

MHD simulation of the interaction of the heliosphere with a magnetized local interstellar medium

Seiichiro Nii[1]; Yasuto Kajiwara[2]; Keiichiro Fukazawa[3]; Tatsuki Ogino[2]

[1] STE Laboratory, Nagoya Univ; [2] STEL, Nagoya Univ.; [3] STEL, Nagoya Univ

The flow of supersonic solar wind plasma with a spiral interplanetary magnetic field (IMF) is continuously blowing off in the interplanetary space. The fundamental structure of heliosphere is determined by interaction of the solar wind plasma with a local interstellar medium. This process may be also influenced by interplanetary magnetic field and interstellar magnetic field.

At about 100AU distance from the sun the solar wind is slowed down from supersonic to subsonic through the termination shock. Moreover, bow shock is formed in the outside and heliopause as a boundary of the local interstellar medium and the solar wind plasma is formed between the two shocks.

In this study we have carried out the 3-dimensional global magnet hydrodynamics (MHD) simulation to investigate the structure of heliosphere. We solved MHD and Maxwell equations as an initial-boundary value problem using the Modified Leap-Frog method which is one of the high precision numerical methods.

We got the fundamental structure of heliosphere which is composed of the bow shock, heliopause and termination shock.