

**Monday, March 7, 2011**  
**ASTEROID GEOPHYSICS AND PROCESSES: SURFACES AND INTERIORS**  
**2:30 p.m. Waterway Ballroom 5**

**Chairs: James Roberts**  
**Benjamin Weiss**

- 2:30 p.m. Richardson J. E. \*  
[\*Regolith Generation, Retention, and Movement on Asteroid Surfaces: Early Modeling Results\*](#) [#1084]  
 A three-dimensional model of cratered surface evolution is used to investigate the development of regolith layers on initially rocky, S-type asteroid bodies as a function of time and accumulated impacts.
- 2:45 p.m. Murdoch N. Michel P. \* Richardson D. C. Walsh K. J. Losert W. Berardi C. Green S. F.  
[\*Numerical Simulations of Granular Dynamics in Various Conditions Applicable to Regolith Motion on Small Body Surfaces\*](#) [#1113]  
 Understanding regolith motion in various conditions can help interpreting images of asteroid surfaces and designing efficient sampling mechanisms. We first simulated numerically shaking, avalanche processes and tumbler behaviors, with comparisons with laboratory experiments.
- 3:00 p.m. Noble S. K. \* Hiroi T. Keller L. P. Rahman Z. Sasaki S. Pieters C. M.  
[\*Experimental Space Weathering of Ordinary Chondrites by Nanopulse Laser: TEM Results\*](#) [#1382]  
 Scanning and transmission electron microscope analysis of a suite of artificially space weathered ordinary chondrites with different metallic iron contents (H, L and LL) reveals the creation of similar nanophase iron-bearing melt and vapor deposits.
- 3:15 p.m. Weiss B. P. \* Elkins-Tantont L. T. Barucci M. A. Sierks H. Pätzhold M. Snodgrass C. Marchi S. Richter I. Weissman P. R. Fulchignoni M. Binzel R. P.  
[\*Evidence for Thermal Metamorphism or Partial Differentiation of Asteroid 21 Lutetia from Rosetta\*](#) [#2077]  
 Observations of asteroid 21 Lutetia by the Rosetta spacecraft indicate that its surface resembles some chondrites, yet its density is like that of the differentiated asteroid 4 Vesta. This suggests that Lutetia may be partially differentiated.
- 3:30 p.m. Wakita S. \* Jogo K. Krot A. N.  
[\*Thermal Evolution of CV-Like Carbonaceous Chondrite Asteroid\*](#) [#1221]  
 We report numerical simulations of thermal evolution of a CV-like parent body using different initial conditions. We found that the CV parent body that accreted at 1.4–1.8 Ma after formation of CAIs could reach peak metamorphic temperature of 1100 K.
- 3:45 p.m. Scheeres D. J. \* Sánchez P.  
[\*Evolution of Small, Rapidly Rotating Asteroids\*](#) [#2307]  
 Small rubble-pile asteroids can be spun rapidly due to cohesive van der Waals forces. When they split they must be rotationally accelerated to split again, a process that can eventually completely fission the body. Applications to 2008 TC<sub>3</sub> are made.

- 4:00 p.m. Jacobson S. J. \* Scheeres D. J.  
[\*Long-Term Stable Equilibria for Synchronous Binary Asteroids\*](#) [#2239]  
We present theoretical evidence for the existence of a long-term stable equilibrium solution for small, synchronous binary asteroids, which enables direct study of asteroid geophysics through tidal theory and the BYORP effect.
- 4:15 p.m. Roberts J. H. \* Rivkin A. S. Chabot N. L.  
[\*A Transient Dynamo on Vesta?\*](#) [#2242]  
A core dynamo on 4 Vesta is impossible now. At best a hot core would yield a transient field early on. We test a hypothesis that an impact restarts the dynamo. In fact, the projectile we need to accomplish the deed won't leave Vesta intact.
- 4:30 p.m. Castillo-Rogez J. C. \* Choukroun M. Hodyss R. P. Johnson P. V.  
Rivkin A. S. Raymond C. A.  
[\*Origin of Ceres' Surface as a Product of Mobile-Lid Convection\*](#) [#2486]  
We demonstrate that all conditions were met for mobile-lid convection to take place in Ceres in the past, and that its peculiar surface is evidence for the occurrence of that mechanism.