Geophysical Research Abstracts
Vol. 20, EGU2018-10821, 2018
EGU General Assembly 2018

Top Ten Discoveries from the Cassini UVIS Investigation

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UVIS Top Ten Discoveries
1. Enceladus icy jets spew 200kg/sec of water, with no significant variations over the mission. The strongest jets that loft future E ring particles are more variable, though.
2. Titan's airglow is primarily from sunlight and photoelectrons, but the weak night airglow is from magnetospheric particle impacts.
3. An atomic oxygen torus surrounds Saturn, peaking at its source, Enceladus.
4. The Europa atmosphere is dominated by atomic oxygen at low density, inconsistent with water plume activity at the time of the Cassini Jupiter flyby. The Enceladus plumes are significantly different from those found at Europa.
5. UVIS observations of propellers, gaps, ghosts, kittens, self-gravity wakes indicate ongoing aggregation in Saturn's rings; ring statistics, wavelet analysis, haloes, small particles show disaggregation on an orbital time scale; we can understand this with an analogy to a predator-prey ecosystem.
6. UVIS and VIMS comparisons find small particles in the outer A ring, and other regions that are strongly perturbed by moon resonances.
7. The UV spectrum of Saturn's rings can be matched by pure water ice polluted over the age of the solar system by material having the reflectance of Comet 67P (as measured by Rosetta's Alice). Using Cassini results for the ring mass from RSS and the polluting flux from CDA, we constrain the ring age to less than about 200 million years.
8. A solitary wave is excited by the Janus-Epimetheus swap, when Janus moves inward every 8 years. This is evidence for non-linear dynamics, and may limit the application of previous conclusions based on a linear theory.
9. UVIS star and solar occultations quantify the profiles of aerosols, nitriles and organics in Titan's atmosphere; and show that Saturn's thermosphere breathes in and out. It was 'in' at the Grand Finale.
10. UVIS sees the auroral 'footprint' of Enceladus and also time varying arcs and spots that indicate magnetospheric variations. Bombarding charged particle radiation may explain the dark color of the polar hexagon.