

Observations of negatively-charged particles near Saturn's Main Rings during Saturn Orbit Insertion

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Abstract

On arrival at Saturn on 1 July 2004, the Cassini spacecraft passed to the north of Saturn's main rings, providing unique observations of the unusual plasma environment associated with them. The Cassini Plasma Spectrometer (CAPS) electron spectrometer (ELS) obtained in situ observations of electrons [1], whilst positive ions, primarily of oxygen, were observed by CAPS ion mass spectrometer (IMS) [2] and the Ion and Neutral Mass Spectrometer (INMS) [3]. Here, we present an extended analysis of the CAPS-ELS dataset, which reveals previously unreported signatures of several negatively-charged species in the vicinity of the main rings. These are interpreted as negative ions, as observed in other contexts in the Saturnian system, and charged dust. Also present is a magnetic field-aligned beam of electrons. We discuss the significance of these features for our understanding of the ring ionosphere and for the dust environment out of the equatorial plane.

References

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