



Energetic Particles in Mercury's Magnetosphere During MESSENGER's Flybys

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The MESSENGER spacecraft last year made the first direct observations of Mercury's magnetosphere in the more than 30 years since the Mariner 10 encounters. During MESSENGER's first flyby on 14 January 2008, the interplanetary magnetic field (IMF) was northward immediately prior to and following MESSENGER's equatorial passage through this small magnetosphere. The Energetic Particle Spectrometer (EPS), one of two sensors on the Energetic Particles and Plasma Spectrometer (EPPS) instrument that responds to electrons from ~ 35 keV to ~ 1 MeV and ions from ~ 35 keV to ~ 3 MeV, saw no increases in particle intensity above instrumental background (~ 5 particles/cm²-sr-s-keV at 45 keV) during its entire magnetospheric passage. Moreover, during MESSENGER's second flyby on 6 October 2008, when there was a steady southward IMF and intense reconnection was observed between the planet's magnetic field and the IMF, EPS still did not observe large bursts of energetic electrons such as those reported by Mariner 10 from its 1974 encounter. MESSENGER's X-Ray Spectrometer (XRS), however, did report low-energy (~ 10 keV) electrons impinging on its detectors during both flybys. In this paper, we will summarize the energetic particle observations made by EPS and XRS from MESSENGER, and we will also revisit the observations made by Mariner 10 in the context of these new results.