

Venus found to have aurora type magnetotails

6 April 2012, by Bob Yirka



Venus. Photo courtesy of NASA

(PhysOrg.com) -- Researchers studying the planet Venus have found that despite a lack of a magnetic field, the planet has magnetotails, which on Earth are part of the process known as the Northern and Southern Lights. This, as the team describes in their paper published in *Science*, is due to the solar wind interacting with the planet's ionosphere.

On Earth and other planets that do have a magnetic field, solar wind is deflected by the magnetism that surrounds the planet into the [magnetosphere](#) causing magnetic lines of force to break and reconnect, resulting in the show of lights in the [night sky](#) called an aurora. This process known as magnetic reconnection also causes the creation of magnetotails, or elongated stretches of the magnetosphere on the lee side of planets. This new research shows that Venus too has such magnetotails, though the process of their creation is different.

In analyzing data obtained from Venus Express, the probe sent by the [European Space Agency](#), the researchers found that on Venus, the solar wind reacts with the ions in its [ionosphere](#) and in one instance resulted in what they describe as a magnetic plasma bubble stretching for some 2100 miles and lasting for just over a minute and a half. This they say is also an example of magnetic reconnection, albeit, one of a different kind.

For years, researchers have puzzled over mysterious flashes of light coming from Venus, and some have even speculated that they might be caused by magnetic reconnection, but until now lacked evidence. This new research adds strong credence to that theory and may also explain how some comet tails manage to disengage from their heads.

As for whether the light generated by such instances of [magnetic reconnection](#) on Venus can truly be called an aurora, that remains up for debate. On Earth the Northern and Southern lights, also known as [aurora borealis](#) and aurora australis are named after the Roman goddess of dawn and thus are not tied to any specific scientific phenomenon, so it wouldn't seem to be a stretch to use the same term for a similar effect discovered on another planet.

More information: Magnetic Reconnection in the Near Venusian Magnetotail, *Science* [DOI: 10.1126/science.1217013](#)

ABSTRACT

Observations with the Venus Express magnetometer and low-energy particle detector revealed magnetic field and plasma behavior in the near-Venus wake symptomatic of magnetic reconnection, a process that occurs in the Earth's magnetotail but is not expected in the magnetotail of a non-magnetized planet like Venus. On 15 May 2006, the plasma flow in this region was toward the planet and the magnetic field component

transverse to the flow was reversed. Magnetic reconnection is a plasma process that changes the topology of the magnetic field and results in energy exchange between the magnetic field and the plasma. Thus, the energetics of the Venus magnetotail resembles that of the terrestrial tail where energy is stored and later released from the magnetic field to the plasma.

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