Modeling Solar Wind Mass-Loading Due to Dust in the Vicinity of the Sun

Anthony Rasca and Mihály Horányi
Laboratory for Atmospheric and Space Physics, University of Colorado at Boulder

Collisionless shocks due to mass-loading were first discussed to describe the solar wind flow around a cometary atmosphere, showing its choking effects on the flow. Recent observations have led to an increased interest in mass-loading occurring in the solar corona, due to sun-grazing comets and also due to collisional debris production by sunward migrating interplanetary dust particles. Using one-dimensional simulations with a hydrodynamic model we have shown the impact on the solar wind from abrupt mass-loading in the coronal region. Full three-dimensional MHD simulations using the Block-Adaptive- Tree-Solarwind-Roe-Upwind-Scheme (BATS-R-US) accomplish more to mimic specific events applicable to modeling the mass-loaded coronal wind caused by the presence of a sun-grazing comet, for example.