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Magnetic Draping as a Possible Solution to Turbulent Heating of the ICM in Kinetic Mode AGN Feedback[1] CHRISTOPHER BAMBIC, University of Maryland, College Park, CHRISTOPHER REYNOLDS, University of Maryland, College Park, Joint Space Science Institute, BRIAN MORSONY, University of Maryland, College Park — Recent x-ray measurements of the Perseus Cluster intracluster medium (ICM) by the Hitomi Mission found a velocity dispersion measure of $\sigma \sim 150$ km/s, indicating a large-scale turbulent energy of approximately 4% of the thermal energy. If this energy is transferred to small scales via a turbulent cascade and dissipated as heat, radiative cooling can be offset and the cluster can remain in its observed thermal equilibrium. We investigate the role of AGN feedback, specifically the production of turbulence by g-modes generated by the supersonic expansion and buoyant rise of AGN-driven bubbles, in a plane-parallel model of the ICM using 3D ideal MHD simulations. We present results for a magnetic field perpendicular to the gravitational field as well as a helical field. We find that, while magnetic draping is able to better preserve AGN-driven bubbles and excite stronger g-modes, the production of turbulence is still inefficient. This fact is likely due to the magnetic tension force preventing the production of vortices in the ICM plasma. Our work shows that ideal MHD is an insufficient description for the cluster feedback process and we discuss future work such as the inclusion of anisotropic viscosity as a means of simulating high β plasma kinetic effects.

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Christopher Bambic
University of Maryland, College Park

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