Studying comets with NEOWISE

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The Wide-Field Infrared Survey Explorer (WISE) mission detected more than 150 comets during its all-sky survey between January 2010 and February 2011. The comets were imaged at 4 infrared wavelengths (3.4, 4.6, 12, and 22 microns). The large sample of both long-period and Jupiter-family comets observed at a range of heliocentric distances allows for systematic comparison of the properties of both dynamical families. Nucleus diameters and albedos, dust comae temperatures, CO and CO_2 emission rates, and dust tail and trail morphologies are some of the properties studied with the WISE data. This work is being continued by the reactivated NEOWISE mission [1]. In 2013, the WISE spacecraft was brought out of hibernation to resume discovering, tracking, and characterizing small bodies in the Solar System by imaging the sky at solar elongations of $\sim 90^\circ$ at wavelengths of 3.4 and 4.6 microns. Since NEOWISE resumed its all-sky survey on December 23, 2013, 10 comets have been observed, including one previously-unknown long-period comet — C/2014 C3 (NEOWISE). Of particular interest are the NEOWISE observations of comet C/2013 A1 (Siding Spring), which will have a close encounter with Mars in October 2014. NEOWISE observed this comet in January 2014 and will observe it twice more before the comet's close approach to Mars. NEOWISE will continue to operate until early 2017, greatly enhancing our understanding of cometary properties as studied in the infrared.

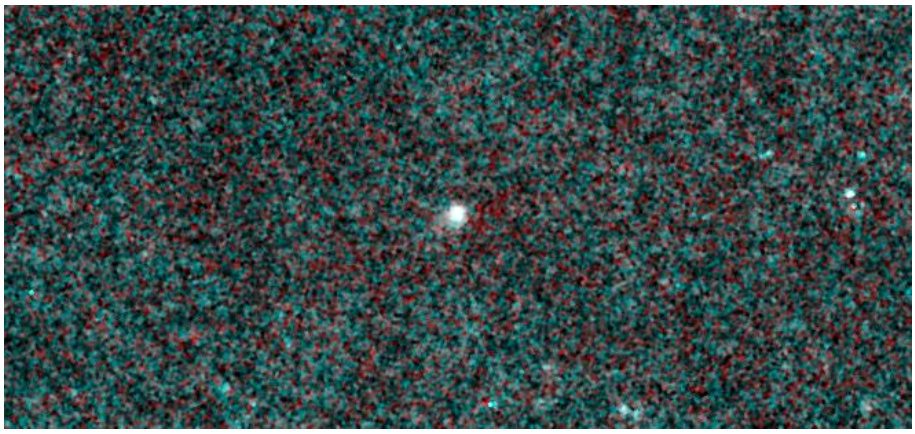

Figure: Comet C/2013 A1 (Siding Spring) — shown here in a 2-color image at 3.4 and 4.6 microns — is one of the first comets observed by the NEOWISE mission following its reactivation in late December 2013. Comet Siding Spring will have a close encounter with Mars in October 2014, passing within ∼138,000 km from the planet's surface. NEOWISE will reobserve the comet twice before the close encounter.

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References: [1] A. Mainzer et al., 2014, submitted to ApJ.