

Propagation of coronal mass ejections in the inner heliosphere - IPS measurements for the 2003 November 2 event

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Interplanetary scintillation (IPS) measurements made with the Solar-Terrestrial Environment Laboratory (STEL) four-station system were analyzed to investigate propagation of the 2003 November 2 halo CME between the sun and the earth orbit. This CME was detected by our IPS observations for two observation periods of November 2-3 and November 3-4. We determined the 3D distribution of density enhancements associated with this CME from our IPS observations to estimate propagation speeds of the CME. The propagation speed derived from the first scan IPS data is as fast as that observed in the corona, and this fact suggests that no significant deceleration of the CME took place within ~ 0.5 AU. In contrast, the propagation speed derived from the second scan IPS data is rather slow, nearly equal to the average speed of the IP shock associated with this CME. This speed requires unrealistically large and rapid deceleration of the CME, if we connect between the first and second scan data. Furthermore, it is found that the morphology of turbulence enhancement region deduced from the first scan data is greatly different from that deduced from the second scan data. The first and second scan data suggest the shell-shaped and loop-shaped structures, respectively. Thus, we consider that the first and second scan IPS data may represent different portions of the CME system, which propagate at different speeds.