

Tuesday, March 24, 2009

SPECIAL SESSION:

ICY SATELLITES OF JUPITER AND SATURN: COSMIC GYMNASTS

8:30 a.m. Waterway Ballroom 6

Chairs: Michael Bland
Steve Vance

- 8:30 a.m. Rudolph M. L. * Manga M.
[Ocean Pressurization, Stress Evolution, and Tensile Fracture Within Icy Moons](#) [#2436]
Thickening of an ice shell overlying an ocean pressurizes the ocean and tangential stresses of several MPa are produced in the overlying ice shell. These stresses drive tensile fractures which may facilitate cryovolcanism.
- 8:45 a.m. Han L. * Showman A. P.
[Tidal Dissipation in Europa's Ice Shell with a Heterogeneous Temperature Distribution](#) [#2279]
We present numerical simulations of the tidal oscillation process to study the temperature and spatial dependence of tidal dissipation in a ice shell with heterogeneous temperature distribution.
- 9:00 a.m. Sarid-Rhoden A. R. * Militzer B. Huff E. M. Hurford T. A. Manga M. Richards M.
[Implications for Europa's Obliquity from Cycloid Modeling](#) [#1891]
We will present improved fits to European cycloids in the southern hemisphere and the first fits to equatorial cycloids, which we obtained using a tidal model that includes the effects of obliquity.
- 9:15 a.m. Matson D. L. * Castillo-Rogez J. C. Johnson T. V. Turner N. Lee M. H. Lunine J. I.
[²⁶Al Decay: Heat Production and Revised Age for Iapetus](#) [#2191]
We revisit the decay energies that have been used for computing the heat produced by the decay of ²⁶Al in geophysical models. Using the most recent nuclear constants, we recommend a heat production value of 3.12 MeV per decay and a half-life of 0.717 My.
- 9:30 a.m. Roberts J. H. * Nimmo F.
[Tidal Dissipation Due to Despinning and the Equatorial Ridge on Iapetus](#) [#1927]
The equatorial ridge on Iapetus cannot be formed by despinning stresses alone. However, heat dissipated by despinning may promote the formation of a degree-2 convective upwelling and positive dynamic topography at the equator.
- 9:45 a.m. Melosh H. J. * Nimmo F.
[An Intrusive Dike Origin for Iapetus' Enigmatic Ridge?](#) [#2478]
The symmetry and linearity of Iapetus' equatorial ridge suggest an extensional dike origin. Tidal despinning may provide both the heat and stress necessary to guide fluid intrusion from its interior.
- 10:00 a.m. Schenk P. M. * Moore J. M.
[Eruptive Volcanism on Saturn's Icy Moon Dione](#) [#2465]
Volcanic plains on Dione include unusual crater-like landforms indicative of eruptive volcanism. Although older than resurfacing on Enceladus, these features confirm that Saturn's icy moons have diverse and complex geologic histories.
- 10:15 a.m. Johnson T. V. * Castillo-Rogez J. C. Matson D. L. Thomas P. C.
[Phoebe's Shape: Possible Constraints on Internal Structure and Origin](#) [#2334]
We address the origin of Phoebe's shape and discuss the potential constraints on the internal structure and thermal evolution of Phoebe that can be inferred from Cassini observations.
- 10:30 a.m. Asmar S. W. * Nimmo F. Thomas P. C. Bills B. G.
[A Shape Model For Rhea and Implications for its Gravity Coefficients and Internal Structure](#) [#2219]
We have determined the shape of Rhea in the form of a spherical harmonic expansion to degree 10 from limb profiles and investigated the implication to gravity coefficients.

- 10:45 a.m. Zhang K. * Nimmo F.
[*Internal Structure of Enceladus and Dione from Orbital Constraints*](#) [#2199]
Based on orbital constraints, we find that Enceladus is likely to have a liquid ocean beneath its conductive ice shell. Dione probably has a similar internal structure.
- 11:00 a.m. Kieffer S. W. * Lu X. McFarquhar G. Wohletz K. H.
[*Ice/Vapor Ratio of Enceladus' Plume: Implications for Sublimation*](#) [#2261]
The ice/vapor ratio for the Enceladus' plume, using the originally reported data ISS and UVIS data should be 0.2, not 0.4. The corrected data are compatible with sublimation. Conclusions about the need for a liquid reservoir need to be reexamined.
- 11:15 a.m. Mitri G. * Iess L. Rappaport N. J.
[*Interior Structure of Titan*](#) [#2019]
Cassini radio science data indicates that Titan is nearly in hydrostatic equilibrium. We have used thermal models and hydrostatic equilibrium theory to derive interior models of Titan.
- 11:30 a.m. Bills B. G. * Nimmo F.
[*Titan's Spin, Gravity, and Moments of Inertia*](#) [#1462]
The gravitational field and spin state of Titan yield separate estimates of the polar moment of inertia, and they differ as would be expected for a body with a decoupled shell floating on a subsurface ocean.