



The Energetic Particle Spectrometer (EPS) on MESSENGER

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NASA's MESSENGER mission to the planet Mercury includes a comprehensive set of advanced instruments. Launched on August 3, 2004, MESSENGER successfully completed two planetary flybys and more than two years of interplanetary cruise. In June 2007, MESSENGER will encounter Venus for the second time with all instruments taking calibration data at that planet. Among these instruments, the Energetic Particle Spectrometer (EPS), one of two sensors for the Energetic Particle and Plasma Spectrometer (EPPS) instrument, is scheduled to commence full operational check-out before the encounter and will remain on during and after the flyby. EPS is a hockey-puck-size, time-of-flight (TOF) spectrometer that measures ions and electrons over a broad range of energies and pitch angles. Particle composition and energy spectra will be measured for H to Fe from ~ 15 keV/nucleon to ~ 3 MeV/nucleon and for electrons from 15 keV to 1 MeV. The EPS concept was developed with the support of a NASA Planetary Instrument Definition and Development (PIDDP) grant aimed at designing a low-mass, low-power sensor that can measure energetic particles, including pickup ions produced near planets and comets. Here we discuss the energetic particle environment of Mercury as measured by the Mariner 10 spacecraft and how that information guided EPS design. Early in-flight data will be shown for an interplanetary shock detected by EPS on MESSENGER at 0.9 AU as it propagated toward Earth and by the Advanced Composition Explorer spacecraft at 1 AU.