MHD SIMULATION OF THE GLOBAL SOLAR CORONA AND THE SOLAR WIND

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We describe the latest applications of our global three-dimensional magnetohydrodynamic (MHD) model of the solar corona and the solar wind. The model uses boundary conditions based on observed photospheric magnetic fields. It has been used in the simplified, "polytropic" approximation of the energy equation to study the geometrical and topological properties of the magnetic field (e.g., the location and evolution of corona holes, the reproduction of streamer structure, the location of the heliospheric current sheet, etc.). However, this approximation does not reproduce the density and temperature contrasts between open and closed field regions and does not address data from EUV and X-ray emission. Our improved MHD model that includes energy transport (radiative losses, anisotropic thermal conduction, and coronal heating) in the transition region and solar corona is capable of reproducing many emission properties as observed by SOHO and Hinode.

MHD, solar corona, solar wind

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