

Contributed Talk

Splinter Plasma

SATURN'S RADIATION BELTS: A COMPREHENSIVE VIEW AFTER THE  
END OF THE CASSINI MISSION

E. Roussos<sup>1</sup>, P. Kollmann<sup>2</sup>, N. Krupp<sup>1</sup>, C. Paranicas<sup>2</sup> and Cassini's MIMI  
team

<sup>1</sup>*A. Max Planck Institute for Solar System Research, Goettingen, Germany*

<sup>2</sup>*B. John's Hopkins Applied Physics Laboratory, Laurel, Maryland, USA*

The Cassini MIMI instrument suite and its energetic particle detector LEMMS have been exploring Saturn's radiation belts since July 2004, completing more than 220 crossings through them until the end of the mission, which occurs on September 15 of 2017. Besides constructing detailed radiation belt maps, this extensive survey allowed us also to capture the system's dynamics and its characteristic time scales of variability, revealing also the source processes associated with the production, acceleration and loss of MeV electrons and ions. Furthermore, we found that measurements in the radiation belts can be diagnostic for the global state of Saturn's magnetosphere and for geophysical aspects of the planet's moon and ring system. In this review talk, only few days after the plunge of Cassini into Saturn's atmosphere, we summarise the major findings resulting from MIMI/LEMMS observations in the planet's radiation belts, focusing on the MeV particle populations. We show that the structure and dynamical evolution of the electron and ion components of the radiation belts is weakly coupled and how the study of each component provides different insights into the magnetosphere, the planet, its moons and rings. We will also present some of the early, exciting findings from Cassini's Proximal Orbits, focusing particularly on the origin of energetic particles inside the D-ring and what the final measurements of the MIMI instrument revealed deep in Saturn's atmosphere and before the loss of signal from the spacecraft.