



ΓΕΝΙΚΟ ΣΕΜΙΝΑΡΙΟ ΤΜΗΜΑΤΟΣ ΦΥΣΙΚΗΣ
PHYSICS COLLOQUIUM

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17:00-18:00

3rd Floor Seminar Room

"Cassini at Saturn: Rings, Atmosphere and Moons."

*Prof. P.D. Nicholson,
Department of Astronomy, Cornell University, USA*

ABSTRACT:

Since Saturn orbit insertion on July 1, 2004, instruments on the Cassini orbiter have been observing the planet, its rings, Titan and several of the icy satellites. I will briefly review some of the highlights of these observations, concentrating on optical and near-infrared imaging. Saturn's main rings have been imaged and scanned in unprecedented detail, revealing density waves and "wakes" driven by nearby and embedded satellites, evidence for unresolved 100-meter-sized moonlets and subtle, large-scale compositional variations. Mosaics show the complex, kinky, multi-stranded structure of the F ring, while images taken in the planet's shadow show two new, extremely tenuous rings. Saturn itself sports a complex, ever-changing pattern of ring shadows, as well as several giant thunderstorms, ultraviolet aurorae and a mysterious hexagonal feature at the north pole. Studies of the planet's radio emissions seem to show that its rotation period has lengthened by about 5 min since 1981.

The surface composition of the large moon Titan remains enigmatic, partly due to our very limited ability to see through its thick, methane-rich atmosphere outside of a few narrow 'windows'. However, significant albedo variations exist in the near-IR which may correspond to elevated regions dominated by water ice and lower areas covered by dark, probably organic material. Recent radar images have revealed what appear to be "lakes" in the far north, while the equatorial regions are dominated by immense dune fields and occasional sinuous channels reminiscent of terrestrial rivers. Although smaller than Jupiter's Galilean satellites, Saturn's icy moons turn out to be equally intriguing. Icy plumes erupt from Enceladus' south polar region, feeding the tenuous E ring, while chaotically-tumbling Hyperion has a surface texture similar to coral. Enigmatic Iapetus shows evidence of ancient giant impacts, as well as more recent geologic activity. Distant Phoebe, likely a captured Kuiper belt object, is heavily-cratered with a much more chemically-diverse surface than the inner satellites.