

Contribution ID: 52

Type: **not specified**

Simulations of Large-Scale Cold Fronts and Subcluster Interactions in the Perseus Cluster

Monday 15 August 2022 16:40 (5 minutes)

The Perseus Cluster is a well-studied system in the X-rays, presenting spiral-shaped cold fronts which extend to large radii. These features are believed to be caused by the sloshing motion of the gas after the passage of a subcluster. We present simulations of the formation of sloshing cold fronts in Perseus using the AREPO magnetohydrodynamics code, with the aim of reproducing the positions of the observed fronts. Our simulations explore a range of initial conditions, including different subcluster masses, impact parameters, and initial magnetic fields. We will show how these parameters affect the formation and propagation of the cold front.

How old is the large-scale cold front? Does its existence constrain the space of initial parameters? What can we learn about the perturbing subcluster from the observations of Perseus cold fronts?

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Session Classification: Monday afternoon: Cosmological simulations