

Extending Pure Luminosity Evolution Models to Herschel Wavelengths

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Abstract Simple Pure Luminosity Evolution (PLE) models have now been found to give remarkably good fits to I-band galaxy LFs in the COSMOS field out to $z=3$. Hill & Shanks (2011a, MNRAS, 414, 1875) have shown that these models also fit Spitzer number counts and redshift distributions out to 70 microns. At Herschel wavelengths these models finally fail. Here obscured AGN PLE models are found to fit the number count and redshift distributions out to 850 microns. Hill & Shanks (2011b, MNRAS, 410, 762) have found evidence in support of this obscured AGN sub-mm model in a significant cross-correlation between absorbed X-ray AGN and sub-mm sources in the LABOCA survey of ECDFS (LESS).

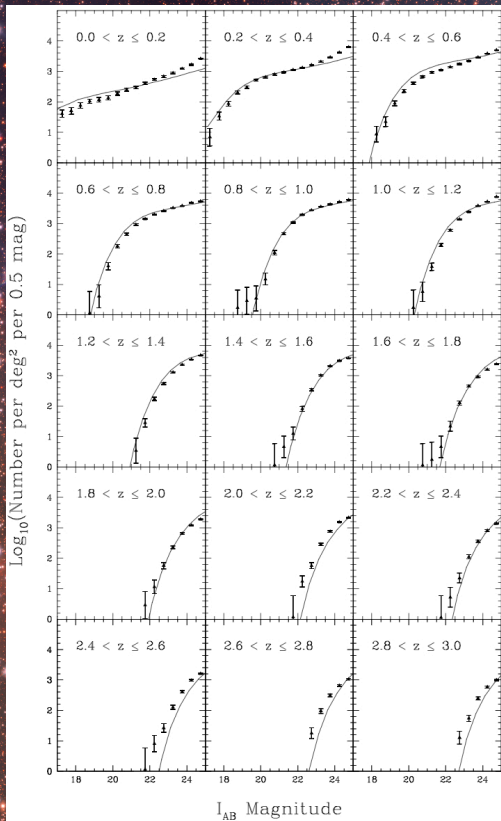


Fig. 1. Galaxy I-band LF's in the COSMOS field are well fit by a simple PLE model (solid line) to $z=3$. (Ball et al 2011, in prep.)

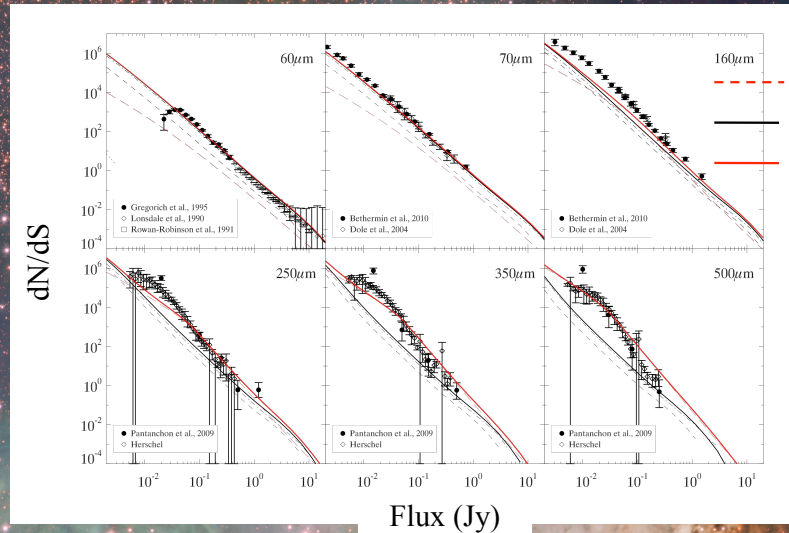


Fig. 2. Galaxy PLE models fit Spitzer counts to 70 microns but fail at Herschel wavelengths. Obscured AGN PLE models then provide an excellent fit out to 850 microns.

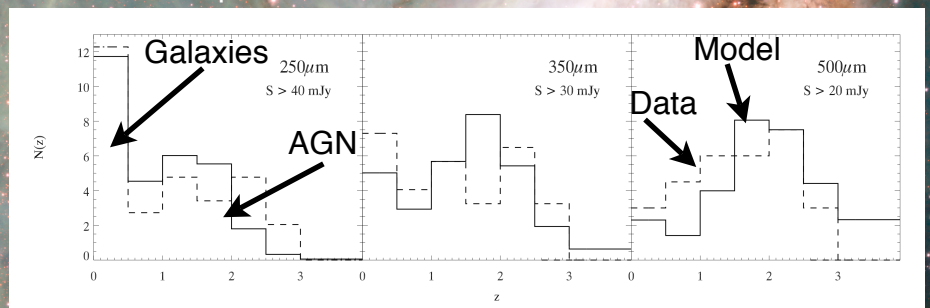


Fig. 3. Herschel $n(z)$ distributions are bimodal and well fitted by a galaxy PLE model at low z and the obscured AGN PLE model at high z .

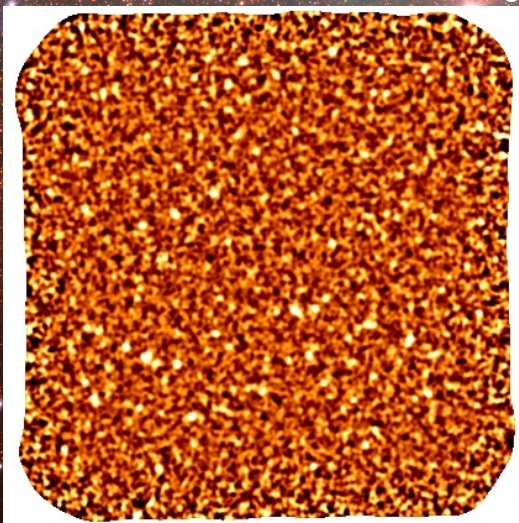


Fig. 4 LABOCA 870micron map of ECDFS containing 167 sub-mm sources in 30' field.

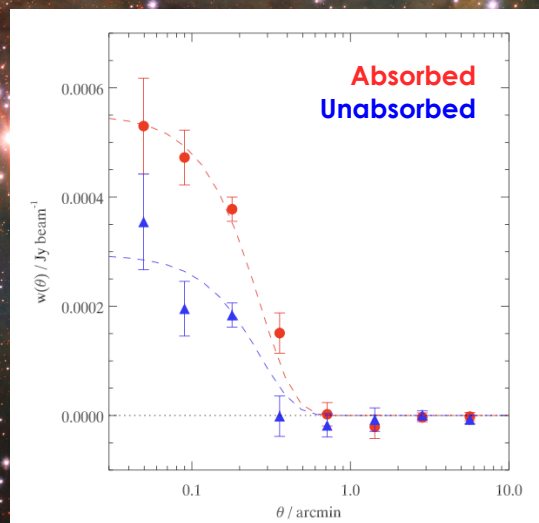


Fig. 5. Cross-correlation of sub-mm sources and absorbed X-ray AGN suggest sub-mm sources are powered by the obscured AGN needed to explain the X-ray background and as predicted by PLE.