The 20 GHz Pilot Survey - What did we find?

Elaine M. Sadler (on behalf of the 20 GHz Survey team)

- Preliminary analysis of scans and 18 GHz images from Sept/Oct 2002 ATCA sessions

- Do we see a ‘new’ source population?

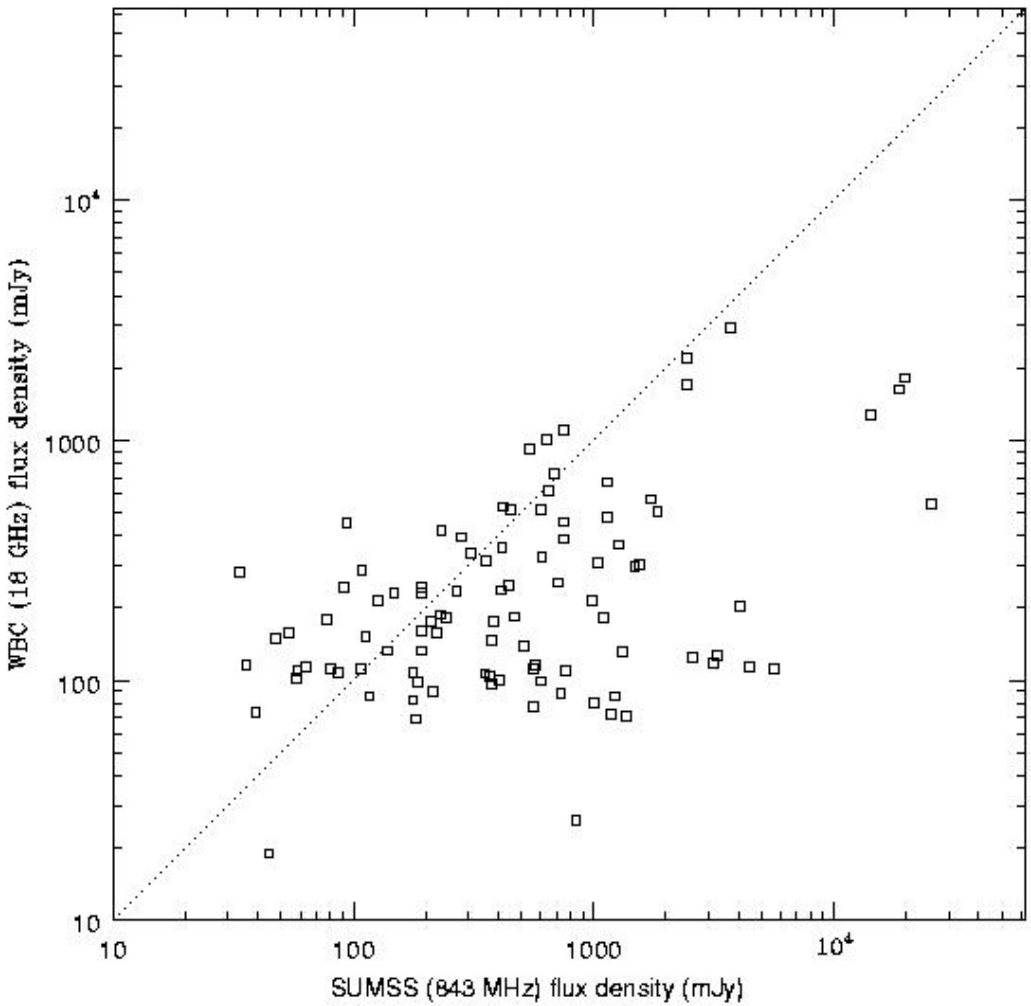
- What kinds of astrophysical objects are these?

(Follows on from Roberto Ricci’s talk…)

The 20 GHz data set

- 226 detected (5σ) sources above ~60 mJy, Dec strip at -60 to -70, RA 0h to 24h
- More than half lie within 10^{o} of the Galactic Plane or in the LMC (HII regions, PNe etc.)
- Work so far: cross-matching and identifying 82 sources at high Galactic latitude.
- Cross-match with 843 MHz SUMSS catalogue to get two-point spectral indices
- Optical ID s from NED and Cosmos

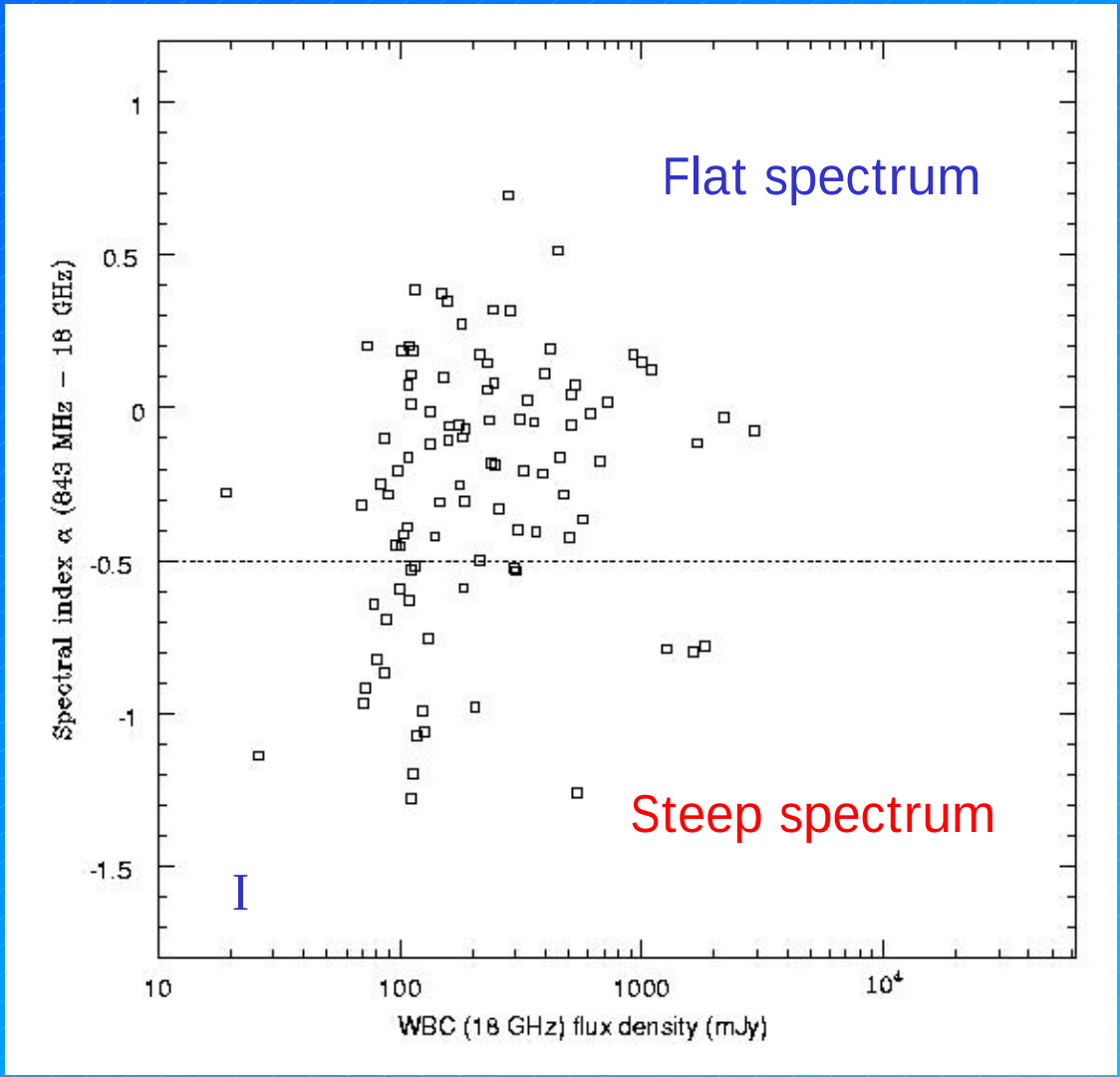
WBC-SUMSS cross-match



- All ($|b|>10^{o}$) sources detected at 18 GHz are also present in the 843 MHz SUMSS catalogue (and well above the 6 mJy limit)
- The 843 MHz and 18 GHz flux densities are essentially uncorrelated

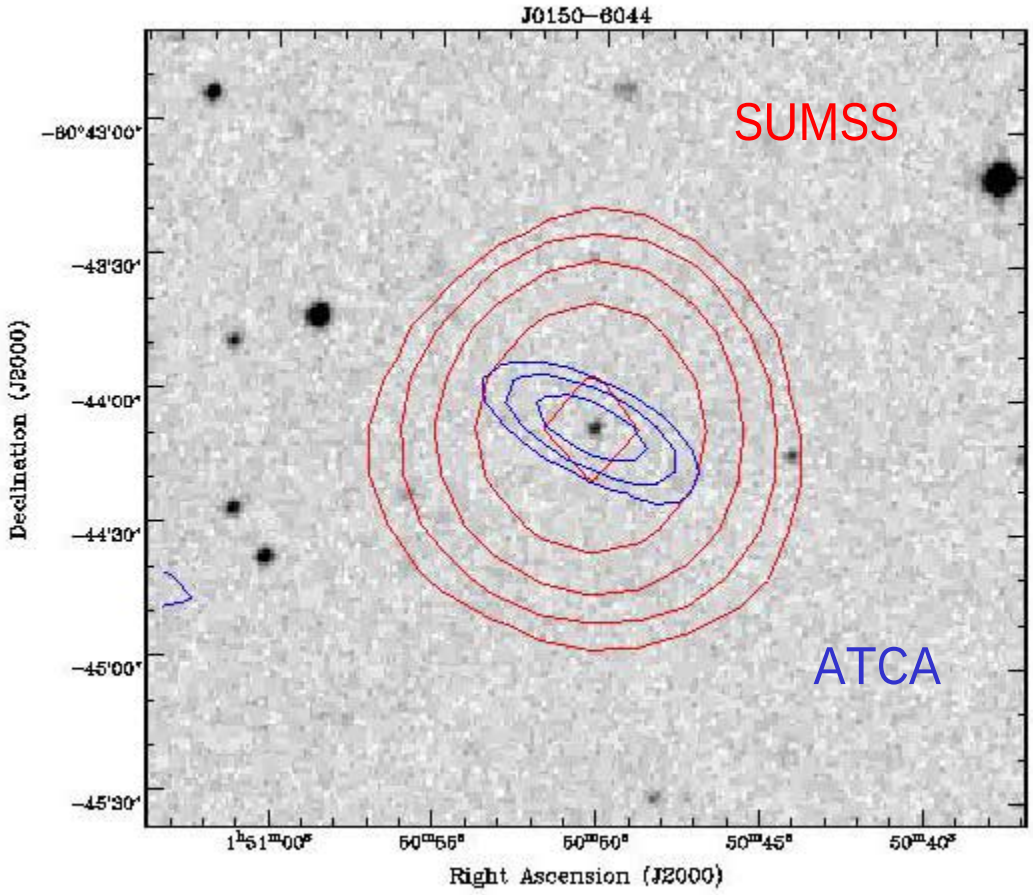
No 'new' sources yet!

Radio spectral indices



- The sample is dominated by sources with flat/inverted radio spectra.
- No obvious sign that α varies with flux density
- Wide range in α

Optical identification



- Both ATCA and SUMSS have good positional accuracy (~1 arcsec).
- Cross-match with NED for existing IDs
- Other optical IDs via Cosmos cat.

Optical ID rate

- High optical ID rate for 18 GHz sources,

(80/82 have a candidate DSS ID within 8 arcsec, versus ~35% for low-freq surveys)

Optical IDs for 82 18 GHz sources:

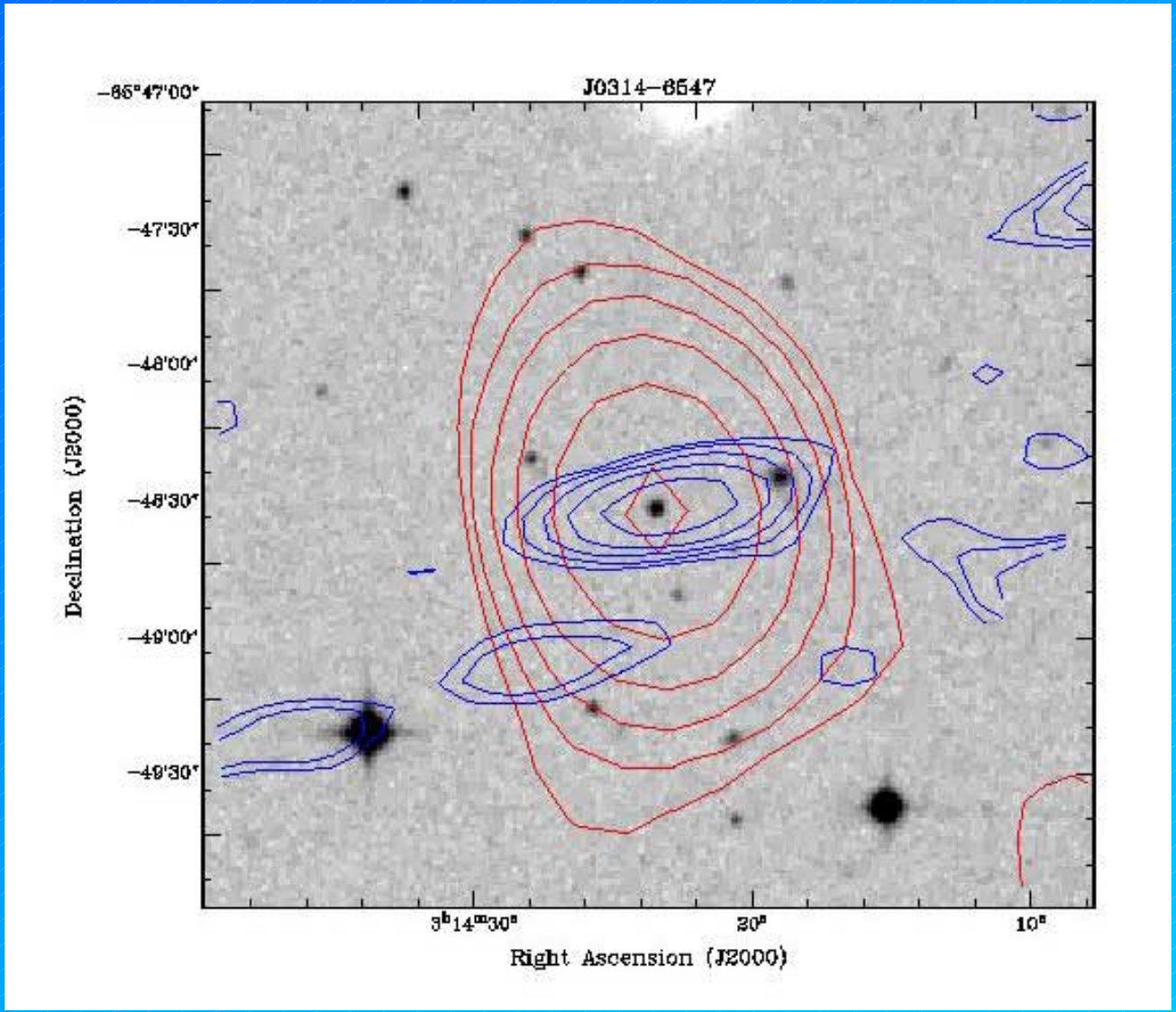
13 galaxies

21 catalogued QSOs

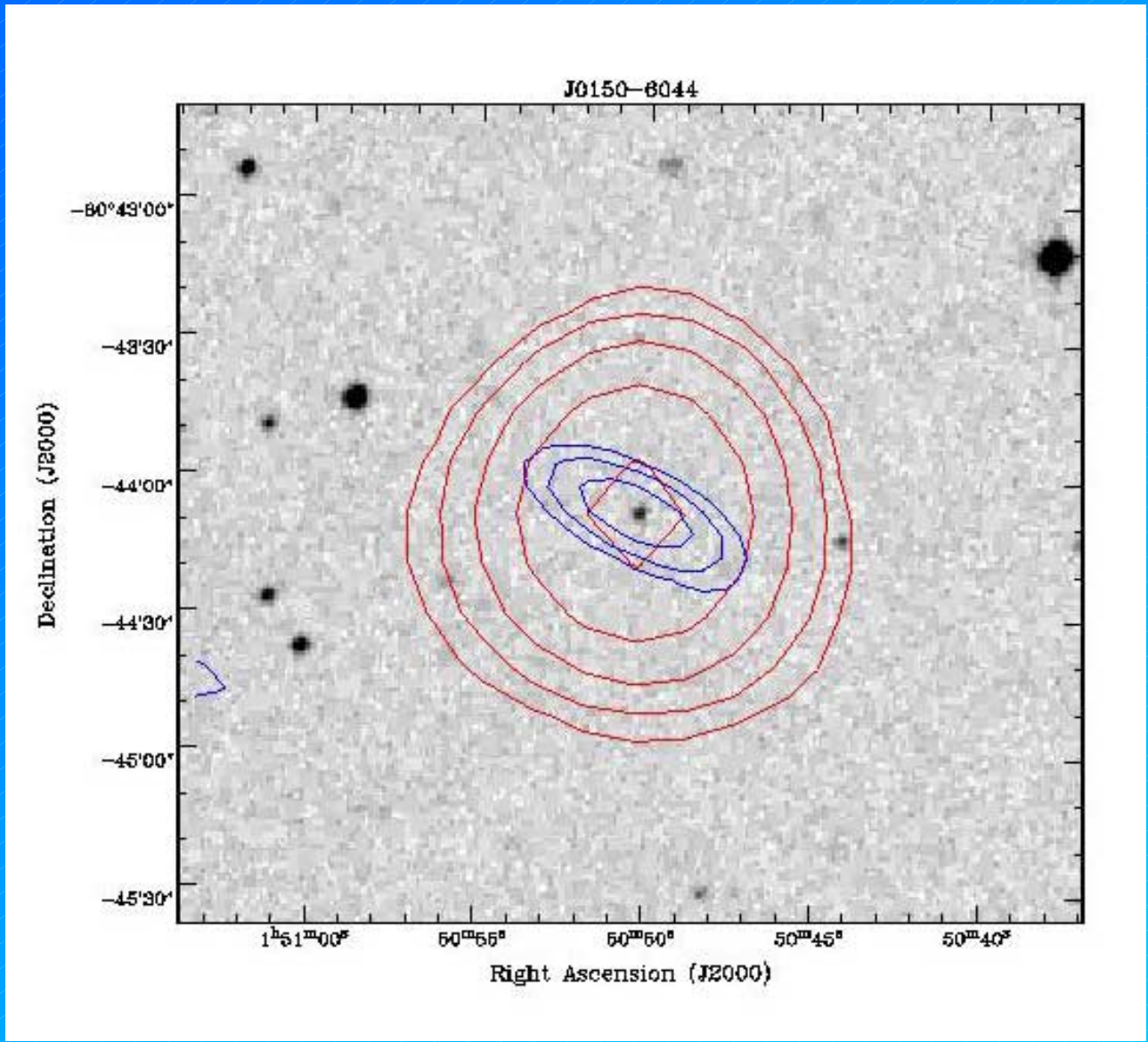
38 new candidate QSOs (~20 likely to be genuine)

10 faint objects or blank fields

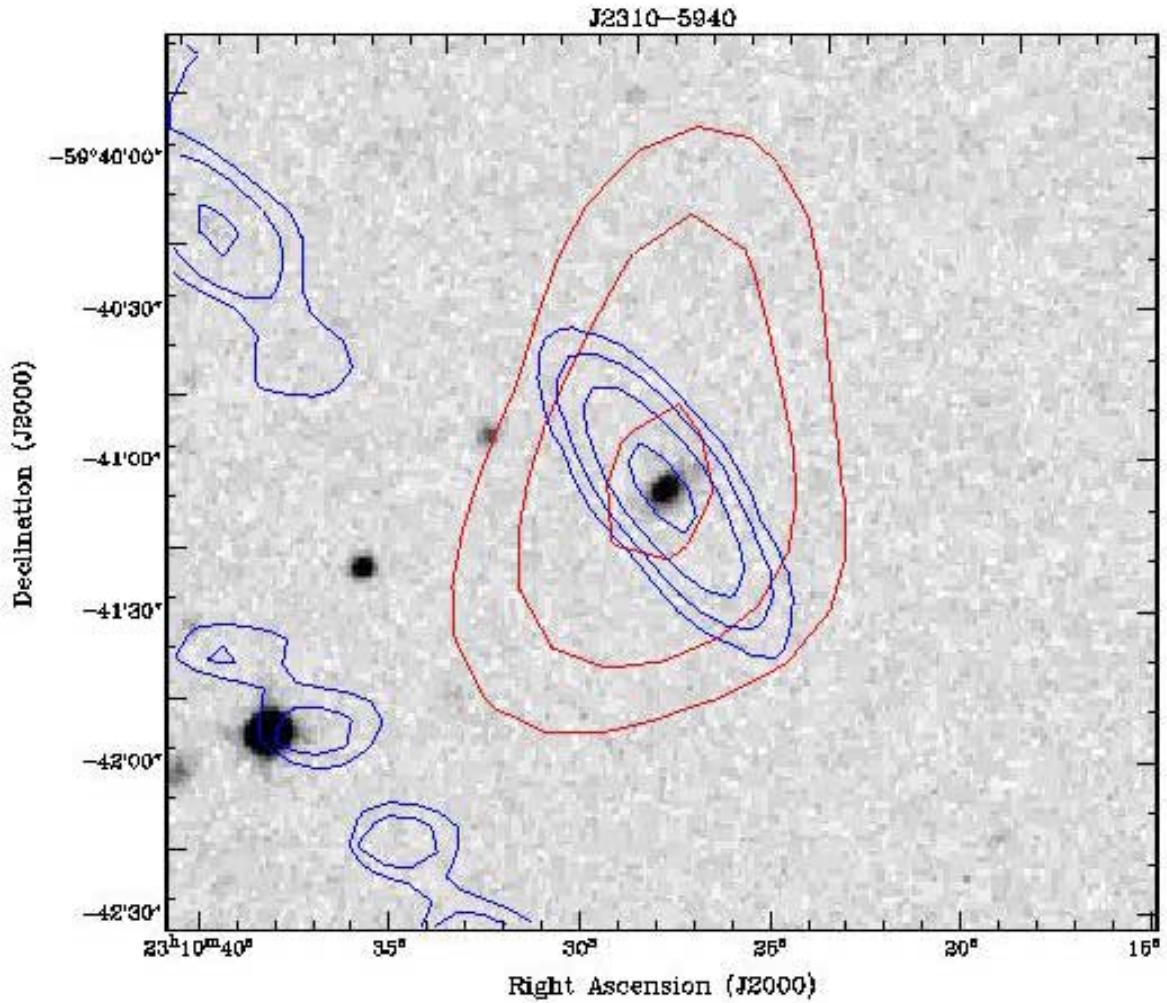
PKS 0313-660 - a known QSO (z=0.636)



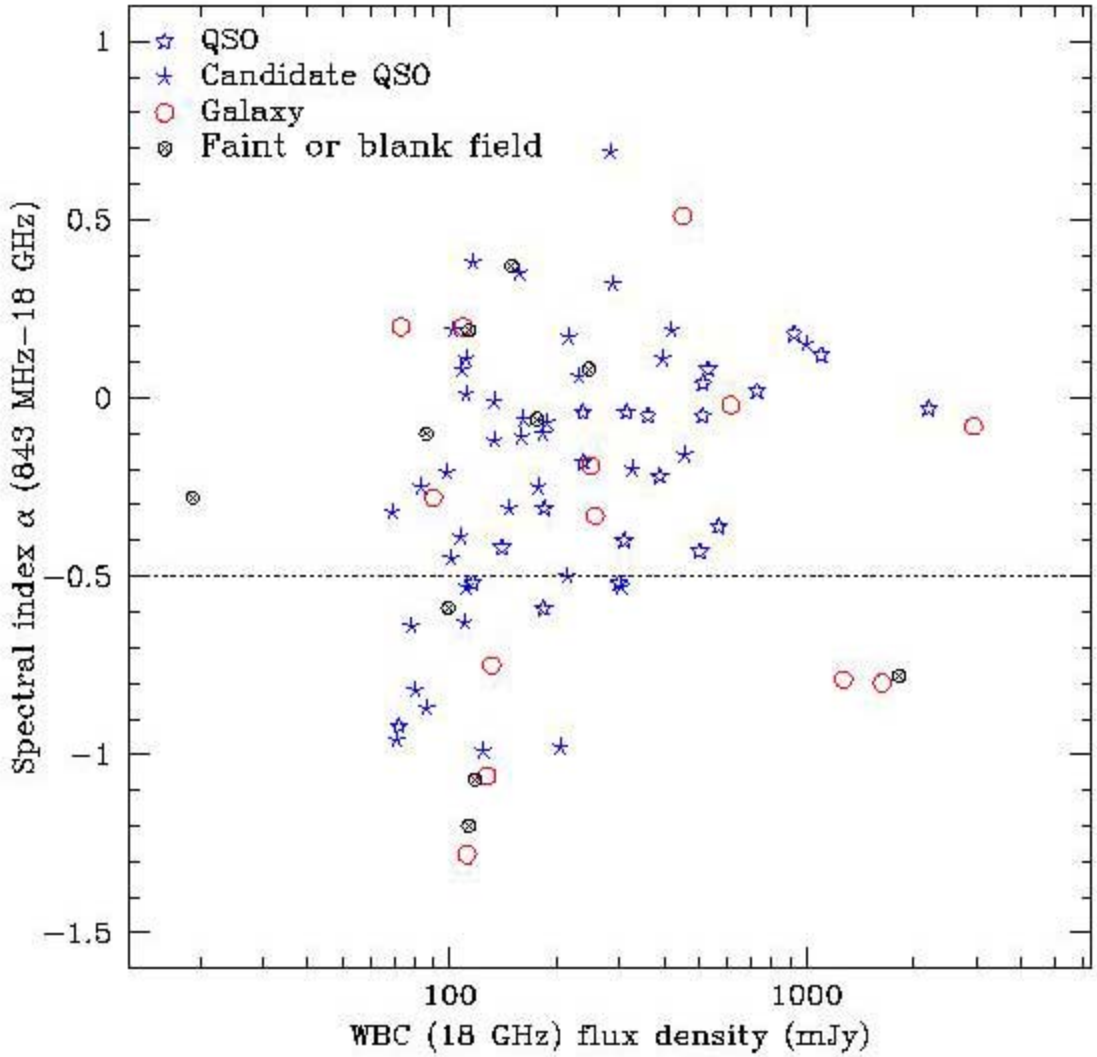
PMNJ 0150-6044 - a new QSO candidate



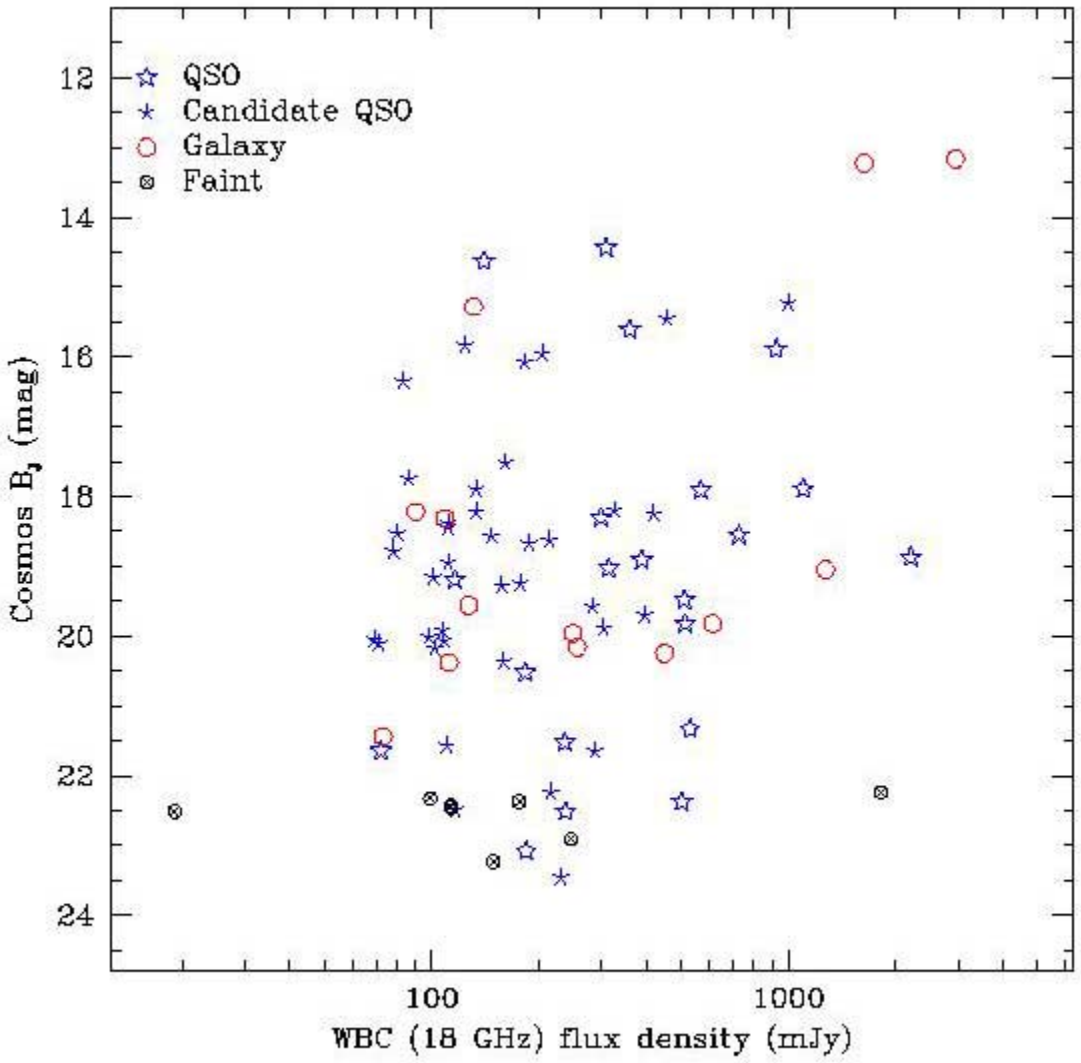
IRAS 23074-5957 - a galaxy at z=0.142



20 GHz source populations



Most optical counterparts are bright!



Optical follow-up of most of the 18 GHz sources needs only a 2m-class telescope.

Summary of results…

- Most of the extragalactic 18 GHz sources appear to be QSOs
- Also some distant radio galaxies, and interesting rarer populations such as IRAS galaxies
- Most optical counterparts are bright, so follow-up spectroscopy should be easy
- A substantial population of Galactic and LMC sources is also present