

Solar wind



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Solar Wind Using the satellite, scientists have observed tiny turbulent swirls in the Sun. This refers to the solarwind, which according to Matthaeus describes a stream made up of charged particles that would be released from the Sun's upper atmosphere and vary in speed, density and temperature over time. The solar wind contains protons and electrons, usually with energy ranging from 1.5 to 10 keV that would escape the gravity of the Sun due to the high temperature and kinetic energy at the corona which cause a larger outward pressure, much more than the gravitational inward pull. This would result in the gas from the corona, in its several million degrees, streaming away from the Sun at a speed much higher than the escape speed. The wind, being a plasma flow of high speed would carry along trapped magnetic fields. The solar wind would create the heliosphere described by Zeilik (265) as a massive bubble existing in the interstellar medium surrounding the Solar System. The heliosphere, at the solar minimum would be dominated by high latitude fast solar wind, but the slow variable wind emanating from all latitudes would dominate at and when approaching the solar.

As the solar wind would be flowing away from the Sun to fill the heliosphere, it would interact with solar system bodies, including planets in various complex ways. The nature of interaction would be determined with whether the target has generated magnetic field internally such as the Earth, Mercury and other giant outer planets or not such as the comets, the Moon, Venus and Mars. According to Zeilik (265), the solar wind whips at typically 500 km/s at the orbit of the earth with the speed varying because the wind blows in gusts. The said particles, electrons and protons would take 5 days to travel from the Sun to the Earth. As the earth swims through the resultant solar

spray, Matthaeus notes that it would catch some of the particles of the solar wind in its magnetic field leading to the creation of its magnetosphere.

The solar wind's plasma, travelling as far as 100 AU, much farther than the orbit of Pluto would carry along with it remnants of the magnetic field of the Sun. It is this transported field that Zeilik (265) attributes to the formation of the magnetic field that exists between planets. This field would interact with comets forming tails, and with planets forming magnetospheres. The comets' plasma tails and the aurorae have been noted to point away from the sun. The interaction of the solar winds with the magnetosphere through the temporary merger between terrestrial and interplanetary magnetic fields would stir and energize magnetospheric plasmas causing magnetic energy to be periodically and explosively released, referred to as magnetospheric substorms by Matthaeus. This results in the injection of billions of power watts into the upper atmosphere giving a display of aurora borealis and australis. Nonetheless, this beauty of the auroras could occur with less pleasant phenomena during extreme magnetospheric disturbance that could cause disruption in navigation, communication and power transmission.

Works Cited

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