

# Planetary Science

Planetary science is an interdisciplinary field which at Johns Hopkins University can be studied at the graduate level in the Departments of Chemistry, Earth and Planetary Sciences, and Physics and Astronomy.

A distinct advantage of studying planetary science at Johns Hopkins is the Space Telescope Science Institute, which is on the Homewood campus and whose facilities are available for thesis research.

## The Faculty

**John P. Doering**, Professor (Chemistry).

**Paul D. Feldman**, Professor (Physics and Astronomy).

**H. Warren Moos**, Professor (Physics and Astronomy).

**Darrell F. Strobel**, Professor (Earth and Planetary Sciences, Physics and Astronomy).

## Graduate Program

### Background Requirements

Because planetary science is the application of basic principles from the parent sciences of chemistry, geology, and physics to the study of solar system objects, it is important that graduate study in this field be carried out with rigorous training in one or more parent sciences. An undergraduate degree in one of these parent sciences with course work in other basic sciences is the best preparation for graduate study. In addition, three years of undergraduate mathematics is highly desirable. An undergraduate degree in planetary science is not required.

The choice of a department to pursue graduate study in planetary science at Johns Hopkins depends on a number of factors: professional identity (whether the student wants to be known as a chemist, geologist, or physicist, etc.), departmen-

tal requirements for the Ph.D., and undergraduate training. Thesis research can be supervised by any professor with interests in planetary science, regardless of the departmental affiliation of either student or professor.

The research program in planetary science is closely coordinated with the programs in astrochemistry and astrophysics. Students are encouraged to take courses in astrophysics, chemistry, geology, physics, and applied mathematics as well as planetary science to gain the comprehensive background necessary for interdisciplinary research in this field.

### Research

Current research includes acquisition, analysis, and interpretation of spacecraft data. An active program to study the outer solar system and comets utilizes the Hubble Space Telescope and the Far Ultraviolet Spectroscopic Explorer. Currently, an in-depth study of the Saturnian system is being conducted with the Cassini spacecraft and Huygens Probe.

Spectroscopic instruments are designed and built to carry out novel solar system measurements with rockets, satellites, and the space shuttle. The chemistry, dynamics, physics, and spectroscopy of the Io torus, the atmospheres of giant planets and their satellites are investigated theoretically, as well as observationally.

In the laboratory, electronic and ionic collision phenomena and spectroscopy, gas-phase chemical reactions, photodetachment of electrons from negative cluster ions, and energy transfer processes are studied. Theoretical studies of atomic and molecular processes relevant to astrochemistry, astrophysics, and planetary science are performed with state-of-the-art calculations.