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MHD simulation of the solar wind interaction with the magnetosphere of Mercury

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We show MHD simulations of the solar wind interaction with the magnetosphere of Mercury. We use the open source codes Pluto and MPI-AMRVAC in 3 dimensional spherical geometry. In order to appreciate the limits of the MHD approach in the context of Mercury's environment we do first compare our simulations with hybrid simulation (e.g. Trávníček et al, Icarus, 209, pp 11–22, 2010). We do also compare magnetic field profiles from the magnetometer on Messenger with profiles sampled along the corresponding spacecraft trajectory in the simulations. These comparisons show that despite the lack of kinetic effects, MHD simulation provide a more than fair description of the interaction of the solar wind with Mercury at low computational cost making it a useful tool to help decrypt data from current and future exploratory missions in the hermean magnetosphere (e.g. Bepi Colombo-MMO).

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