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MID-IR EXTRAGALACTIC SOURCE COUNTS IN THE ELAIS S1 FIELD

F. Pozzi,[1] C. Gruppioni, C. Lari, G. Zamorani, A. Franceschini, S. Oliver, M. Rowan-Robinson and S. Serjeant

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We present the 15 μm extragalactic source counts obtained in the ELAIS (European Large Area ISO Survey, Oliver et al. 2000) southern field S1 ($\approx$ 4 deg^2). At low fluxes (S $\leq$2 mJy), the counts show a very steep super-Euclidean slope, which can only be explained by strong galaxy evolution (Gruppioni et al. 2002).

The southern field S1 has been analysed using a new data reduction method (*Lari method*). A catalogue of 462 sources has been obtained in the flux range 0.45-150 mJy (Lari et al. 2001).

Figure 1 (*Top*) shows the differential (normalized to the Euclidean law) extragalactic source counts from our survey (Gruppioni et al. 2002) and a compilation of other Deep/Ultra-Deep 15μm data (Elbaz et al. 1999). Our counts sample very well the flux range where the Deep/Ultra-Deep counts start to diverge from no evolution models, showing a significant change in slope from a value of 2.35 to a very steep value of 3.60 at $S \approx 2$ mJy. This is in qualitative agreement with previous results, although our counts show a steeper slope. Moreover, at bright fluxes ($S >$ 2-5 mJy), where our data are statistically significant (because of the large sampled area) our counts are significantly lower.

A good fit to our counts is obtained by re-adapting the Franceschini et al. (2001) model (Figure 1, *Bottom*). Our solution considers no evolution for normal spirals, luminosity evolution (($L(z) = L(0)(1+z)^3$) for type 1 AGN and a combination of luminosity and density evolution (($L(z) = L(0)(1+z)^3$ and $\rho(L,z) = \rho_0(L)(1+z)^{3.5}$) for starburst galaxies with a break in their LLF at $L_{15\mu m} = 10^{10.8} L_\odot$. The model is able to reproduce the sharp increase of the counts below 2 mJy and the redshift distributions observed for 15 μm galaxies at different flux levels. In particular, the model predicts a rather local population ($z_{med}$$\approx$0.2) of star-forming galaxies down to $\approx$ 1.5 mJy (as found by preliminary spectroscopy of ELAIS 15 μm sources) and a rapid appearance and rise of a high-z ($z_{med}$$\approx$1.0) population of objects at fainter fluxes, in agreement with the observational results in Deep Fields (HDFN and CFRS 1415+52).

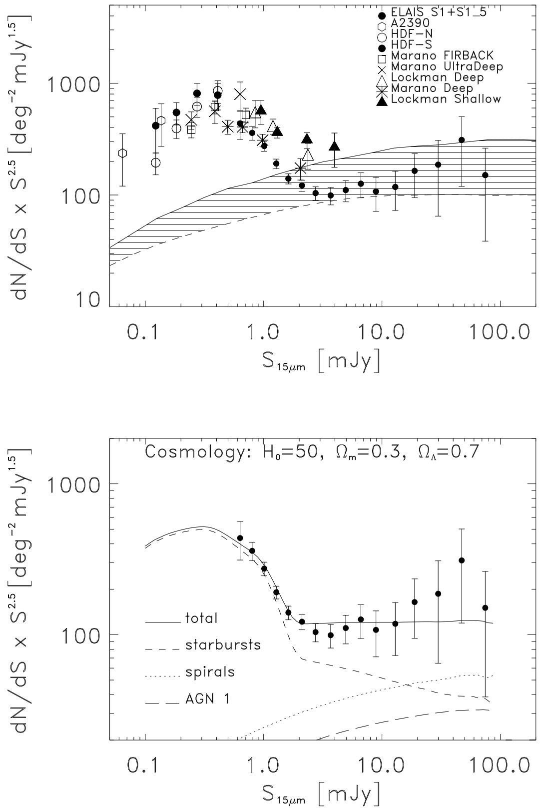

Fig. 1. *Top*: Euclidean normalized differential source counts from the ELAIS S1 survey (filled circles) and a compilation of other Deep/Ultra-Deep survey. *Bottom*: Best fit model to the ELAIS S1 counts.

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[1]Dipartimento di Astronomia, Università di Bologna, via Ranzani, 1 - 40127 Bologna - Italy (fpozzi@avalon.bo.astro.it)