View Abstract

CONTROL ID: 2363666

TITLE: Finding metal-rich asteroids – a NEOShield-2 Study

ABSTRACT BODY:

Abstract (2,250 Maximum Characters): The 1.2 km diameter Barringer Crater in Arizona was produced by an impact of a metallic asteroid, whereas the impact of a similar sized stony asteroid in 1908 over Tunguska, Russia, resulted in a large airburst but no crater.

Studies of the metal content of asteroids are relevant not only to estimations of their potential to wreak devastation on impacting the Earth, but also for theories of their origins and nature, and possibly in the future for endeavors in the field of planetary resources.

However the reflection spectra of metallic asteroids are largely featureless, which makes it difficult to identify them and relatively few are therefore known. With reference to radar albedos and taxonomic classifications, we showed (Harris and Drube, 2014) that data from the WISE/NEOWISE thermal-infrared survey (Wright et al. 2010; Mainzer et al. 2011a) fitted with a simple thermal model (NEATM; Harris 1998), can reveal asteroids likely to be metal rich, based on the NEATM fitting parameter, η, which carries information on thermal inertia.

To further explore the dependence of η and thermal inertia on taxonomic type, we are continuing analyses of WISE/NEOWISE data and expanding them to include IRAS data (Tedesco et al., 2002). We are calculating the angle between the spin vector and the solar direction, θ, for different sightings of asteroids having known spin vectors. The η values of objects with high thermal inertia and moderate to high spin rates should depend strongly on θ, whereas those with low thermal inertia and/or low spin rates should not. We will present the latest results of our work and provide a demonstration of its potential.

Harris, A. W., 1998, Icarus, 131, 291.

Harris, A. W. and Drube, L, 2014, Ap. J. Letters, 785, L4

Mainzer, A., et al. 2011a, ApJ, 743:156

Tedesco, E. F. et al, 2002, Astron. J., 123, 1056.

Wright, E. L., et al. 2010, AJ, 140, 1868

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CURRENT CATEGORY: Asteroid Physical Characteristics: Surfaces

CURRENT : None

AUTHORS/INSTITUTIONS: L. Drube, A.W. Harris, Planetary Research, German Aerospace Center, Berlin, GERMANY;