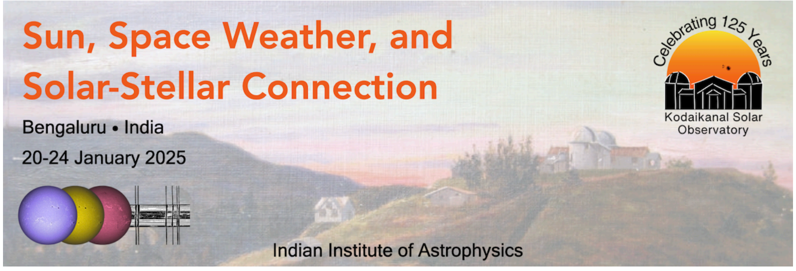

Contribution ID: **191**

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Numerical modelling of MHD wave propagation in twisted magnetic flux tubes

Various configurations of the magnetic field in the solar atmosphere effectively link plasma processes between the photosphere, chromosphere, and solar corona. In a majority of cases, these magnetic configurations are twisted. Therefore, studying excitation and propagation of magnetohydrodynamic waves in the magnetic flux tubes when twist is present is a key to understanding energy transport and dissipation processes. Due to the complexity of analytical study, it is natural to model the wave excitation and propagation numerically. In this work, we implemented the different configurations of twisted 3D magnetic fields with varying magnetic pressure (plasma-beta changing in the range of 0.2-20). The magnetohydrostatic equilibrium within a non-stratified atmosphere was obtained analytically under solar atmospheric conditions based on the results reported by Sen and Mangalam (2018, 2019). The proposed magnetic configurations are consistent with the magnetic field within solar magnetic bright points regarding field strength and radial distribution. Related solutions are found by taking the complex conjugate of the flux function and by using current-free boundary conditions. Our analysis shows that these quasi-stable solutions and their extensions are suitable candidates for localised twisted configurations that may exist singly or in a network on the photosphere. The stability of magnetic configurations was analysed using a newly developed MPI-based numerical code. We investigated the propagation characteristics and contribution to the energy budget of MHD waves excited by realistic vortical drivers applied at footpoints of the constructed twisted magnetic flux tubes.

Contribution Type

Poster

Theme

Solar Magnetism in High-Resolution

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