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A new approach to magnetosheath - cusp interface modeling

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We report an attempt for numerical modeling of the magnetopause indentation, formed by the magnetosheath - cusp interaction. Our attempt is based on a new numerical magnetosheath - magnetosphere model, developed in the Institute of Mechanics, Sofia. The model includes, in a self-consistent modular approach, the models of the magnetosheath and the magnetosphere. The latter is a hybrid between data-based magnetospheric current system and numerically obtained magnetopause shielding current system. A simplified gasdynamic approach is applied for the

magnetosheath. The positions and the shapes of the bow shock and the magnetopause are determined self-consistently as a part of the numerical procedure, based on the pressure balance. The substantial difference of the processes, responsible for the pressure formation inside and outside magnetopause indentations over cusps, poses difficulties of the problem solution for the closed magnetosphere. We discuss the considered problem in the light of CLUSTER and Interball data. Both magnetopause normals and plasma decelerations into the over-cusp indentation can be accounted in the frame of the model, along with the magnetopause shape dependence on the geomagnetic dipole tilte. We relay the over-estimated model flux in magnetosheath with the recently reported accelerated plasma jets, moving with the magnetosheath flow.