



Results on the shock waves extension by using Helios-1, 2 data: a statistical analysis

A. de Lucas (1,2), R. Schwenn (2), E. Marsch (2), A. Dal Lago (1), A. C. de Gonzalez (1)

(1) Instituto Nacional de Pesquisas Espaciais, São José dos Campos, São Paulo, Brazil, (2)
Max-Planck-Institut für Sonnensystemforschung, Katlenburg-Lindau, Germany
(delucas@dge.inpe.br / Fax: +55 12-39456810 / Phone: +55 12-39456838)

The two Helios probes traveled at variable longitudinal and radial separations through the inner heliosphere. They collected most valuable high resolution plasma data for more than 11 years. A set with more than 390 shock waves driven by Interplanetary Coronal Mass Ejections (ICMEs) was identified. Combining the data from both probes, we make a statistical study for the extension of the shock waves in the interplanetary medium. For longitudinal separations of 90° we found a cutoff value at this angular separation. A shock has about 50% of chance to be observed by both probes and approximately the same probability for not being observed by two spacecrafts at the same time, when the angle between them is around 90° . We describe how with decreasing separation the chance for shocks to be observed by both probes grows. Including plasma data from the ISEE-3 and IMP-8 spacecrafts, improves our statistical evaluation substantially.