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Dynamics of Energetic Electrons in Mercury's Magnetosphere

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MESSENGER entered into orbit about Mercury on March 18, 2011, and began its primary one-year mission at the innermost planet of our solar system. From the start of science operations shortly after orbit insertion, the Energetic Particle Spectrometer (EPS), one of two sensors on the Energetic Particle and Plasma Spectrometer (EPPS) instrument that measures electrons from $\sim$ 35 keV to $\sim$ 1 MeV energy detected extensive low-energy (hundreds of keV) electron bursts on nearly every orbital pass. However, there have since been times when electrons were not observed for several days, and other times when such bursts were observed regularly over several weeks. Now that MESSENGER has sampled most Mercury longitudes, it is evident that that these low-energy electrons are present at all longitudes near the planet, and most events are seen near local noon and midnight. These locations provide important constraints on possible source processes. Multiple examples of detailed magnetic field measurements together with modeled solar wind conditions upstream of Mercury's magnetosphere provide a basis for exploring the characteristics of these events and their possible causes.