Geophysical Research Abstracts
Vol. 21, EGU2019-6614, 2019
EGU General Assembly 2019

Characterizing Jupiter's energetic (>15 MeV) particle environment with the Juno MAG investigation's micro Advanced Stellar Compass

Peter S. Jørgensen (1), John L. Jørgensen (1), Matija Herceg (1), Troelz Denver (1), Mathias Benn (1), Jack E. Connerney (2,3), Heidi N. Becker (5), Scott J. Bolton (4), and Steven M. Levin (5)

(1) Technical University of Denmark, DTU Space, Measurement and Instrumentation Systems, Kgs. Lyngby, Denmark, (2) Space Research Corporation, Annapolis, MD, United States, (3) NASA Goddard Space Flight Center, Greenbelt, MD, United States, (4) Southwest Research Institute, San Antonio, TX, United States, (5) Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA, United States

NASAs Juno mission entered into polar orbit about Jupiter on July 4th, 2016. Since then 17 science orbits have been completed, systematically mapping the 3D magnetosphere of Jupiter for the first time. Located on the tip one of Juno's three solar arrays, the Magnetic Field Experiment carries an absolute attitude reference sensor, the fully autonomous "micro Advances Stellar Compass" (μASC) designed and built at the Technical University of Denmark.

In addition to its primary attitude sensing function, the μASC has a broad range of advanced observational capabilities made possible by its processing power, memory storage, and versatile design. These include optical imaging of solar system bodies as well autonomous detection and tracking of objects passing through the instrument field of view, a capability gainfully employed to characterize hypervelocity dust impacts on the spacecraft. In addition to these optical capabilities, the μASC on Juno is capable of detecting high energy particles (>15MeV electrons and 100MeV protons) that penetrate the heavily shielded optical head of the instrument to be sensed by the imaging sensor (CCD). The μASC is programmed to record the number of such energetic particles detected in each $\frac{1}{4}$ second, yielding a nearly continuous record of the energetic particle environment traversed by Juno. The observed particle flux distribution provides an excellent in-situ measurement of the global particle environment and its interaction with the moons of Jupiter. We give an overview of the highly energetic particle population, the interaction with the Jovian moons, and the footprints left in the Jovian atmosphere by the Galilean satellites.