

Three-dimensional structure and dynamics of the solar wind with rotation of the Sun

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It is well known from Parker model that the solar wind becomes supersonic beyond a critical radius. The 2-D structure was given by several simulation studies. In the present study, it is extended to the 3-D when a spherically symmetric 1-D solution by Parker is used as an initial state. By using this model, we can investigate physically complex phenomena more detail. We use a dipole magnetic field as the initial conditions of the solar wind. The 3-D structure of the solar wind has been simulated by using a global MHD model and the Parker spiral configuration has been demonstrated. At that time, magnetic field lines enter the Earth's revolution orbit with an angle of 45 degrees. In addition, we use a split dipole magnetic field in place of dipole magnetic field as the initial conditions to study configuration of the current sheet.