Abstract Submitted
for the DPP15 Meeting of
The American Physical Society

A Model of the Heliosphere with Jets JAMES DRAKE, MARC SWISDAK, University of Maryland, College Park, MERAV OPHER, Boston University — The conventional picture of the heliosphere is that of a comet-shaped structure with an extended tail produced by the relative motion of the sun through the local interstellar medium. Recent magnetohydrodynamic (MHD) simulations of the heliosphere have revealed that the heliosphere drives magnetized jets to the north and south similar to those driven by the Crab Nebula. That the sun's magnetic field can drive such jets when $\beta = 8\pi P/B^2 \gg 1$ in the outer heliosphere is a major surprise. An analytic model of the heliosheath (HS) is developed in the limit in which the interstellar flow and magnetic field are neglected. The heliosphere in this limit is axi-symmetric and the overall structure of the HS is controlled by the solar magnetic field even for very high β. The tension of the solar magnetic field produces a drop in the total pressure between the termination shock and the HP. This same pressure drop accelerates the plasma flow into the north and south directions to form two collimated jets. MHD simulations of the global heliosphere embedded in a stationary interstellar medium match well with the analytic model. Evidence from the distribution of energetic neutral atoms from the outer heliosphere from IBEX and CASSINI supports the picture of a heliosphere with jets.

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Date submitted: 23 Jul 2015 Electronic form version 1.4