



Contribution ID: 368

Type: Poster

Study of Alfvénic vortex shedding past a cylindrical obstacle

Tuesday, 7 September 2021 09:13 (13 minutes)

In this paper, the phenomenon of vortex shedding around a circular cylindrical obstacle is studied numerically in magnetohydrodynamic (MHD) conditions in three spatial dimensions using the numerical code Lare3d. A parametric study was performed for different values of magnetic field perpendicular to the plasma flow plane. This model mimics coronal mass ejection flowing around a coronal loop, which is known as a probable mechanism for excitation of kink-mode oscillations in coronal loops. The phenomenon of vortex shedding has been widely studied in hydrodynamic conditions in both science and engineering, it has also been investigated by a number of numerical simulations in magnetic field environments, mainly in two dimensions. In MHD conditions, however, it is poorly understood.

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Session Classification: Poster Session 3.3

Track Classification: Session 2 - The Solar Atmosphere: Heating, Dynamics and Coupling