

## **Energetic Particles in Mercury's Magnetosphere during the First Two MESSENGER 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 Particle 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/cm<sup>2</sup>-sr-s-keV at 45 keV) at any time during its magnetospheric passage. During MESSENGER's second flyby on 6 October 2008, there was a steady southward IMF and intense reconnection was observed between the planet's magnetic field and the IMF. However, once again EPS saw no large bursts of energetic electrons similar to those reported by Mariner 10 from its 1974 encounter. MESSENGER's X-Ray Spectrometer (XRS) nonetheless observed a signature of low-energy (~10 keV) electrons impinging on its detectors during both flybys. Supra-thermal plasma electrons below the EPS energy threshold may have caused the Bremsstrahlung seen by XRS as well as the Mariner 10 "burst". In this paper, we summarize the energetic particle observations made by EPS and XRS from MESSENGER, and we revisit the observations reported by Mariner 10 in the context of these new results.