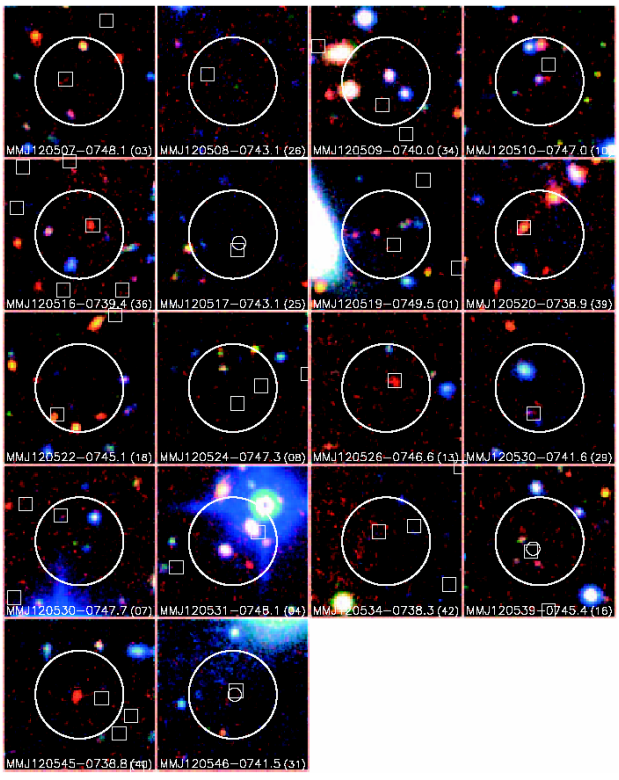
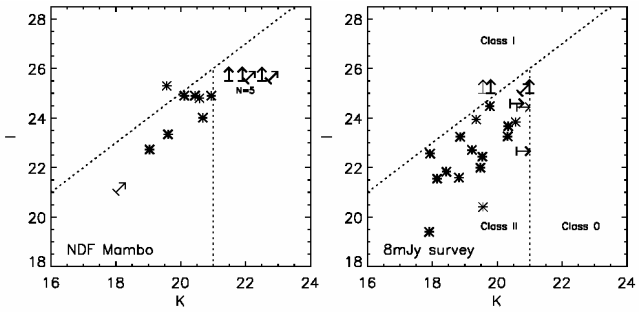
The faint counterparts of MAMBO mm galaxies

We have pursued identifications for 18 sources from our MAMBO 1.2mm survey of the region surrounding the NTT Deep Field, using accurate positions from VLA 1.4 GHz interferometry and in a few cases IRAM mm interferometry, and deep BVRIzJK imaging at ESO. We find thirteen 1.2mm sources associated with optical/near-infrared objects in the magnitude range K=19.0 to 22.5, while five are blank fields at K>22. Two of the thirteen optical/near-infrared objects are likely foreground objects distinct from the dust sources, one of them possibly lensing the mm source. **Compared to published identifications of objects from 850μm surveys of equivalent depth, the median K and I magnitudes of our counterparts are roughly two magnitudes fainter and the dispersion of I-K colours is less.** Real differences in the median redshifts, residual misidentifications with bright objects, and small number statistics are likely to contribute to this significant difference, which also affects redshift measurement strategies. Some of the counterparts are red in J-K, but the contribution of such mm objects to the recently studied population of near-infrared selected (J_s-K_s>2.3) high redshift galaxies is only of the order a few percent. The recovery rate of MAMBO sources by pre-selection of optically faint radio sources is relatively low (~24%), in contrast to some claims of a higher rate for SCUBA sources. From a comparison with submm objects with CO-confirmed spectroscopic redshifts roughly two thirds of the (sub)mm galaxies are likely at z>~2.5. This fraction is probably larger when including sources without radio counterpart.



Deep BzK 'true' color identification images, overlayed with the original MAMBO beams (large circles) and the accurate interferometric locations using the VLA (small squares) or IRAM Plateau de Bure interferometer (small circles).
Optical identifications of the MAMBO sources range from extremely red but well detected objects to fields that are blank at K>22.

The counterparts of the NDF MAMBO mm sources (left panel below) are typically two magnitudes fainter than those of identifications from the SCUBA 8mJy survey at 850μm survey (Ivison et al. 2002, right panel below)



References:
• Dannerbauer, H., Lehnert, M.D., Lutz, D., Tacconi, L., Bertoldi, F., Carilli, C., Genzel, R., Menten, K.M. 2002, ApJ, 573, 473
• Dannerbauer, H., Lehnert, M.D., Lutz, D., Tacconi, L., Bertoldi, F., Carilli, C., Genzel, R., Menten, K.M. 2004, ApJ, 606, 664

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