Monte Carlo Modeling of Io’s [OI] Aurora in Eclipse [#2281]
A 3D direct Monte Carlo simulation is used to simulate Io’s atmospheric interaction (upon entering eclipse) with electrons from the plasma torus. It is found that the flux tube depletion across Io controls the latitude of the bright wake feature.

1-D Monte Carlo Modeling of Io’s Atmospheric Collapse in Eclipse [#2266]
The collapse of Io’s dayside SO$_2$ atmosphere was simulated using the DSMC method. It was found that the presence of a non-condensible species (SO) greatly increases the collapse timescale through the formation of a diffusion layer near the surface.

Keszthelyi L. Milazzo M. Davies A. G. Wilson L.
A Simple Thermal Model for Lava Fountains: Application to Io [#2216]
A simple model for the thermal emission from lava fountains helps explain the high lava temperatures seen at Io.

Lougen J. A. Gregg T. K. P. Lopes R.
Behavior of Loki Patera, Io Revealed Through Mathematical and Laboratory Modeling [#2179]
Laboratory simulations and mathematical models test lava lake hypotheses for the formation of Loki Patera, Io.

Kirchoff M. R. McKinnon W. B.
Mountain Building on Io – Part 2: Effects of Preexisting Faults and Pore Sulfur on Thermal Stresses [#2120]
We examine mountain formation on Io by thermoelastic stresses when the crust is allowed to expand laterally on preexisting faults, and in the presence of liquid sulfur pore pressure. The potential for mountain formation is enhanced.

Black S. R. Gregg T. K. P.
The Origin and Evolution of “Islands” in Ionian Paterae [#2180]
A morphological investigation of the Ionian paterae containing islands suggests that the islands are not solidified rafts of crust.

Davies A. G. Kyle P.
Spacecraft and In-Situ Observations of the Mt. Erebus, Antarctica, Lava Lake: A Terrestrial Analogue for Pele on Io [#2284]
In December 2005 we observed strombolian activity at an active lava lake in Antarctica, ground-truthing VIS/IR spacecraft observations (four instruments on two spacecraft) using Forward Looking Infrared (FLIR) cameras.

Groenleer J. M. Kattenhorn S. A.
Implications of Cycloid History in the Northern Trailing Hemisphere of Europa [#2071]
A CW rotation of cycloids through time is compatible with 600 degrees of nonsynchronous rotation of the Europan ice shell. Up to eight cycloids formed in a single rotation cycle. Non-cycloidal cracks continued to form after cycloids first developed.

Crawford Z. A. Pappalardo R. T.
Evidence for Episodic Formation of Europa’s Global Lineaments Via Non-Synchronous Rotation [#2264]
By comparing mapped and synthetic global lineaments on Europa to non-synchronous rotation stresses at a variety of westward translations, we show that the observed features are consistent with episodic lineament formation.

Mullen M. E. Crawford Z. Pappalardo R. T. Wahr J.
Visco-Elastic Surface Stress on Europa [#2350]
Accurate modeling of long-period stresses on Europa’s surface requires incorporating period-dependent Love numbers and Maxwell rheology terms. Visco-elastic surface stress is reduced significantly relative to purely elastic stress at NSR time scales.
Bills B. G. Nimmo F.

*Limits to Non-Synchronous Rotation for Maxwell Viscoelastic Bodies* [#2131]

It has been argued that Europa may rotate at a slightly non-synchronous rate, due to non-vanishing tidal torques. We show that, in self-consistent calculations, rigid body torques can easily prevail and enforce synchronicity.

Lichtenberg K. A. McKinnon W. B. Barr A. C.

*Heat Flux from Impact Ring Graben on Europa* [#2399]

Measurements of graben widths in the vicinity of Tyre and Callanish impact structures on Europa are used to constrain the surface heat flux from the satellite at the time of impact.

Bierhaus E. B.

*Europa’s Surface Properties from Small Craters* [#2436]

This abstract describes how observations of small crater morphology reveal information regarding Europa’s surface and near-surface properties.

Patterson G. W. Head J. W.

*Plate Motion and the Rigidity of Europa’s Lithosphere* [#1813]

We examine the offset magnitudes of eight plate boundaries associated with a band complex located on the equatorial trailing hemisphere of Europa to determine the rigidity of the icy satellite’s lithosphere when the feature was actively forming.

Doggett T. C. Davies A. G. Greeley R.

*Detectability of Cryo-Volcanism with Thermal Infrared Spectroscopy* [#2243]

This study modeled the thermal emission of putative cryovolcanic features to determine the minimum requirements of resolution and spectral range for the detection of cryovolcanism.

Dougherty A. J. Hogenboom D. L. Kargel J. S. Zheng Y. F.

*Volumetric and Optical Studies of High Pressure Phases of Na2SO4-10H2O with Applications to Europa* [#1732]

We present optical images of high-pressure phases of the Na2SO4-H2O system, associated volume changes of the sample, and the experimental eutectic and liquidus transitions for pressures up to 300 MPa, with implications for modeling Europa’s ocean.

Brand H. E. A. Fortes A. D. Wood I. G. Alfredsson M. Vocadlo L.

*High Pressure Properties of Planetary Sulfate Hydrates Determined from Interatomic Potential Calculations* [#1310]

We present the results of simulations of magnesium, sodium and ammonium sulfates and their hydrates, for comparison with experimental studies, and incorporation into planetary models.

Fortes A. D. Wood I. G. Voèadlo L. Brand H. E. A. Grindrod P. M. Joy K. H. Tucker M. G.

*The Phase Behaviour of Epsomite (MgSO4•7H2O) to 50 Kbar: Planetary Implications* [#1029]

We describe the polymorphism of epsomite from a high-pressure powder neutron diffraction study, and relate these findings to the interiors of icy moons and to impact metamorphism.

Goguen J. D. Orzechowska G. E. Johnson P. V. Tsapin A. I. Kanik I.

*UV Photolysis of Amino Acids in Water Ice: How Long Can They Survive on Europa?* [#2006]

We report the rate of decomposition by ultraviolet photolysis of 4 simple amino acids in a ~mm-thick crystalline water ice at T=100K to constrain the survivability of these important organic molecules.

Hibbitts C. A. Szanyi J

*Physisorption of CO2 on Non-Ice Materials of Relevance to Icy Satellites* [#1753]

Physisorption may explain some of the characteristics of the CO2 in the surfaces of the Galilean and Saturnian satellites. Spectral characteristics of adsorbed CO2 depend on mineralogy, composition of the major cation, and temperature.

Patterson G. W. Head J. W. Collins G. C. Pappalardo R. T. Prockter L. M. Lucchitta B. K.

*Global Geologic Mapping of Ganymede Light and Dark Material at 1:15M* [#1724]

We are in the process of compiling a global geologic map of Ganymede at 1:15M utilizing a revised DOMU described herein. Our progress toward the completion of this mapping effort is summarized here.
Katz-Wigmore J.  Barlow N. G.
The "Catalog of Impact Craters on Ganymede" [#1387]
We are producing a catalog of all impact craters larger than 3 km on Ganymede. The catalog include information on crater location, diameter, geologic unit, type of crater, ejecta and interior morphologies, and crater preservational state.

Klaybor K.  Barlow N. G.
Interior Morphologies of Impact Craters on Ganymede [#1360]
We are analyzing the interior morphologies of impact craters on Ganymede. We are finding evidence of regional variations in the distributions of dome, central peak, and central pit craters.

Martin E. S.  Collins G. C.  Crawford Z. A.  Pappalardo R. T.
Computer Assisted Time Sequence Sorting of Grooves in Eastern Mysia Sulci, Ganymede [#1204]
We examine the sequence of deformation in a complex area of Ganymede grooved terrain, using a new computer technique to sort the groove sets.

Collins G. C.
Global Expansion of Ganymede Derived from Strain Measurements in Grooved Terrain [#2077]
Global expansion is estimated by combining high-resolution strain estimates with global image and groove data. The ~3% radial expansion result is consistent with interior differentiation, but too large for melting in a thermal runaway event.

Physical Models of Tectonic Resurfacing on Ganymede [#1774]
Physical analog modeling of grooved terrain has produced geometrically similar morphology to the fault systems on Ganymede. Models suggest that the grooved terrain on Ganymede formed by imbricate normal faulting at 25% or greater extension.

Murphy N. W.  Khurana K. K.  Pappalardo R. T.  Denk T.
Ganymede’s Polar Caps and Field Line Boundaries [#2186]
We find strong correlations between the locations of Ganymede’s polar caps and open/closed field line boundaries based on modeling of Ganymede’s induced and intrinsic magnetic fields. This supports a plasma bombardment origin for the polar caps.

De Sanctis M. C.  Coradini A.  Gavrishin A.
G-Mode Classification of Trans Neptunian Objects [#1109]
TNO population show a wide colour diversity. Since the population is characterized by several parameters it is important to use a multivariate statistics in order to understand if different types of objects exist.

Near-Infrared Spectra of Charon: Support for Cryovolcanism on Kuiper Belt Objects? [#2107]
We present spectra of Charon which show crystalline water and ammonia hydrate, suggesting geological activity. The presence of ammonia hydrate enables cryovolcanism. We discuss how cryovolcanism may be possible on Charon, and other icy bodies.