Contribution ID: **176** Type: **Poster**

The coronal power spectrum from MHD mode conversion above sunspots

Sunspots are intense regions of magnetic flux that are rooted deep below the photosphere. It is well established that sunspots host magnetohydrodynamic waves, with numerous observations showing a connection to the internal acoustic or p-modes of the Sun. The p-modes are fast waves below the equipartition layer and are thought to undergo a double mode conversion as they propagate upwards into the atmosphere of sunspots, which can generate Alfvenic modes in the upper atmosphere. We employ 2.5D numerical simulations to investigate the adiabatic wave propagation and examine the resulting power spectra of coronal Alfvenic waves. A broadband wave source is used that has a 1D power spectrum which mimics aspects of the observed p-mode power spectrum. We examine magnetoacoustic wave propagation and mode conversion from the photosphere to the corona. Frequency filtering of the upwardly propagating acoustic waves is a natural consequence of a gravitationally stratified atmosphere, and plays a key role in shaping the power spectra of mode converted waves. We demonstrate that the slow, fast and acoustic waves above the equipartition layer have similarly shaped power spectra, which are modified versions of the driver spectrum. Notably, the results reveal that the coronal wave power spectra have a peak at a higher frequency than that of the underlying p-mode driver. This matches observations of coronal Alfvenic waves and further supports the role of mode conversion process as a mechanism for Alfvenic wave generation in the Sun's atmosphere.

Primary author: Ms MIRIYALA, Hemanthi (Northumbria University)

Co-authors: Dr KHOMENKO, Elena (Instituto de Astrofisica de Canarias); Dr BOTHA, Gert (Northumbria University); Dr ANTOLIN, Patrick (Northumbria University); Dr MORTON, Richard (Northumbria University)

Session Classification: Coffee break and poster session 1

Track Classification: Fundamental mechanisms of solar plasmas: magnetic reconnection, waves, radiation and particle acceleration