Effects of Viscosity on Sloshing Cold Fronts in Galaxy Clusters

Ming-Hsueh Hsieh & H.-Y. Karen Yang

Cold fronts are sub-structures resulting from cluster mergers, provide an opportunity to investigate the nature of the ICM. Cold fronts should be disrupted by Kelvin-Helmholtz instabilities (KHI) due to the velocity shear at the cold front interface. However, in most of X-ray observations of galaxy clusters, cold fronts often appear smooth, suggesting the presence of mechanisms that suppress KHI. In our study, we utilized simulations with varying viscosity to assess the suppression of KHI on the surfaces of cold fronts

- Case A: No viscosity
- Case B: Isotropic viscosity
- Case C: Anisotropic viscosity
- Case D: Anisotropic viscosity limited by micro-instabilities

*plasma beta=1600

Result:
The suppression of KHI are B>C>D>A



