2MASS Extragalactic Science

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The Two Micron All Sky Survey (2MASS) will catalog more than 3 million galaxies brighter than Ks=14.5 mag (\~1 mJy at 2.2 microns). The imaging survey was designed to probe the nearby Universe in detail out to redshifts of z\~0.2. Accordingly, the catalog is uniform in both photometric and astrometric measurements to better than 10\%. The near-infrared (NIR) photometry (J, H and Ks bands) includes accurate PSF-derived measures and a variety of circular and elliptical aperture measures, fully characterizing both point-like and extended objects. The position centroids have an astrometric accuracy better than \~0.5 arcsec. In addition to tabular information, 2MASS archives full-resolution images for each extended object, enabling detailed comparison with other imaging surveys.

At high galactic latitudes, approximately 15\% of all sources in the 2MASS Point Source Catalog (PSC) with Ks brighter than 14.5 mag are unresolved galaxies. Galaxies with z$>$0.2 can be identified reliably via their location in B-J-Ks color space, and can be used to probe extragalactic source counts out to redshifts as large as z=0.3-0.4. 2MASS also provides an important extragalactic constituent of the 2MASS PSC in active galaxies. 2MASS provides an unprecedented large, highly uniform set of near infrared photometry for known AGN and QSOs, and has begun to reveal a population of previously unknown red AGN that are as numerous in the local universe as UV/optically-selected examples.

The Extended Source Catalog (XSC) will consist of more than 1.4 million galaxies brighter than 14th mag (at 2.2 microns) with angular diameters greater than \~6 arcsec. The 2MASS XSC has engendered a variety of science, including construction of the infrared Tully-Fisher relation, a dense census of the field population and its luminosity function, maps of cluster and super-cluster large-scale structures, classification and morphology of nearby galaxies, and penetration of the Zone of Avoidance. The NIR is most sensitive to the older stellar populations, whose aggregate mass dominates the total for nearly all galaxies in the local Universe. It is for this reason, and the overall uniformity, that the 2MASS XSC is a critical resource in construction of source/target lists for ongoing/future spectroscopic (e.g., the CfA redshift survey, the 2DF/6DF surveys) and radio surveys.