

Voyager's exploration of the heliosheath

E. Stone

California Institute of Technology, USA (ecs@srl.caltech.edu)

In December 2004 at 94 AU, Voyager 1 crossed the inward moving termination shock of the supersonic solar wind and began exploring the heliosheath. In mid-2006, Voyager 1 will be at 100 AU and ~ 10 AU downwind of the shock. The magnetic field sector structure is more extended and the radial flow slower than expected, and the turbulence differs from that in the supersonic solar wind. Contrary to expectations, the anomalous cosmic rays did not peak at the shock, leading to new suggestions for their origin. However, the shock near Voyager is a source of low energy ions with properties that have raised new questions about shock acceleration. These termination shock particles were first observed at 85 AU when Voyager 1 was ~ 4 AU upstream of the shock, requiring an inward distortion of shock. Voyager 2 began observing upstream particles at 76 AU, indicating that the shock is 7 to 9 AU closer to the Sun in the southern hemisphere than at Voyager 1 in the north, consistent with an asymmetric distortion of the heliosphere by the local interstellar magnetic field. As a result, Voyager 2, which will be at 80 AU in mid-2006, may cross the termination shock in the next two years, joining Voyager 1 in exploring the heliosheath and what lies beyond.