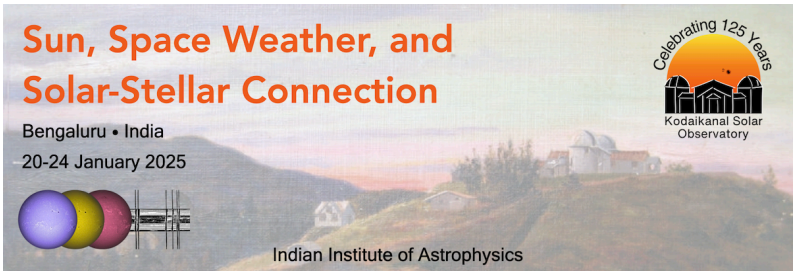

Contribution ID: **24** Type: **Poster**

Propagation Characteristics of Acoustic Waves in the Quiet-Sun Lower Solar Atmosphere: MAST Observations

Solar atmosphere provides conducive environment for the generation, propagation, and dissipation of various mechanical waves. These waves are considered to play an important role in the heating and dynamics of the solar atmosphere. Acoustic waves are generated by turbulent convection inside the convection zone of the Sun. These waves trapped inside the acoustic cavities are formed due to high temperature inside the Sun and sharp fall in density at the photosphere. The acoustic cutoff frequency of the quiet-Sun photosphere is 5.2 mHz and these waves (<5.2 mHz) are evanescent in the solar atmosphere. In contrast, high frequency (> 5.2 mHz) acoustic waves propagate into the higher solar atmosphere with increasing amplitude. Exploiting the full potential of the Narrow Band Imager (NBI) instrument installed with the Multi-Application Solar Telescope (MAST) operational at Udaipur Solar Observatory (USO), Physical Research Laboratory (PRL), Udaipur, India, we observed a quiet-Sun region located within the disk centre of the Sun for 1h 50m duration. The photospheric Fe I 6173 Å spectral line is scanned at 35 wavelength positions, while chromospheric Ca II 8542 Å line is scanned at 27 wavelength positions. Utilizing the bisector method on the observed spectral line profiles, we obtain seven height line-of-sight velocities within Fe I line and nine height line-of-sight velocities within Ca II line. The fast Fourier transform is used at each pixel over the observed full field of view by the NBI/MAST to obtain phase shift and coherence. The frequency and height-dependent phase shift integrated over the regions having an absolute line-of-sight magnetic field of less than 10 G indicates the nonevanescent nature of low-frequency acoustic waves within the photosphere and photosphere–chromosphere interface regions. We also report that the nonevanescent nature persists beyond the photosphere, encompassing the photospheric–chromospheric height range. Additionally, our observations reveal a downward propagation of high-frequency acoustic waves indicating refraction of these waves from higher layers in the solar atmosphere.

Contribution Type

Theme

Solar Magnetism in High-Resolution

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