WISE Solar System Research – Clearer Views of the Darkest Objects. A. K. Mainzer[1], J. Masiero[1], J. M. Bauer[1], T. Grav[2], R. Cutri[3], R. McMillan[4], R. Walker[5], E. L. Wright[6], and the WISE Team,[1]Jet Propulsion Laboratory, California Institute of Technology, 4800 Oak Grove Drive, Pasadena, CA 91011, [2] Department of Physics and Astronomy, Johns Hopkins University, [3]Infrared Processing and Analysis Center, California Institute of Technology, [4]Lunar and Planetary Laboratory, University of Arizona, [5]Monterey Institute for Research in Astronomy, [6]Department of Physics and Astronomy, University of California, Los Angeles.

The Wide-Field Infrared Survey Explorer (WISE) will image the entire sky at four wavelengths spanning the near through mid-IR at sensitivities hundreds of times greater than previous surveys [1]. The WISE band-passes (3.4, 4.7, 12 and 22μm) sample the flux from most inner-solar-system bodies near the peak of their thermal emission (Figure 1). Repeated samplings of overlapping sky regions at 90 minute intervals, on average, will enable the detection of undiscovered moving objects, as well as known bodies. The same region of sky will be observed a minimum of 8 times, allowing for the detection of faint, extended objects as well.

While the primary WISE science objectives focus on ultra-luminous infrared galaxies and the nearest brown dwarfs, WISE will be capable of performing a vast array of solar-system observations. WISE will observe and detect thousands of main belt asteroids and hundreds of near-Earth objects (NEOs) [2], providing IR-derived diameters and albedos for many of these bodies, with increased sensitivity for the darkest members of these populations. The survey will also provide measurements of:

- asteroid thermal inertia,
- dust grains in the coma of active comets,
- albedos & diameters of cometary nuclei,
- comet debris trails and zodiacal dust bands,
- and the diameters & albedos of large outer solar system objects.

We will give a brief overview of these and other solar-system observations based on the first two months of survey data, focusing on the highlights of the mission to-date.

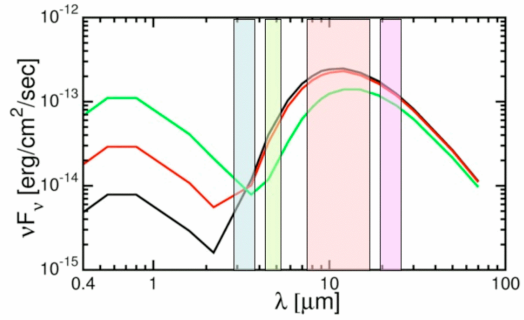

Figure 1: WISE observes NEOs near the peak of their spectral energy distributions; a typical NEO with dark (0.04), median (0.145), and bright (0.52) albedo values is shown, along with the four WISE band-passes. Centered at 12 μm, WISE band W3 is optimally suited for detecting NEOs. The NEO shown is close to the WISE sensitivity limit in band W3.

References:

[1] Mainzer, A. K. *et al.* (2006) *SPIE, 6265,* 626521. [2] McMillan, R. S. *et al.* (2009) *B.A.A.S, 41,* p. 364.

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