Observations of MeV electrons in Jupiter's innermost radiation belts and polar regions by the Juno radiation monitoring investigation: Perijoves 1 and 3

Juno's "Perijove 1" (27 August 2016) and "Perijove 3" (11 December 2016) flybys through the innermost region of Jupiter's magnetosphere (radial distances <2 Jovian radii, 1.06 RJ at closest approach) provided the first in situ look at this region's radiation environment. Juno's Radiation Monitoring Investigation collected particle counts and noise signatures from penetrating high-energy particle impacts in images acquired by the Stellar Reference Unit and Advanced Stellar Compass star trackers, and the Jupiter Infrared Auroral Mapper infrared imager. This coordinated observation campaign sampled radiation at the inner edges of the high-latitude lobes of the synchrotron emission region and more distant environments. Inferred omnidirectional >5 MeV and >10 MeV electron fluxes derived from these measurements provide valuable constraints for models of relativistic electron environments in the inner radiation belts. Several intense bursts of high-energy particle counts were also observed by the Advanced Stellar Compass in polar regions outside the radiation belts.