"Numerical Modeling of Field-aligned Solar Wind Streams"

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Abstract

The transonic solar wind that emanates from the surface of the sun is a critical area of research in solar and heliospheric science. Its properties are broadly understood in the aggregate, and yet the fundamental physic processes that are responsible for heating and accelerating the solar wind are not. For example, it is known that solar wind streams are broadly grouped into two types, the fast solar wind (FSW) and the slow solar wind (SSW), and yet very little is known about the detailed dynamics that lead to this bimodal behavior.

In this talk I present the results of two recent studies focused on modeling the effects of 1) interchange reconnection and 2) enhanced foot-point heating, both of which have been suggested as mechanisms for reducing the speed of the SSW relative to the FSW. These results afford us new insights into the dynamic evolution of solar wind streams, so that we can better understand the observational effects of the various physical processes that are at work in the solar corona, and how these impact the surrounding heliosphere.