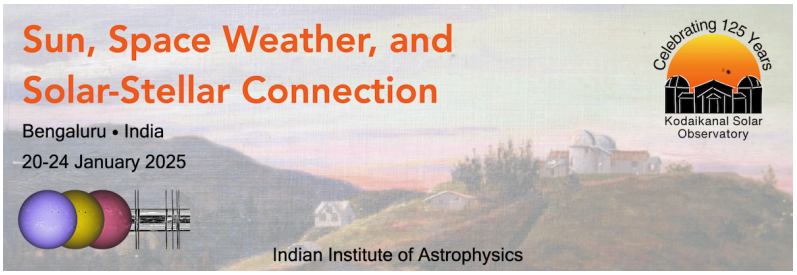

Contribution ID: **26** Type: **Poster**

Large-Scale Energy Transport in the Solar Corona Due to Fast Magnetosonic Waves Generated by Impulsive Reconnection

Magnetosonic waves and magnetic reconnection have been studied for a long time as two major processes responsible for coronal heating, solar wind acceleration, and other energetic eruptive processes in the Sun' s corona. Here, we study the mutual interactions between these two plasma processes in a physics-based numerical model. In this model, a velocity perturbation representing the effect of a coronal transient fast-mode wave interacts with a coronal null point and forms a current sheet (CS). Due to unbalanced magnetic forces along and across the current sheet, it evolves to give a curved elongated magnetic structure that fragments to form multiple plasmoids. These plasmoids eventually coalesce with each other to enhance the total pressure locally, which generates propagating nearly-circular large-scale wavefronts. An in-phase relation between thermal pressure and magnetic pressure confirms that the propagating wavefronts are fast magnetoacoustic waves. We find that the fast waves carry energy fluxes of 10^5 erg cm^{-2} s^{-1} which are sufficient to heat coronal holes and the quiet-Sun and to drive the solar wind. We also describe the spatio-temporal correlation of multiple coalescence events in the CS and the resulting wave energy density peaks, thereby establishing a relationship between CS dynamics and the resulting wave motions.

Contribution Type

Theme

Energetic Phenomena

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