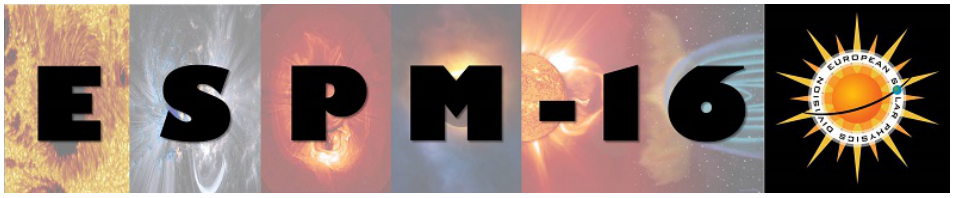

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Oscillatory reconnection of a 2D magnetic X-point for systems with different base temperatures.

Tuesday, 7 September 2021 10:05 (13 minutes)

The propagation of magnetoacoustic waves about a 2D magnetic X-point has revealed the existence of oscillatory reconnection, which is a series of horizontal and vertical current sheets with associated changes in magnetic connectivity. Oscillatory reconnection has been proposed as a wave-generation mechanism to explain some of high-speed, quasi-periodic outflows/jets in the solar atmosphere, as well as one possible physical mechanism behind quasi-periodic pulsations (QPPs). In this study we expand the results of McLaughlin et al. (2009) by performing a parameter study over a wide range of base temperatures. We solve the full set of 2D MHD equations for a magnetic X-point with the use of the PLUTO code, with explicit resistivity included. Through a nonlinear wave, we initiate the collapse of the X-point into a current sheet, initiating oscillatory reconnection for systems of different base temperatures. We study the evolution of plasma beta and its effects on the oscillatory process. By increasing the base temperature of the system, we see that both the amplitude and the period of the oscillating current density profile change. Finally, we will discuss how thermal conduction affects the temperature evolution of our systems, and by extension the final non-potential state of our systems.

Student poster?

Primary author: Dr KARAMPELAS, Konstantinos (Northumbria University)

Co-authors: Prof. MCLAUGHLIN, James, A. (Northumbria University); Dr BOTHA, Gert, J. J. (Northumbria University); Dr REGNIER, Stephane (Northumbria University)

Presenter: Dr KARAMPELAS, Konstantinos (Northumbria University)

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