

Abstract Submitted
for the APR17 Meeting of
The American Physical Society

Titan's Topside Ionospheric Composition: Cassini Plasma Spectrometer Ion Mass Spectrometer Measurements¹ EDWARD SITTLER, NASA Goddard Space Flight Center, RICHARD HARTLE, Retired, ASHRAF ALI, Science, Systems and Applications Inc., JOHN COOPER, NASA Goddard Space Flight Center, ALEXANDER LIPATOV, University of Maryland Baltimore County, DAVID SIMPSON, NASA Goddard Space Flight Center, MENELAOS SARANTOS, University of Maryland Baltimore County, DENNIS CHORNAY, University of Maryland College Park, TODD SMITH, Johns Hopkins Applied Physics Laboratory — We present ion composition measurements of Titan's topside ionosphere using both T9 and T15 Cassini Plasma Spectrometer (CAPS) Ion Mass Spectrometer (IMS) measurements. The IMS is able to make measurements of Titan's ionosphere due to ionospheric outflows as originally reported for the T9 flyby. This allows one to take advantage of the unique capabilities of the CAPS IMS which measures both the mass-per-charge (M/Q) of the ions and the fragments of the ions produced inside the sensor such as carbon, nitrogen and oxygen fragments. Specific attention will be given to such ions as NH₄⁺, N⁺, O⁺, CH₄⁺, C_xH_y⁺, and HCNH⁺ ions as examples. The CAPS IMS uses a time-of-flight (TOF) technique which accelerates ions up to 14.6 kV, so they can pass through ultra-thin carbon foils. Neutral fragments are used to measure the ion M/Q and positive fragments to measure the atomic components. We preliminarily find, by using IMS measurements of T9 and T15 ionospheric outflows, evidence for methane group ions, nitrogen ions, ammonium ions, water group ions and C_nH_m⁺ ions with n = 2, 3, and 4 within Titan's topside ionosphere.

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Sittler acknowledges support at Goddard Space Flight Center by the CAPS Cassini Project from JPL funds under contract NAS703001TONMO711123/1405851. Edward Sittler
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Date submitted: 30 Sep 2016

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