

Mercury's magnetosphere fends off the solar wind

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Artist's concept of the NASA's MESSENGER spacecraft at Mercury. Credit: NASA

The planet Mercury's magnetic field appears to be strong enough to fend off the harsh solar wind from most of its surface, according to data gathered in part by a University of Michigan instrument onboard NASA's MESSENGER spacecraft.

U-M's Fast Imaging Plasma Spectrometer (FIPS) on Jan. 14 took the first direct measurements of Mercury's magnetosphere to determine how the planet interacts with the space environment and the Sun.

The solar wind, a stream of charged particles, fills the entire solar

system. It interacts with all planets, but bears down on Mercury, 2/3 closer than the Earth to the Sun.

Earth's magnetosphere is strong enough to protect us from the solar wind's radiation, but Mercury's magnetic field is comparatively weaker.

"From our magnetic measurements, we can tell that Mercury is managing to stand up to a lot of the solar wind and protect the surface of the planet, at least in some spots. Even though the magnetic field was weak, it was enough," said Thomas Zurbuchen, FIPS instrument project leader and a professor in the U-M Department of Atmospheric, Oceanic and Space Science.

Zurbuchen said scientists can tell Mercury is putting up a good fight because instruments detected a layer of much slower-moving magnetospheric plasma around the planet.

It's possible that the magnetosphere shield has holes. Scientists found ions in the magnetosphere that may have been knocked off the surface by the solar wind at the poles, for example. The source and chemical composition of the ions is still unclear, Zurbuchen said. The particles could also be from the planet's thin atmosphere.

"Mercury's magnetosphere is more similar to Earth's than we might have thought," Zurbuchen said.

The spacecraft did find one major difference. Mercury has no Van Allen Belts, wing-shaped regions of energetic particles trapped by Earth's magnetic field.

"We flew through the region they would be in and they just weren't there," Zurbuchen said. "It could be that they're intermittent, but when we were there, they weren't."

Mercury and Earth are the only two terrestrial planets in the solar system with magnetospheres produced by an intrinsic magnetic field

This was the first of three planned flybys of Mercury. MESSENGER is scheduled to enter orbit in 2011.

View Movie: www.nasa.gov/mov/209705main_Pr...ckter08Departure.mov

Source: University of Michigan

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