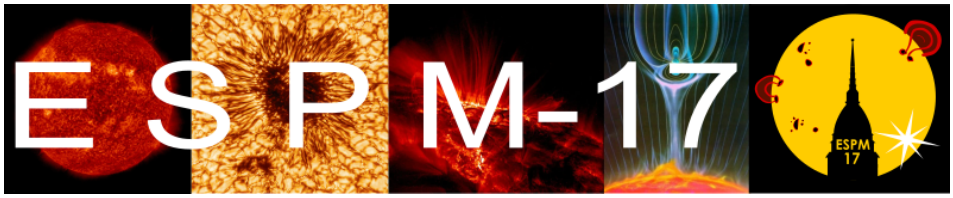

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Identifying Alfvén Wave Modes in the Solar Corona

The Solar Atmosphere is subject to a number of oscillatory motions. Magnetic flux tubes acts as wave guides from the lower atmosphere to the upper. In a uniform plasma, there are three distinct magnetohydrodynamic (MHD) wave modes: Alfvén and fast and slow magnetoacoustics waves. In a non-uniform plasma, like the solar atmosphere, these wave modes no longer decouple. It follows that identifying them becomes non-trivial. However, a method for accurate wave mode identification would yield a valuable tool both in coronal seismology and to determine to what extent waves contribute to coronal heating. We have investigated a method which utilises different properties of each wave mode to identify Alfvén-, fast- and slow-like MHD waves in the plasma flow. For the first time, we show how this wave mode identification scheme can be used in actual observations to identify Alfvén-like waves in a coronal loop. This is done by comparing the identifier for the Alfvén-like wave applied to both a numerical simulation of a coronal loop and a synthetic emission of the same coronal loop as if it was observed by the forthcoming Multi-Slit Solar Explorer (MUSE) mission. We have demonstrated two procedures for this identification scheme, depending on the observation line-of-sight, providing a proof-of concept for how this method could be used in observations to identify Alfvén-like waves.

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