



## **Ion flows and composition in Titan's wake: Ion measurements from the December 26 Cassini encounter**

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On December 26, 2005, the Cassini spacecraft passed through the midplane of Titan's wake at a distance of 5.4 Titan radii downstream. Here we present the initial results from the Cassini Plasma Spectrometer's Ion Mass Spectrometer. The most striking features are the presence of two regions of heavy ions on either side of the geometric wake, and of hot protons in the center of the wake. The first region of heavy ions was observed 32-16 minutes before closest approach, at a distance of 2.29 to 0.2 Titan radii from the center of the geometric wake and on the side towards Saturn. In this region, time-of-flight mass spectra indicate the presence of several species with masses between 14 and 18 AMU and near 30 AMU and a small abundance of 2 AMU ions. Additional peaks in the spectra indicate the presence of carbon from heavy molecular ions. In the second region, a high abundance of 2 AMU ions was observed from +9 minutes (2.9 Titan radii from the center of the wake) until a spacecraft turn prevented ion measurements at roughly +30 minutes. No heavier species were observed in this region. In both cases, the ions were cool and slow-moving, with energies of order 10 and 50 eV respectively, in contrast to the  $\sim 1000$  eV protons measured between these regions.