

# ATLAS: Australia Telescope Large Area Survey: Deep Radio Observations of the CDFS-SWIRE field

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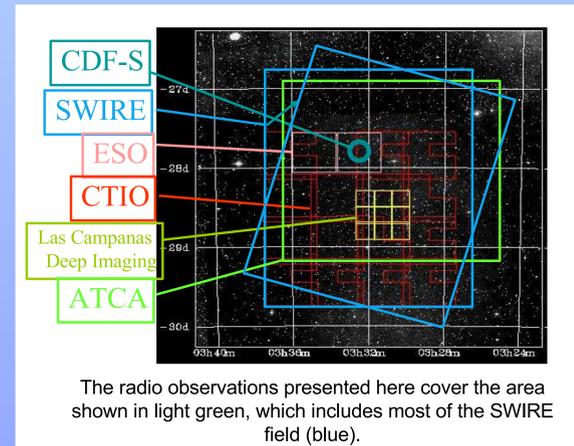
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## 1. Overview

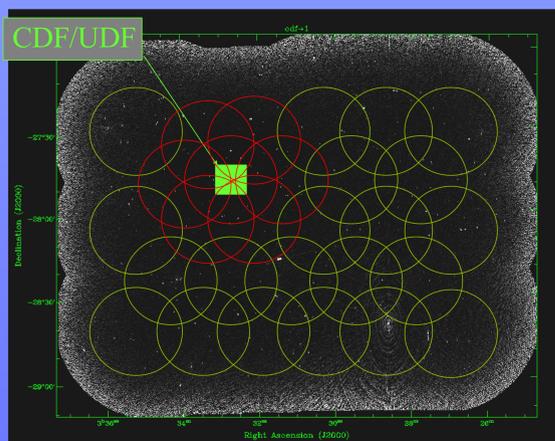
- We are imaging the CDFS and ELAIS-S1 SWIRE fields at 20 cm. Combining radio data with other wavelengths will help us understand the formation and evolution of early galaxies.
- When finished, this will be the widest ( $6^\circ^2$ ) deep (10-15  $\mu\text{Jy}$ ) radio survey ever. It will:
  - not be affected by dust obscuration,
  - uncover rare classes of object,
  - show obscured large-scale structure.
- This is an interim report – we are about half-way through the observations and have not yet reached our final sensitivity. Only CDFS data are shown here.
- We see a mixture of star-formation and AGN galaxies.
- We have combined radio, infrared, and optical data to produce SED fits and photometric redshifts. We also have spectroscopic redshifts for a subset.
- Stacking gives an  $\text{rms}_{20\text{cm}} \sim 1.5 \mu\text{Jy}$  and shows the radio-FIR correlation extends down to  $S_{20\text{cm}} \sim 10 \mu\text{Jy}$ .
- We identify a class of radio sources with surprisingly little infra-red emission.



The Australia Telescope Compact Array used to make the radio images in this paper.



## 2. Observations & Data

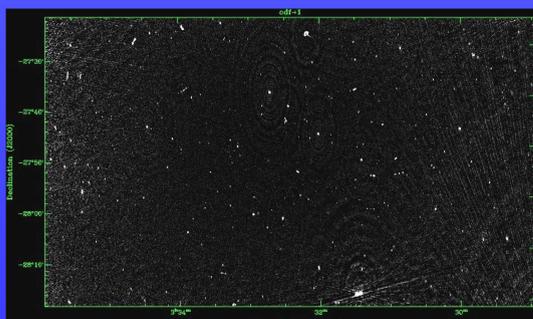


### Vital statistics

- 28 pointings shown as circles above.
- ~300 hours of data used for results shown here.
- A further 300 hours expected in this field.
- Rms so far ~ 40  $\mu\text{Jy}$  over most of the field except close to 1 Jy source.
- Rms ~ 15-20  $\mu\text{Jy}$  in UDF region.
- Spatial resolution ~ 6 arcsec.
- UDF data already published by Afonso et al., astro-ph/0510774.

### Challenges

- Better calibration to remove sidelobes from 1 Jy source requires a better antenna primary beam model.

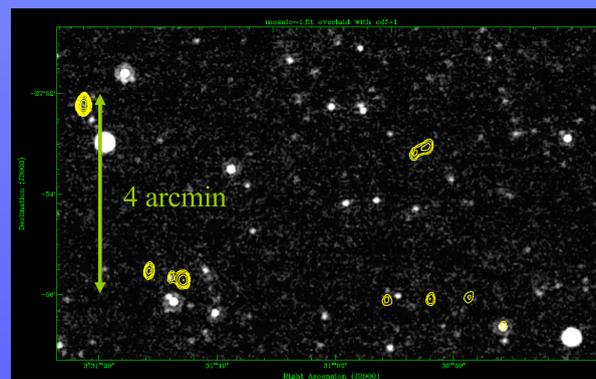


A typical part of the field. Both classical radio doubles/triples and isolated starburst galaxies can be seen.

## 3. Results

### Vital Statistics:

- 809 radio components in current image.
- These correspond to 764 galaxies (because some galaxies have multiple radio components).
- 713 of these have SWIRE IDs (at any wavelength).
- 208 have good SED fits, yielding classifications and photometric redshifts.



A typical part of the field with 20 cm radio contours overlaid on 24  $\mu\text{m}$  SWIRE image.

