



Energetic neutral atom emissions associated with Titan: first Cassini observations

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Titan's nitrogen-rich atmosphere is directly bombarded by energetic ions, due to its lack of a significant intrinsic magnetic field. Singly-charged energetic ions from Saturn's magnetosphere undergo charge exchange collisions with neutral atoms in Titan's exosphere, being transformed into energetic neutral atoms (ENAs). The Ion and Neutral Camera (INCA), one of the three sensors that comprise the Magnetosphere Imaging Instrument (MIMI) on the Cassini/Huygens mission to Saturn and Titan, images the ENA emissions from various ion/gas interaction regions in the Saturnian magnetosphere. MIMI also directly measures the parent energetic ion population in situ along the Cassini trajectory, using the CHEMS and LEMMS ion sensors. During Cassini's second orbit around Saturn the spacecraft performed the Ta Titan flyby (October 26, 2004), at an altitude of only 1174 km. INCA data acquired during this targeted close flyby confirm model predictions of dominant finite ion gyroradii effects, but also reveal a much more complex interaction. The Tb Titan flyby (December 14, 2004) showed in addition a quite variable ENA output. These observations will be analysed and a simulation will be presented of some of the features they reveal.