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Stability analysis on a four-fluid cosmic-ray-MHD system

Abstract content

We study the linear stability of a cosmic-ray-MHD system in the hydrodynamic approach. The system comprises four fluids: magnetized thermal plasma, cosmic rays, forward and backward propagating Alfven waves. The coupling between plasma, cosmic rays, and waves depends on the waves themselves. We perform short-wavelength linear stability analysis and find that the Alfven mode is not affected while the magneto-acoustic modes are modified. The unstable/stable regions in the background parameter space are rather complex. In general if the thermal pressure is large enough the system is stable. However, it is interesting to note that if the background has only one Alfven waves, the system is more unstable.

If this papers is presented for a collaboration, please specify the collaboration

Summary

Reference

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