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# Magnetic fields and the Helium content in the intracluster medium

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Understanding whether Helium can sediment to the core of galaxy clusters is important for a number of problems in cosmology and astrophysics. For example, our ignorance in the distribution of Helium leads to systematic uncertainties in estimating the density and masses of galaxy clusters. All current models addressing this question are one-dimensional, and ignore the fact that the intracluster medium is a dilute, magnetized plasma, which can effectively channel ions and electrons, leading to anisotropic transport of momentum, heat, and particle diffusion. This anisotropy can lead to a wide variety of instabilities, which could be relevant for understanding the dynamics of the heterogeneous medium. As part of my thesis work, I am shedding light on this problem, by investigating the dynamical role played by gradients in the temperature and mean molecular weight in a magnetized tenuous plasma, such as the ICM. I will present the results of analytical and numerical studies analyzing the wide spectrum of instabilities, and discuss the future prospects of studying the long term evolution of Helium sedimentation in more realistic settings.

**Primary author:** Mr BERLOK, Thomas (NBIA)

**Co-author:** Dr PESSAH, Martin (Niels Bohr International Academy)

**Presenter:** Mr BERLOK, Thomas (NBIA)

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