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PEM026-P07

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A new numerical method for simulating the solar wind Alfvén waves: Development of the Vlasov-MHD model

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A novel scheme of plasma simulation, particularly suited for computing the one-dimensional non-linear evolution of parallel propagating solar wind Alfvén waves is presented. The scheme is based on the Vlasov and the MHD models, for solving the longitudinal and the transverse components, respectively. As long as the nonlinearity is not very large (so that the longitudinal and transverse components are well separated), our Vlasov-MHD model can correctly describe evolution of finite amplitude quasi-parallel Alfvén waves, which are typical in the solar wind, both in the linear and nonlinear stages. The present model can be applied to discussions of phenomena where the quasi-parallel Alfvén waves play major roles, for example, the solar coronal heating and solar wind acceleration by the Alfvén waves propagating from the photosphere.

Keywords: Vlasov simulation, solar wind, Alfvén wave