

## Solar Wind Challenge: Two BU Astronomers Research Profs Will Debate Differing Theories Of Origin

## May 26 2008

The solar wind -- a stream of electrically-charged particles and magnetic fields that blows outward from the sun and streams past Earth and through the solar system in all directions at speeds of a million miles per hour -- continues to baffle scientists 50 years after its initial discovery.

Just what fuels the solar wind that buffets the Earth's atmosphere and can, under certain circumstances, disrupt satellites, power grids and communications? Is the outflow of matter driven by powerful waves emitted from the Sun's surface or from its hot, bright magnetic loops?

The answers are a vital step toward improving forecasts of solar windinduced hazards and gain a better understanding of stellar winds in general. But researchers are divided on solar wind theory and these questions will be the subject of a unique debate between two Boston University research professors. They are Nathan Schwadron, Associate Professor of Astronomy and Nancy Crooker, Research Professor, Center for Space Physics.

Each will present opposing points of view at a press conference on Wednesday, May 28th at the American Geophysical Union's four-day 2008 Joint Assembly at the Greater Fort Lauderdale-Broward County Convention Center in Ft. Lauderdale, Florida. Billed as the "Solar Wind Challenge," the event will also honor Eugene Parker, who 50 years ago first proposed the solar wind's existence. He is Distinguished Service



Professor Emeritus at the Departments of Physics and Astronomy & Astrophysics at the University of Chicago's Enrico Fermi Institute. Parker will offer perspective and commentary on the differing views.

Crooker will present the views of Steven Cranmer, Astrophysicist at the Harvard-Smithsonian Center for Astrophysics, who maintains a widelyaccepted position that is an extension of Parker's solar wind model. It has been sustained by U.S., European and Japanese researchers who point to recent space images and measurements taken from a Japanese earth orbiting space telescope, called Hinode (or "sunrise") which helped astronomers gain clues to the mechanisms heating the carona and the acceleration of the solar wind. The collected data revealed that contrary to expectations, turbulence and waves, which can provide energy for the solar wind, extend all the way down to the Sun's surface. (The actual existence of the solar wind was confirmed in 1962 followed in the 1970s by satellite images of the solar wind escaping primarily through coronal holes, which are found near the Sun's poles.)

Schwadron believes that the properties of the two predominant types of solar wind, one traveling faster than the other, are determined by the loops from which the wind is formed. The slower wind has high concentrations of iron, silicon, magnesium while the faster one has less metal content. Schwadron argues that this "genetic" signature of solar wind can be traced all the way to the sources of the wind in the Sun's magnetic loops. He also relies on the information from the Hinode spacecraft which observed and measured the rapidly varying loops of the Sun's outer layers. The orbiting spacecraft's pictures showed magnetic fields linking two bright spots on the sun that were 311,000 miles apart. When these powerful, swirling magnetic fields collided into each other, charged gases spewed out in all directions forming the solar wind.

Each is expected to cite similar data but interpret the information differently.



"I think in the end, we will understand the solar wind as a synthesis of the two views," said Crooker.

Source: Boston University

Citation: Solar Wind Challenge: Two BU Astronomers Research Profs Will Debate Differing Theories Of Origin (2008, May 26) retrieved 4 May 2024 from <u>https://phys.org/news/2008-05-solar-bu-astronomers-profs-debate.html</u>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.