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The interplay between slow waves and heating/cooling mechanisms in the solar corona

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In the corona, the (apparent) thermal equilibrium arises from a delicate balance between radiative losses and some unknown heating mechanism(s). The effect of these heating and cooling mechanisms varies with the plasma parameters, such as density, temperature and potentially magnetic field strength. Meanwhile, slow magnetoacoustic waves can perturb the density and temperature of the hosting plasma enough to affect these heating and cooling mechanisms, to the extent that the waves themselves are impacted in a measurable way. Thus there is great potential in exploiting these slow waves, which are commonplace in the corona, as probes of the local thermal equilibrium.

In this talk I will outline how, by measuring the properties of slow waves as they perturb the coronal equilibrium, we may place some constraints on the poorly understood coronal heating function. I will show that if the magnetic field is sufficiently strong, even if the heating mechanism depends strongly on magnetic field strength, the slow waves are insensitive to this (magnetic) dependence. This holds true in the corona so long as the magnetic field strength is greater than approximately 10G for quiescent loops and plumes, and 100G for hot and dense loops.

Primary authors: DUCKENFIELD, Tim (KU Leuven); Dr KOLOTKOV, Dmitrii (University of Warwick); Prof. NAKARIAKOV, Valery (University of Warwick)

Presenter: DUCKENFIELD, Tim (KU Leuven)

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