

Modified two-stream instability in a transition region of a supercritical quasi-perpendicular shock

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It is known that a variety of micro-instabilities get excited in a transition region of a super critical quasi-perpendicular shock wave. Especially, the modified two-stream instability (MTSI) is important since its linear growth time is shorter than the time scale of a shock self-reformation in a wide parameter regime.

We have discussed basic properties of the MTSI and its influence on global structure of shocks by means of a one dimensional full particle simulation code. According to linear analysis, the growth rate of the MTSI strongly depends on a propagation angle relative to the ambient magnetic field. Furthermore, two MTSIs possibly coexist because of existence of incoming and reflected ion beams. In this study, therefore, the long time evolution of the MTSI and a competing process of multi-instabilities are discussed by performing two dimensional full particle simulations.