Global Hybrid Simulations: Ion Foreshock Morphology

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Global hybrid simulations are a very powerful tool to study the region of solar wind interaction with earth's magnetosphere. This approach provides a collective picture of processes in the foreshock, bow shock and magnetosheath, taking in account micro-scales, i.e. kinetic effects. In the absence of collisions kinetic effects play a major role in dissipation processes and affect greatly the large scale dynamics of the system. In this work we use study solar wind coupling with the magnetosphere for different IMF orientations. We also study the properties and evolution of various foreshock structures such as ULF waves and cavitons, and the impact that they can have on the bow shock. Our results are compared with observations.