BOSTON UNIVERSITY

Boston University College of Arts & Sciences
Center for Space Physics

2023—2024 SPACE PHYSICS SEMINAR SERIES

Saturn's Variable Atmosphere in Ultraviolet

The upper atmosphere of Saturn sits at the interface of the magnetosphere, ionosphere and atmosphere. Saturn, like the other outer planets, suffers from an 'energy crisis', with thermospheric temperatures greatly exceeding those expected from solar heating. Auroral heating provides sufficient energy to the system, but the fast rotation of Saturn prevents distribution of energy to mid-latitudes. Unravelling circulation and seasonal changes in the thermosphere could provide the answer to the temperature disparities.

Throughout the Cassini mission, the Ultraviolet Imaging Spectrometer (UVIS) probed the structure and temperature of Saturn's upper atmosphere through occultations of stars and the sun, as well as direct observations of emissions. We analyse extensive emissions from 13 years of Cassini, in addition to radiative transfer modelling, revealing seasonal and latitudinal changes in Saturn's hydrogen distribution, which exhibits surprising variability. Solar occultations provide further measurements of atomic hydrogen and the methane homopause, which can constrain dynamics in the upper atmosphere and contribute to the resolving the energy crisis.

Thursday, April 4th

4:00-5:00 p.m.

725 Commonwealth Ave | Room 502

Peter Stephenson

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