



## Ions and nanograin dust in the Enceladus plume: Cassini/CAPS high resolution energy spectra

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During three Cassini encounters with Saturn's satellite, Enceladus, the spacecraft crossed through the plume of water vapor and dust south of the satellite with a spacecraft orientation which allowed the Cassini Plasma Spectrometer (CAPS) to observe ions and nanograin dust particles associated with the plume. These measurements were made on the E3 (March 12, 2008), E5 (October 9, 2008) and E7 (November 2, 2009) encounters. Analysis of these results, using data from the CAPS ion mass spectrometer (IMS) and electron spectrometer (ELS), found cold ions at rest with respect to Enceladus [1], negative water group and water cluster ions [2], and both positively and negatively charged dust particles in the 0.5 to 2 nm (1000 to 20,000 AMU) size range [3,4].

We present previously unreported observations from the third CAPS sensor, the ion beam spectrometer (IBS). This sensor measured the flux of positive ion and nanoparticle on the same three encounters discussed, above. The IBS measurements differ from those of IMS in several, complementary respects. The IBS data covers a more limited energy range (a factor of 67, rather than nearly four decades) and does not, in the mode used during the encounters, provide any angular resolution. It does, however, acquire energy spectra with 1.4% rather than 17% energy resolution at 2-second rather than 4-second time resolution. The IMS and IBS sensors are co-aligned, but the IBS sensor's field of view is a factor of five narrower. The IBS data allows us to estimate the temperature and flow speed of the cold ions, and characterize structure which is not resolved in the IMS data.

### References:

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