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Effect of the Interstellar Magnetic Field on the Termination Shock: Explaining the Voyager 1 Results PAULETT LIEWER, MERAV OPHER[1], Jet Propulsion Laboratory, California Institute of Technology, E. C. STONE, California Institute of Technology, Pasadena, CA — After a 27 year journey, Voyager 1 crossed the solar wind termination shock, the first boundary separating the solar system from the rest of the galaxy, and is now exploring the heliosheath. In 2002, before crossing the shock, Voyager 1 observed strong beams of energetic particles coming outward along the spiral magnetic field, the opposite of the direction expected for particles accelerated at the shock. This can be explained if the shock is non-spherical so that the interplanetary magnetic field lines cross the shock into the heliosheath and then reenter the solar wind before reaching Voyager 1. This configuration has been invoked recently (Jokipii et al., 2004; Stone et al., 2005) to explain how Voyager 1 can detect energetic particles accelerated at the shock several years before crossing it. Using 3D MHD models of the global heliosphere, we show that the termination shock is, in fact, non-spherical due the distortion caused by an inclined interstellar magnetic field. We use values for the direction of the interstellar magnetic field based on observations and show that the shape of the termination shock depends strongly on the direction of the interstellar magnetic field.

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