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<Abstract in the text format>

Example:

Modeling axially symmetric heliosphere with an adaptive MHD-kinetic code.

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The problem of the interaction of the solar wind with the local interstellar medium can be modeled in different ways. First approach consists of solving hydrodynamic and MHD equations. The key question is how to correctly describe neutrals behavior since the complicated charge-exchange process between plasma and neutrals must be taken into account. A single fluid can not provide an accurate description of neutral hydrogen since their mean free path is much larger than characteristic length scale of the problem. To address this issue the multifluid approach was proposed where heliosphere is divided into regions and neutral distribution is split into populations and certain distribution function for each population is assumed (usually Maxwellian). It allows modeling each population by solving gas-dynamic equations.

Second way is employing kinetic approach where neutrals are treated by solving Boltzmann equations using Monte Carlo method and coupled self-consistently to MHD model of the solar wind and LISM plasma. This approach gives much more accurate description of the problem.

We combined axially symmetric MHD model of the heliosphere based on high –resolution shock capturing methods and adaptive mesh refinement techniques with kinetic code. We will present some details of code integration and numerical results of simulations.