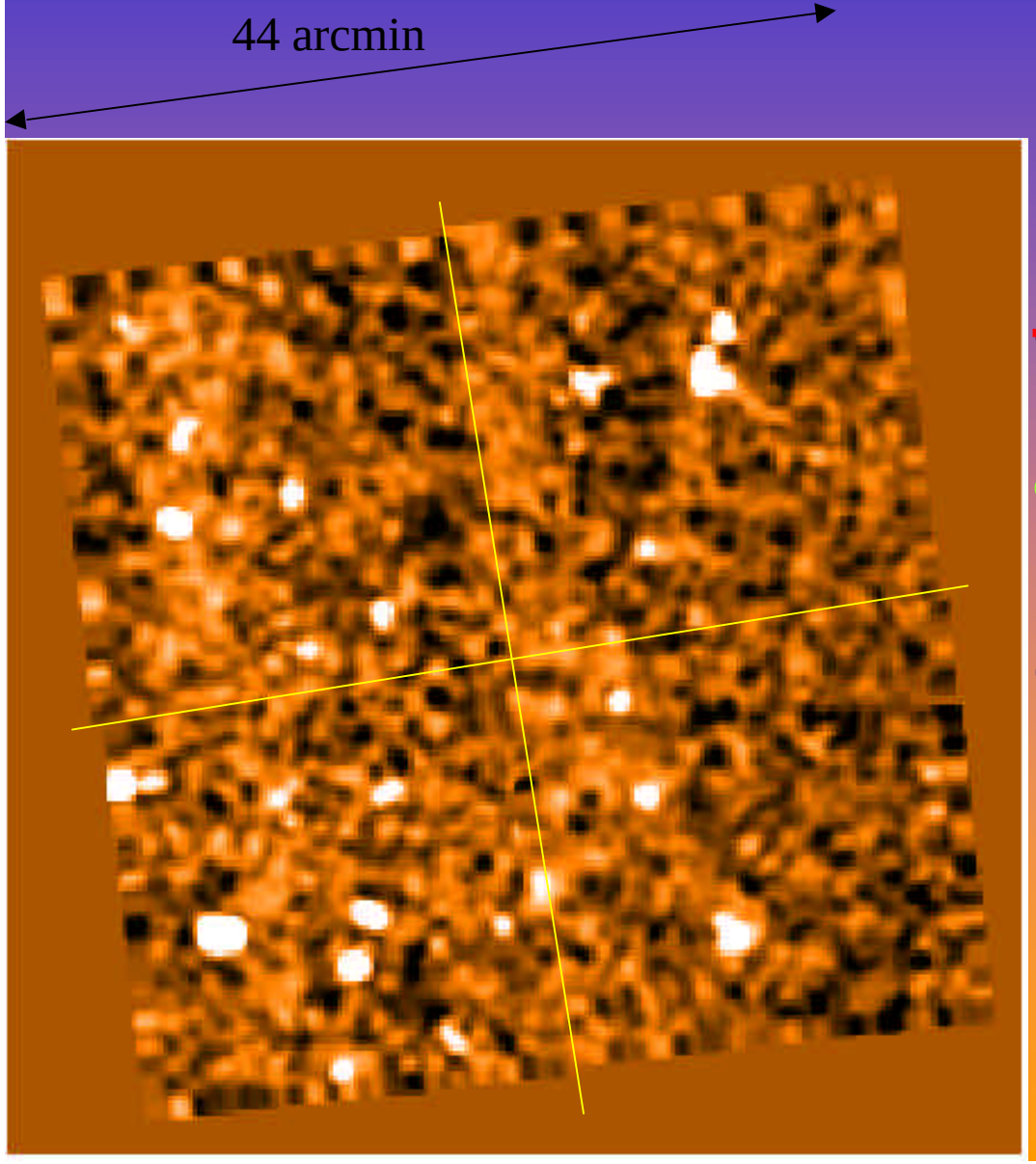
A PHOT source seen by two different adiacent pixels



IRAS 100 micron MAP IN THE LOCKMAN HOLE REGION



The LOCKMAN HOLE has seen by PHOT:

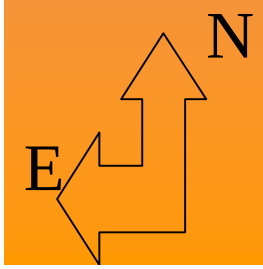


THE SURVEY

area : ~40´ x 40´

number of sources detected:36
(above 5 sigma)

minimum flux level: ~30 mJy



The problem for PHOT sources identification

Of the total sample of 37 sources:

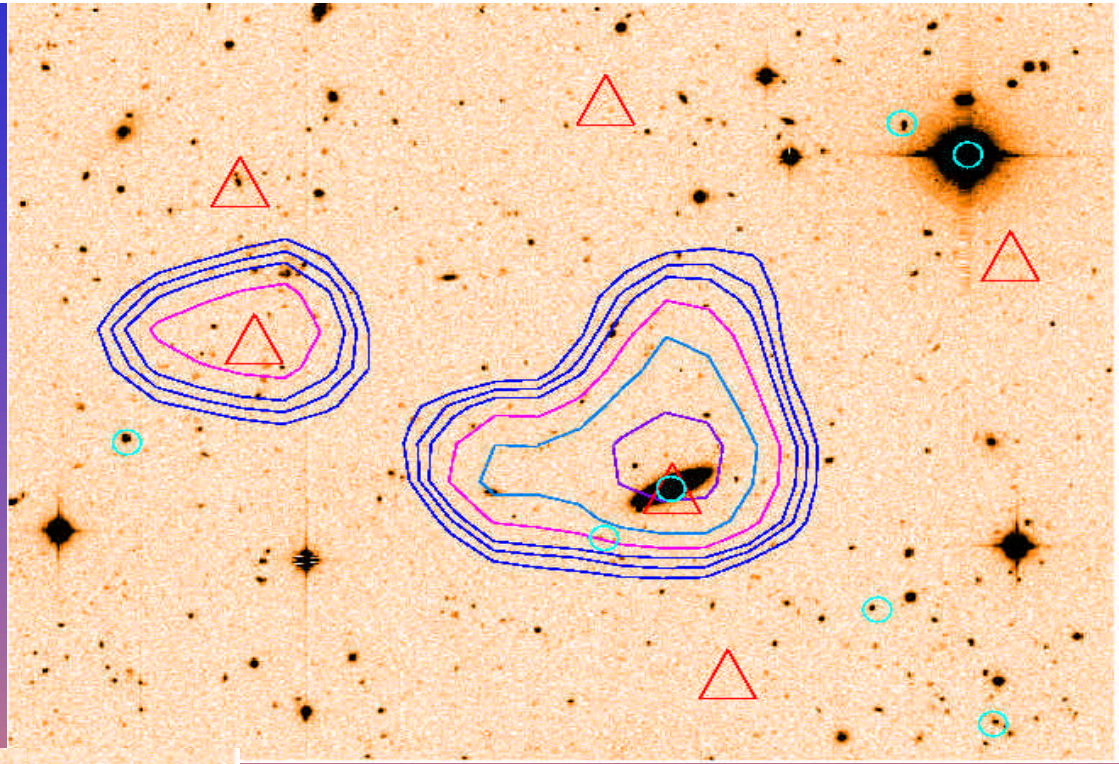
10 have both RADIO and MID-IR counterparts

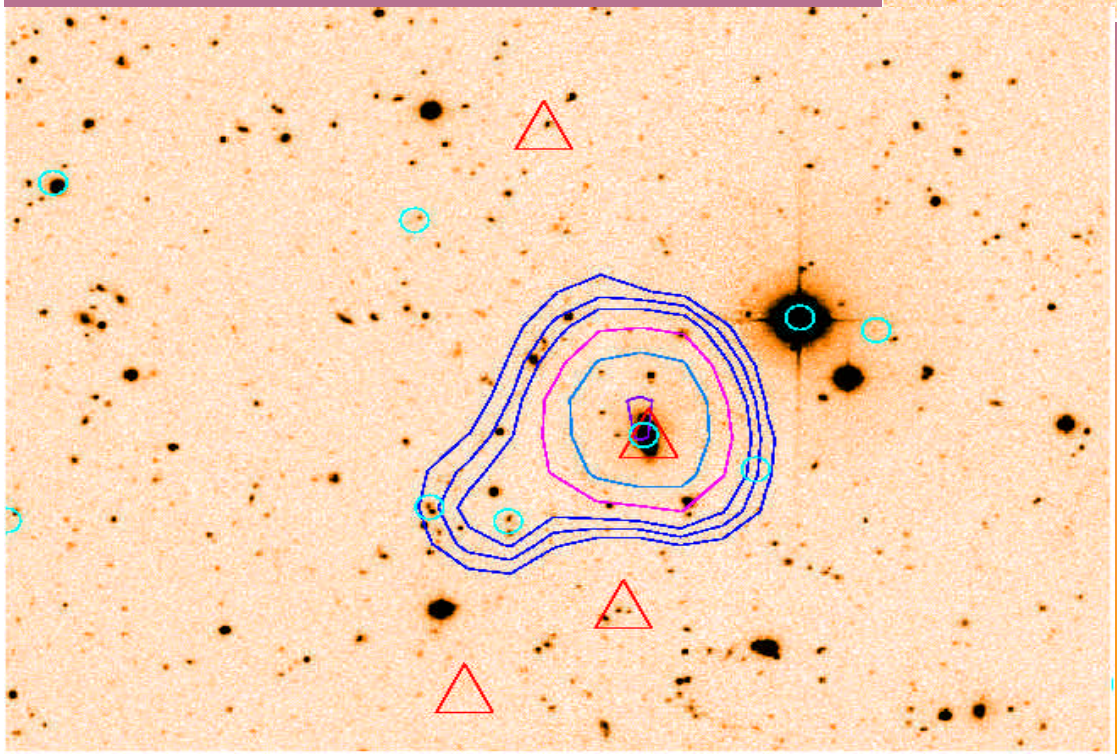
5 have only RADIO counterparts

3 have only MID-IR counterparts

The remaining 19 sources do not present counterparts

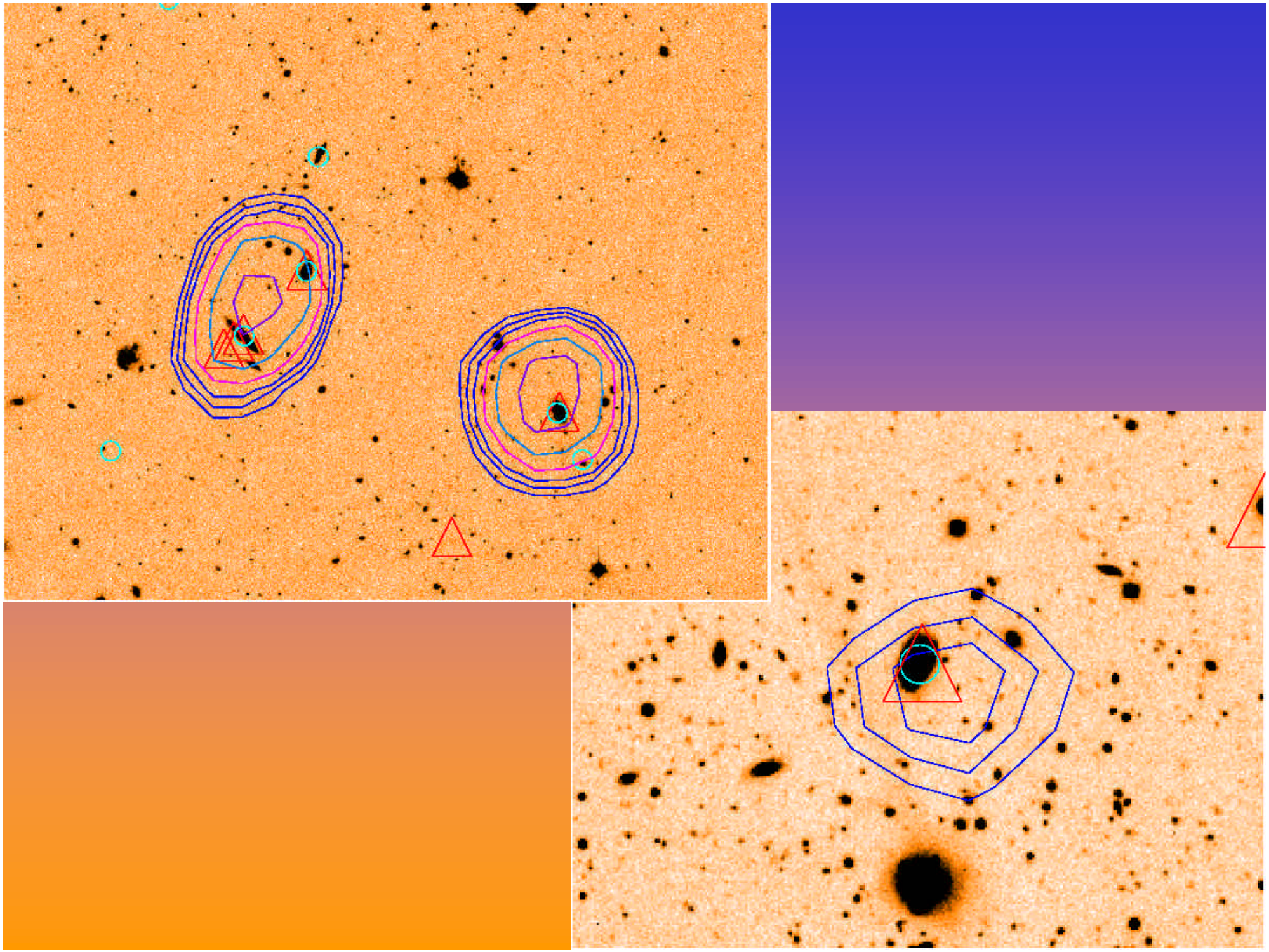
Sources with radio and 15 micron detections on optical images



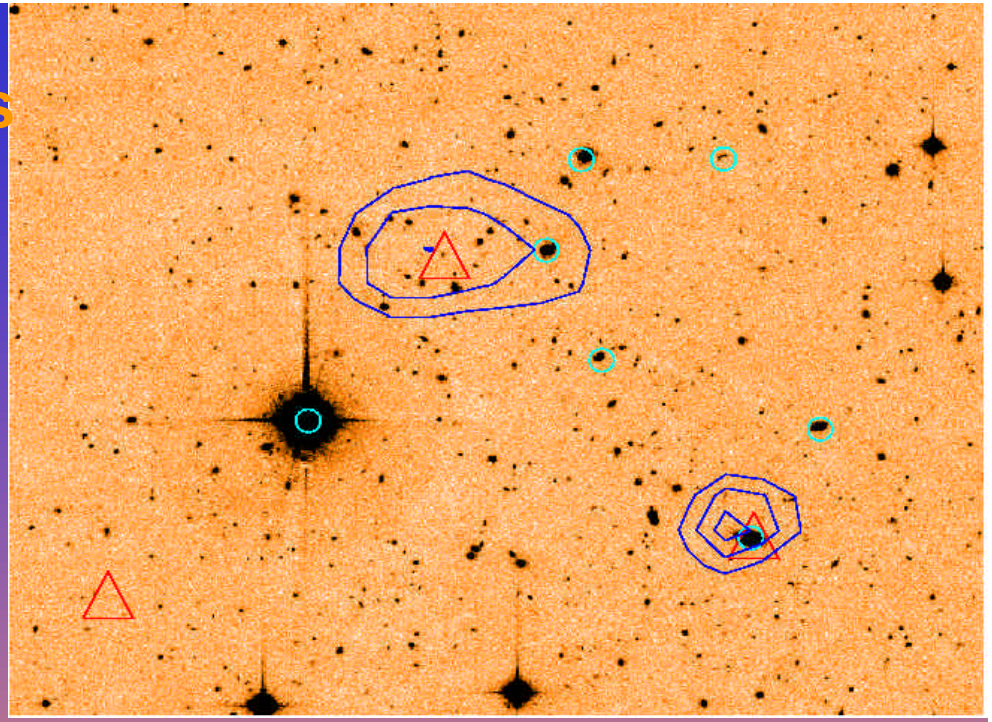


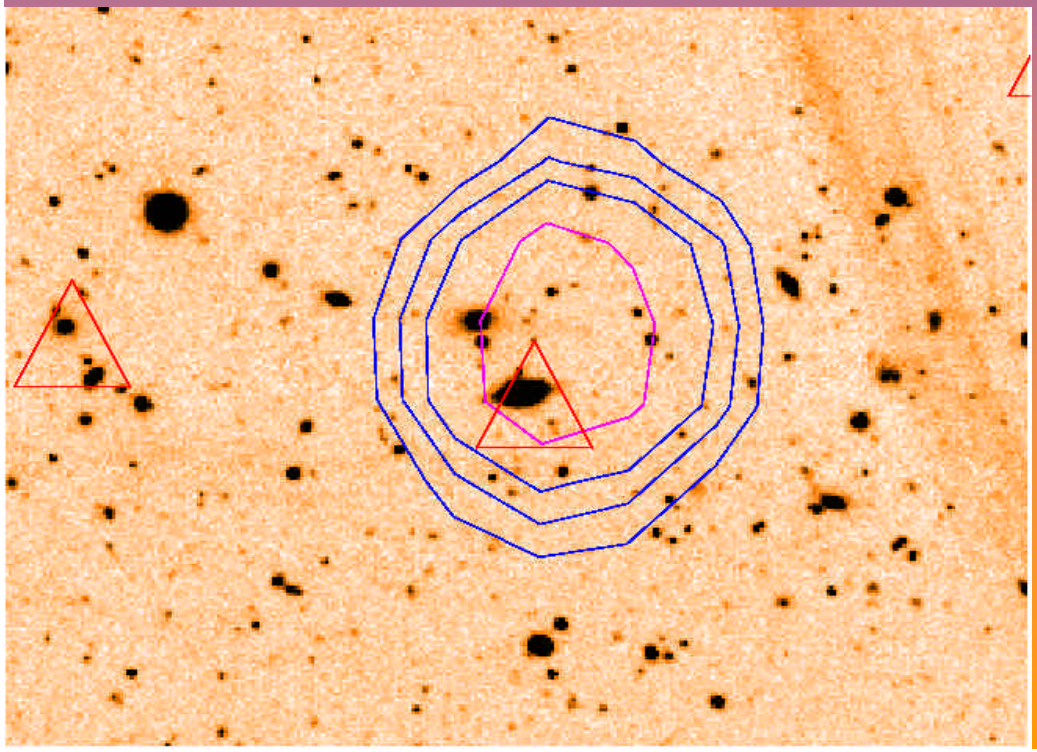
radio

15 micron

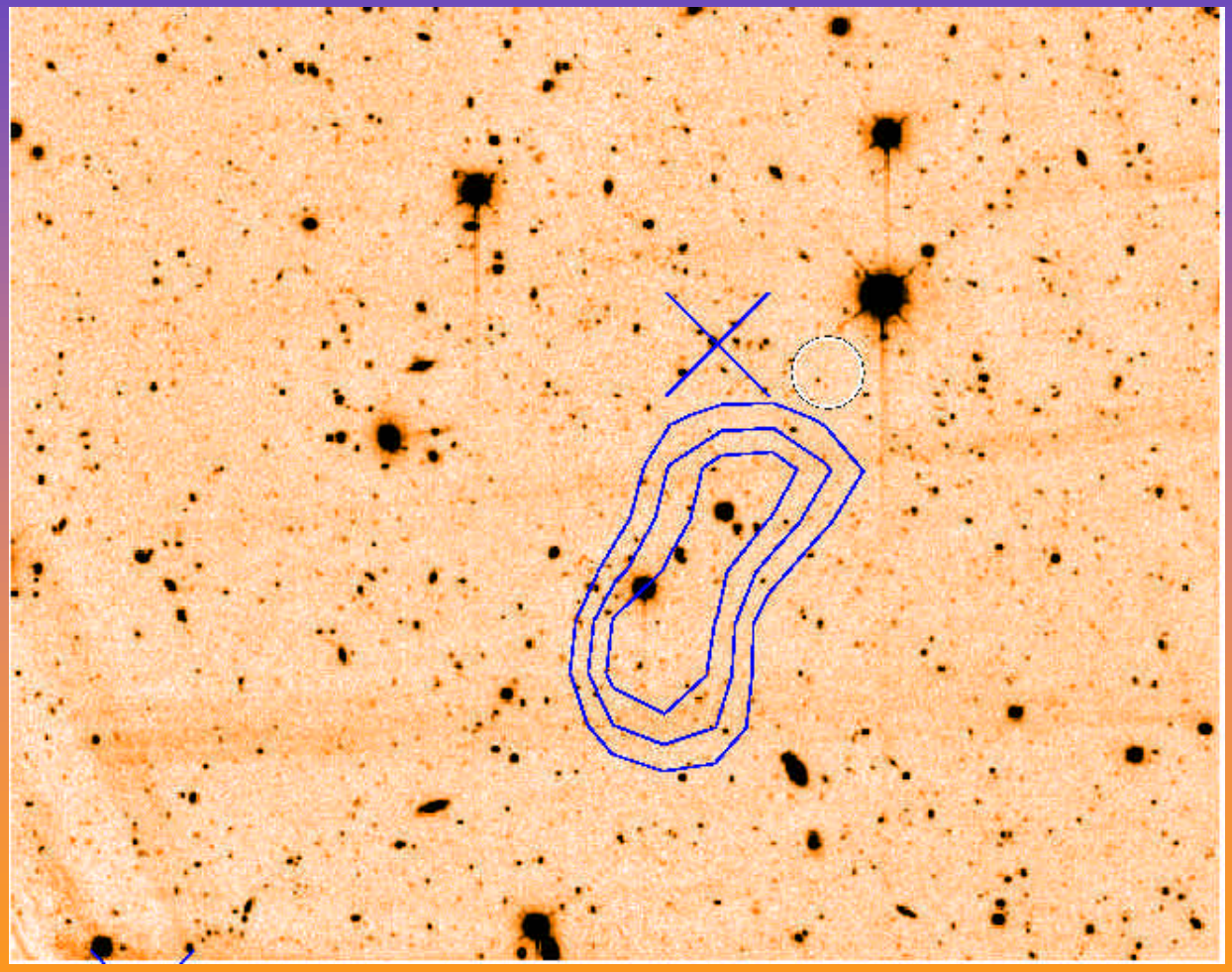


Objects with radio counterparts and NO mid-infrared



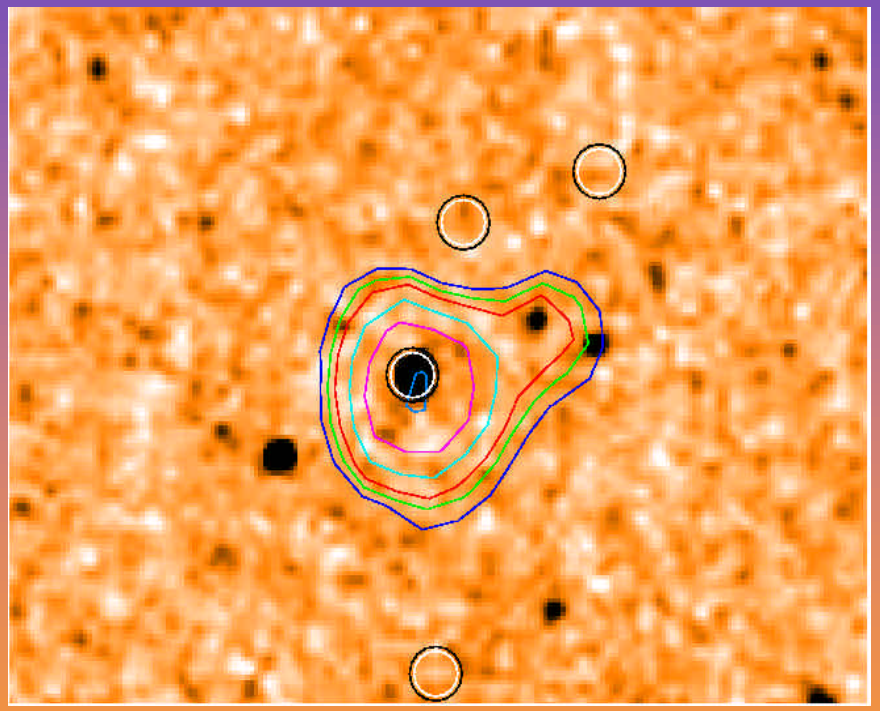


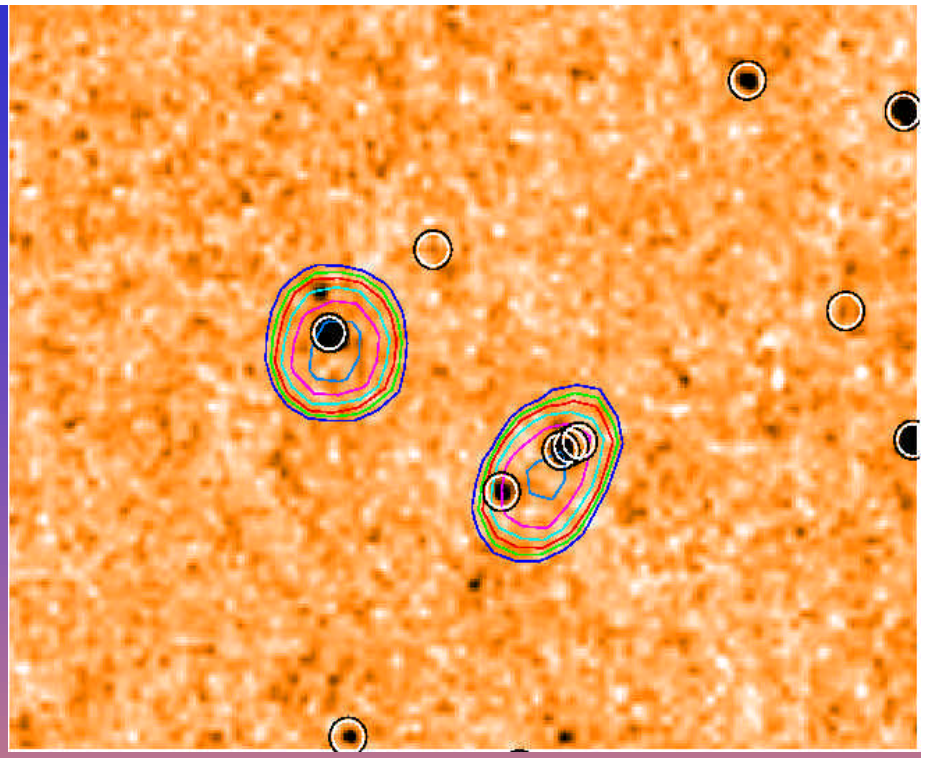
In the sample we find 19 sources without cross-correlation at other wavelengths. In this case the identification via the optical images is difficult and uncertain, as in the beam of the PHOT detector there could be many optical galaxies.

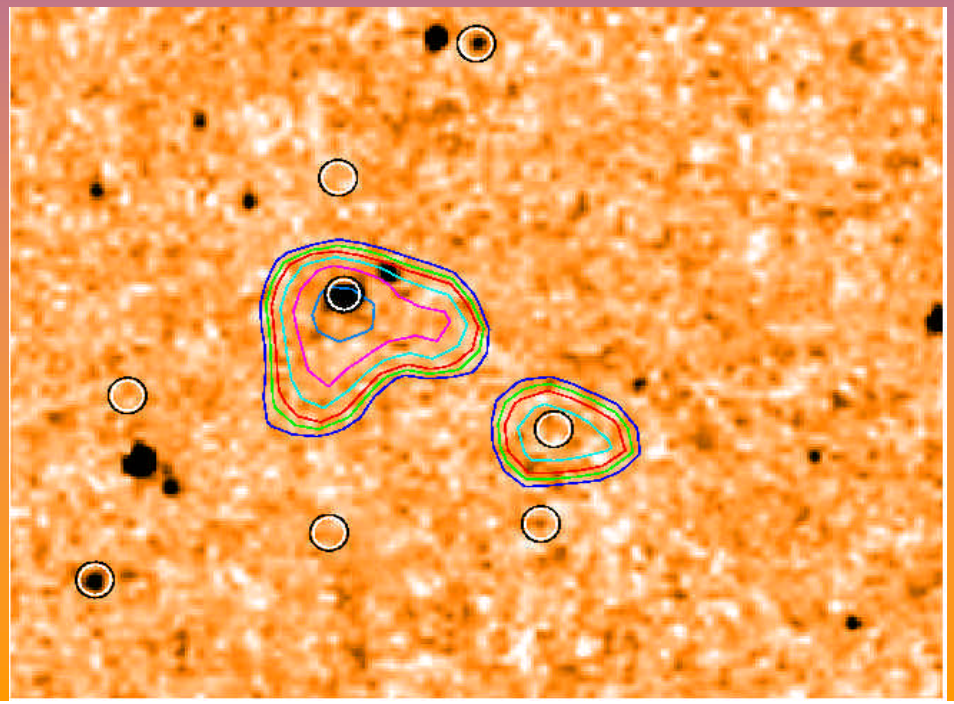


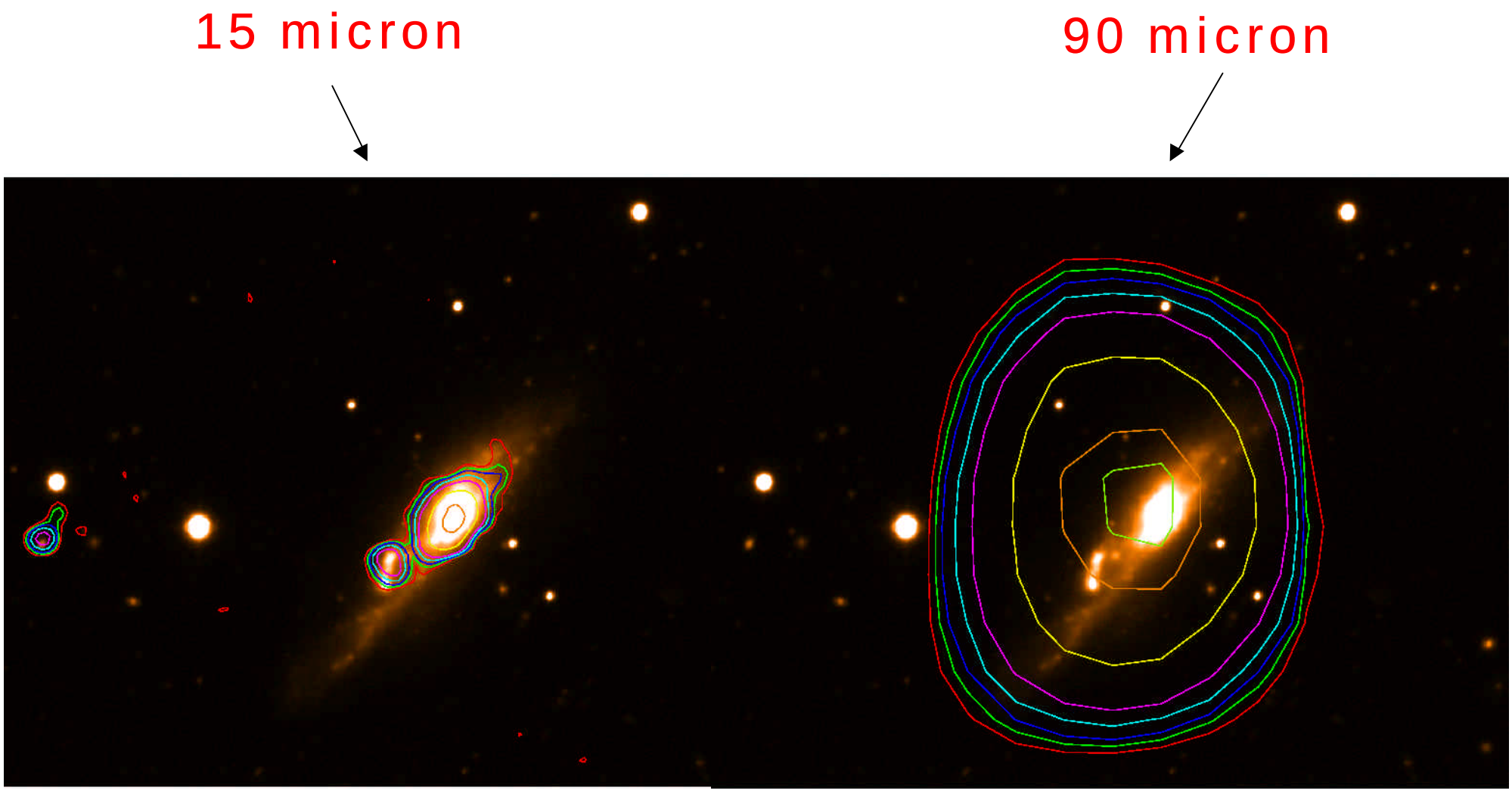
Need for good CAM maps

15 micron map with 90 micron contour and radio detections

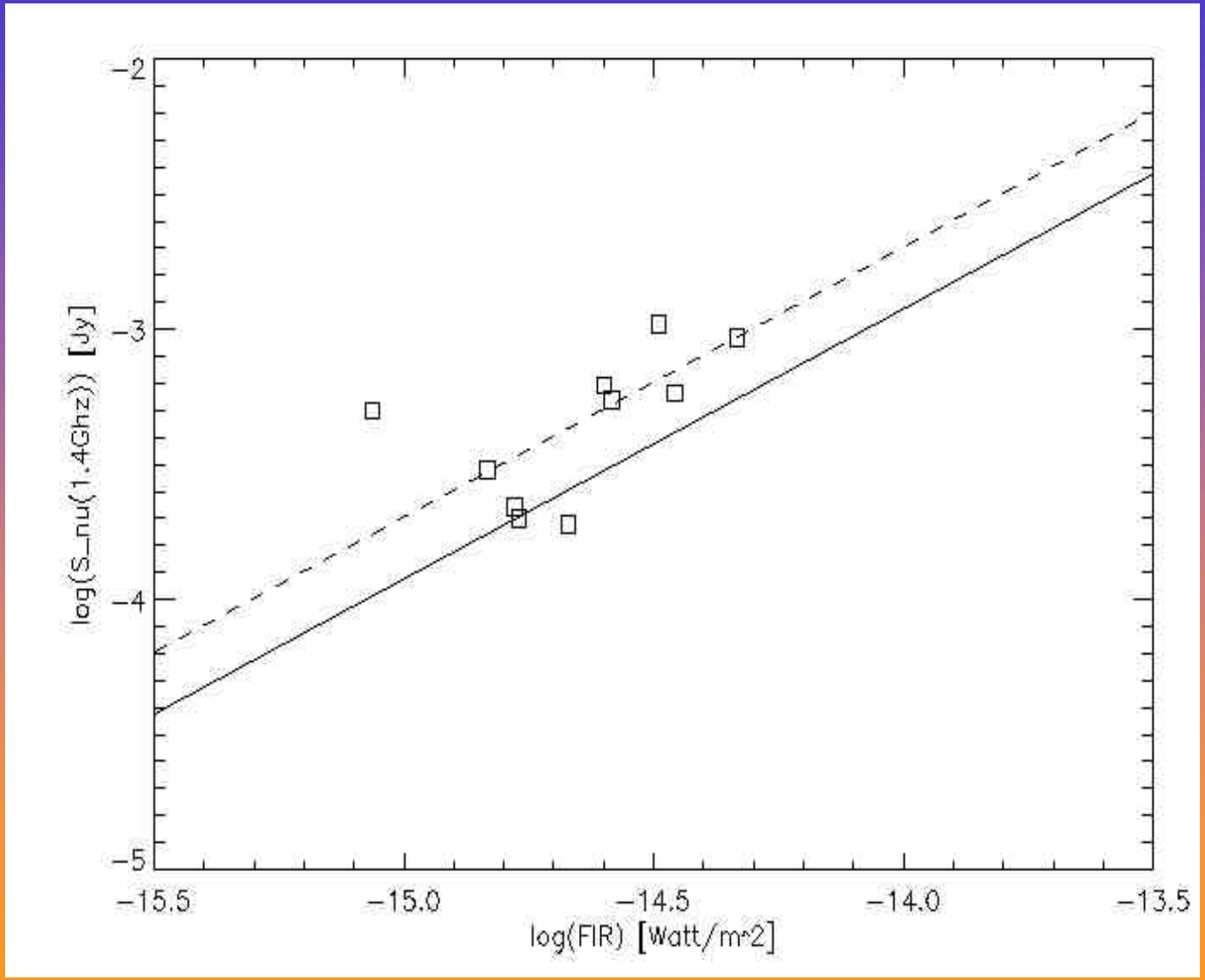




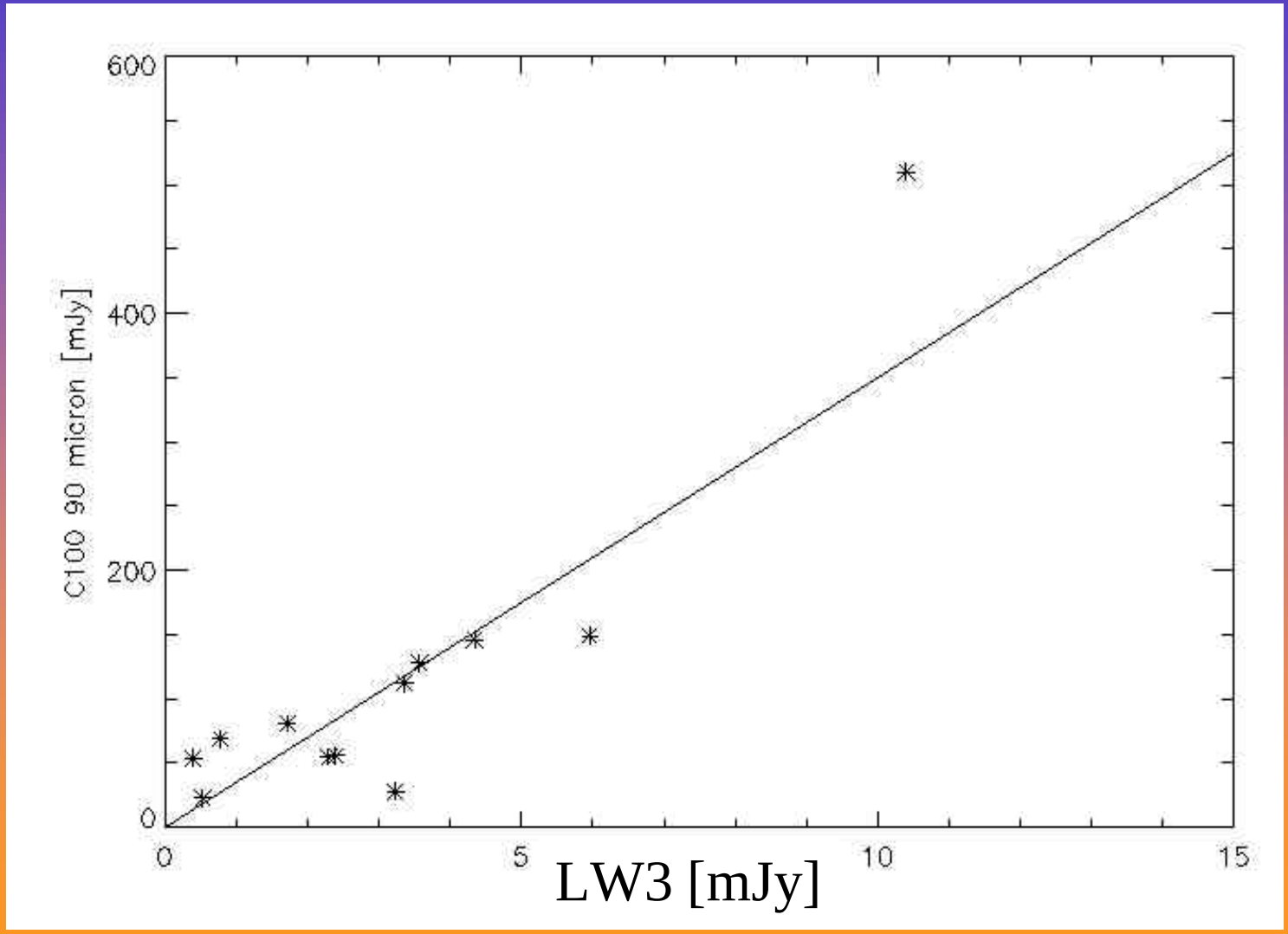



15 micron
90 micron

The FIR-RADIO correlation

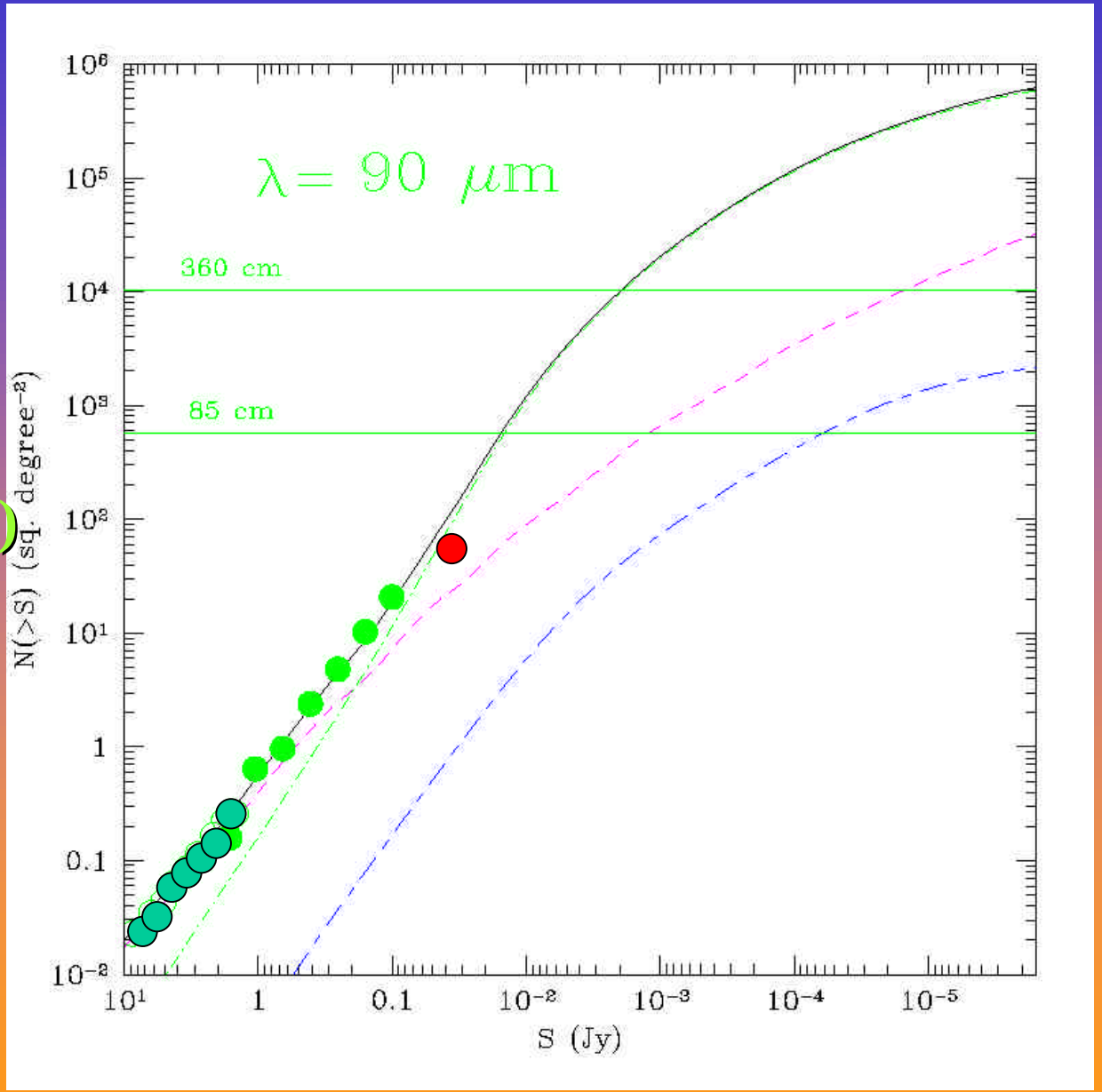


The 90 micron / 15 micron correlation



90 micron counts

- LOCKMAN
- ELAIS (Efstathiou et al 2000)
- IRAS



Franceschini et al. (2001)

NEXT STEPS

•To improve the calibration with external calibrators (stars and IRAS sources)

•Reduction of the ELAIS fields (15 square degrees) for a better statistics on 90 micron galaxy counts

•Application of our method to the far infrared C200 ISO detector (175 micron)

•Multiwavelength analysis of detected sources to study their nature (see Fadda talk)