A multi-fluid MHD Model for Sun-grazing comets

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Cometary plasma has been modeled with numerical codes for decades, to study its shock, contact surface and tail under nominal solar wind conditions. Recently, comets have been observed under very different conditions, the lower corona. This region contains plasma, orders of magnitude denser, and much stronger field. The cometary molecules are ionized much faster as well. Tail activity has been observed, providing a new way to study the plasma in coronal loops. In this study we model the charging-balanced cometary plasma, and its interaction with the lower corona. We simulate the momentum exchange between solar corona plasma and the cometary ions. Typical structures of the coronal field are studied to observe their effects on the tail, and to model the observed tail activity.