Wednesday, March 21, 2012
SMALL BODY STUDIES I: FORMATION, REGOLITH, AND RUBBLE PILES
1:30 p.m. Waterway Ballroom 5

Chairs: **Seth Jacobson**
Linda Elkins-Tanton

1:30 p.m. Cuzzi J. N. * Hogan R. C.
Primary Accretion by Turbulent Concentration: The Rate of Planetesimal Formation and the Role of Vortex Tubes **[#2536]**
We present a new fundamental timescale for direct formation of 10–100-km-diameter asteroids and TNOs by concentration of small particles in turbulence, and show how vortex tubes acting on large scales may explain the properties of numerical simulations.

1:45 p.m. Elkins-Tanton L. T. *
The Fate of Water in Early-Accreting Internally Heated Planetesimals **[#1582]**
Partial differentiation in early-forming planetesimals results in bulk densities and water compositions that vary by total mass, time of accretion, and bulk radiogenic content. Crusts will be heterogeneous in density and water content.

2:00 p.m. Brown P. * Kikwaya J. B. Campbell-Brown M. D.
An Electro-Optical Survey of Meteoroid Bulk Density: Evidence for Widespread Radial Mixing in the Early Solar Nebula **[#1576]**
Based on precise observations of 92 meteors, we have estimated bulk densities of meteoroids. We find that Jupiter family comet-type meteoroids have chondritic-like bulk densities, while many asteroidal-type meteoroids are nearly pure iron.

2:15 p.m. Scheeres D. J. * Jacobson S. A.
Comet Rotational Relaxation and Interior Stresses and Loads **[#2169]**
Comet outgassing excites complex rotation of nuclei, causing time-varying internal stresses and strains that damp over time toward uniform rotation. The internal stresses and loads change during dissipation and may be related to comet bursting.

2:30 p.m. Steckloff J. K. * Melosh H. J.
Cometary Jet Collimation Without Physical Confinement **[#2548]**
The prevailing view of cometary jets is that collimation requires physical confinement. Here we show that this this is not that case, but rather that collimation can result from a porous, flat surface.

2:45 p.m. Singerling S. A. * McSween H. Y. Jr.
A Comparison of Glasses on Airless Bodies: The Moon vs. Vesta **[#1180]**
The purpose of this research is to analyze glasses in howardites and distinguish their origin (impact-melt-derived or pyroclastic) based on textural and chemical differences observed in lunar glasses. The Moon is used as a proxy for Vesta.

3:00 p.m. Delbo M. Libourel G. Michel P. * Ganino C. Verati C.
Temperature Shocks at the Origin of Regolith on Asteroids **[#1776]**
Here we study how regolith on asteroids develop via thermal fatigue cracking of rocks at the surface of these bodies due to the huge number of day/night temperature cycles that asteroids experience during their lifetime.

3:15 p.m. Vahidinia S. V. * Cuzzi J. N. Draine B. D. Marouf E. M.
Radiative Transfer in Closely Packed Realistic Regoliths **[#2880]**
We present a regolith radiative transfer model that is essential for near-to-far infrared observations of all airless solar system bodies with granular surfaces. We show the role of porosity on layer reflectivity and problematic spectral bands.

3:30 p.m. Sanchez P. * Scheeres D. J.
Granular "van der Waals Bridges" and the Cohesion of Rubble-Pile Asteroids **[#1620]**
Fine regolith in rubble pile asteroids may act as a sort of "van der Waals concrete" that forms bridges that bind larger boulders and strengthens small asteroids, allowing them to rotate more rapidly. We test these ideas using DEM simulations.

3:45 p.m. Richardson D. C. Munyan S. K. Schwartz S. R. * Michel P.
Comparison of Discrete Element Methods for Simulating Low-Speed Rubble Pile Collisions: First Results **[#2195]**
We compared low-speed rubble-pile collisions using hard- and soft-sphere methods. Results are similar, although differences exist during the peak of the impact shock.

4:00 p.m. Jacobson S. A. * Scheeres D. J.
Formation of the Asynchronous Binary Asteroids **[#2737]**
We find three pathways to form asynchronous binaries: they are born that way, are formed from planetary flybys, and are formed due to BYORP/tidal expansion. The YORP effect on the secondary can play an important role for each of these pathways.

4:15 p.m. Rossi A. * Marzari F. Scheeres D. J. Jacobson S.
Effects of YORP-Induced Rotational Fission on the Asteroid Size Distribution at the Small Size End **[#2095]**
The asteroid belt size distribution was shaped by collisions grinding the population into smaller bodies via cratering or fragmentation. At the small size end YORP may contribute by accelerating the spin of the bodies beyond the disruption limit.

4:30 p.m. Takir D. * McSween H. Y. Jr. Emery J. P. Clark R. N. Pearson N.
Constraints on the Nature and the Degree of Aqueous Alteration in Outer Main Belt Asteroids **[#1354]**
In order to constraint the nature and the degree of aqueous alteration in outer main belt asteroids (2.5 < a < 4.0 AU) , we investigated the geochemical/petrological parameters and the spectral properties of 10 CM/CI carbonaceous chondrites.