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Disentangling the AGN and Star-forming Contribution to the Sub-mJy Radio Counts

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Abstract. The true nature of the faint radio population remains elusive despite the many observations of the "sub-mJy" bump over the last two decades. This lack of information is largely due to the faint magnitudes of the optical counterparts to the radio sources. There are strong theoretical reasons (and a few observational ones) to believe that this rise in the counts is due to the emergence of a rapidly evolving star-forming population. Now, for the first time, we are able to separate the AGN and star-forming populations below 1mJy using a combination of multi-wavelength data from *Spitzer*, GMRT, MERLIN, CFHT, Keck, UKIRT, Subaru, *Chandra* and *XMM-Newton*. The many discriminators between these emission mechanisms include MIR colours, MIR/radio flux ratios, X-ray luminosities/spectra, optical spectra, radio morphologies and radio spectra. We can now derive the source counts separately for AGN and star-forming galaxies confirming that the latter population rise sharply at faint flux densities.

Keywords. radio continuum: galaxies; galaxies: starburst, active

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The counts by type derived here do not follow any of the known models. This result may be due to low number statistics at the bright end of the counts or may be revealing that the AGN activity and star-formation are occurring simultaneously within the same galaxy in some cases, hence confusing some of the discriminating methods. However, if we can reliably separate AGN and star-forming galaxies we can look at their evolution separately. It is then possible to derive an independent study of the star-formation history of the universe and examine such effects as "downsizing" (Seymour *et al. in prep*).

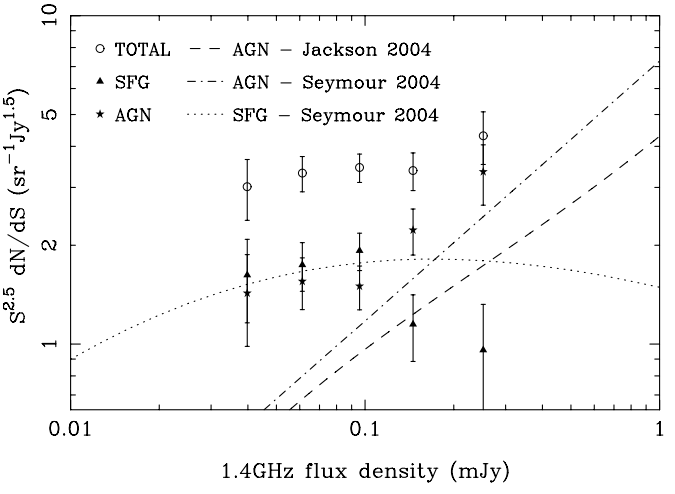

Figure 1. The 1.4 GHz normalised Euclidean source counts. The separate contribution from AGN and SFGs is shown as well as their combined total. Currently no models fit the data well.