Observational Signatures of Wave Propagation in the Magnetic Network of the Sun

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The solar atmosphere is magnetically structured and highly dynamic. Owing to the dynamic nature of the regions in which these magnetic structures exist, waves can be excited in them. Numerical investigations of wave propagation in small scale magnetic flux concentrations in the magnetic network on the Sun have shown that the nature of the modes excited depends on the value of plasma β (the ratio of gas to magnetic pressure) where the driving motion occurs. Considering the fact that these properties of wave propagation shoud give rise to observable signatures, we have attempted a study of emergent spectra from our numerical simulations. We find that the signatures of wave propagation in magnetic elements can be observed with spatial resolutions when the magnetic concentrations are clearly resolved and observations in different regions within the flux concentrations is possible. Observations with higher resolution will not only resolve individual flux tubes/sheets but looking at various lines of sight around the flux concentration will also reveal effects like mode coupling. We highlight the importance of using the Stokes V asymmetries as a possible diagnostic tool to study wave propagation in magnetic structures. This can be compared with existing and new observations in order to place constraints on different wave excitation mechanisms.

Keywords: Sun - atmosphere; Sun - magnetic field; Magnetohydrodynamic (MHD); Waves.

References

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