



Hybrid simulations of mirror instability and waves

Hybrid simulations of mirror instability and waves

C.-K. Chang¹ and L.-N. Hau^{1,2}

¹Department of Space Science and Engineering, National Central University, Taoyuan City, Taiwan R.O.C.

²Department of Physics, National Central University, Taoyuan City, Taiwan R.O.C.

Mirror instability is one of the most profound plasma instabilities occurring in space environments and laboratory experiments. In recent years we have analyzed the properties of mirror waves observed in the terrestrial magnetosheath. Using the observed plasma and magnetic field data we have obtained the quantitative phase relationships between plasma density, temperatures and magnetic field. The results are found to be in high agreements with the linear kinetic theory (Hau and Chang 2020). In this study we present the hybrid particle simulations of mirror instabilities with the focus on the phase relationships. It is shown that the observational results in terms of the phase relationships may quantitatively be reproduced by the kinetic simulations which are also consistent with the linear theory.