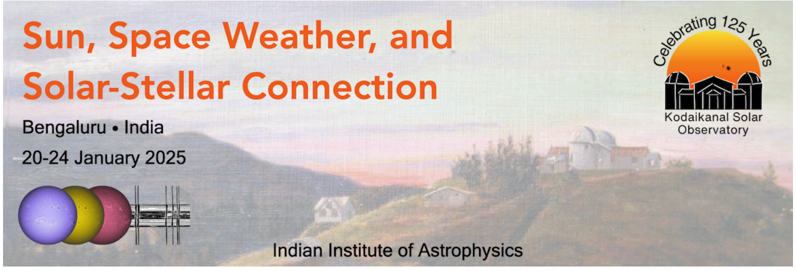

Contribution ID: **105** Type: **Poster**

The relation between solar spicules and magneto-hydrodynamic shocks

Spicules are thin, elongated jet-like features ubiquitously seen shooting upwards in observations of the solar atmosphere, appearing to protrude into the corona before (mostly) falling back to the solar surface. These features exhibit highly complex dynamics during their short lifetimes of 5-10 minutes and seem to be a necessary connecting link between the cooler, denser solar chromosphere and the extremely hot, tenuous corona. In this work, we explore the spatial and temporal relation between solar spicules and magneto-hydrodynamic (MHD) shocks using data from a 2D radiative MHD (rMHD) simulation of the solar atmosphere driven by realistic solar convection that was earlier reported by Dey et al. 2022. This model was able to self-consistently excite a forest of spicules with heights in the range of 6–25 Mm and speeds in the range 30–80 km/s, in agreement with observations. In this work, we demonstrate that slow MHD shocks, which propagate along magnetic field lines, are regions of strong positive vertical acceleration of the plasma that forms the tip of the spicule material during its rise phase. We further show that the strength of these shocks may play a vital role in determining the heights of the spicules, supporting the idea that shocks act as drivers of spicules. In addition, we report some results on the presence of structures similar to propagating coronal disturbances (PCDs) in the simulation, linked with the spicules.

Contribution Type

Poster

Theme

Solar Magnetism in High-Resolution

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