

Effects of the IMF disturbance on the magnetosheath: comparison of the one-dimensional study with the observation

Sun-Mie Park¹, Kyoung-Wook Min^{1,2}, and Jongho Seon²

¹Department of Physics, KAIST

²Satellite Technology Research Center, KAIST

One dimensional magnetohydrodynamic simulation study is carried out for the interaction of the solar wind with the bow shock when the interplanetary magnetic field is disturbed. The upstream magnetic field is perturbed for one hour interval, following the upstream WIND data on 3 January 1996. It is seen that various forward and backward wave modes are generated in the downstream of the solar wind. Large fluctuations are formed behind the bow shock as a result of the superposition of these waves, but they subside later as the waves propagate down with their own characteristic speeds. The density fluctuations are generally anti-correlated with the magnetic field intensity, representing the signature of the slow modes. The results are compared with the GEOTAIL data observed in the magnetosheath.