THE GENERATION AND DAMPING OF PROPAGATING MHD KINK WAVES IN THE SOLAR ATMOSPHERE

G. Verth[1], R.J. Morton[2], A. Hillier[3] and R. Erdélyi[1]

[1]*Sheffield University (UK),* [2]*Northumbria Univeristy (UK),* [3]*Kyoto Univeristy (Japan)*

The source of the non-thermal energy required for the heating of the upper solar atmosphere to temperatures in excess of a million degrees and the acceleration of the solar wind to hundreds of kilometres per second is still unclear. One such mechanism for providing the required energy flux is incompressible torsional Alfvén and kink magnetohydrodynamic (MHD) waves, which are magnetically dominated waves supported by the Sun's pervasive and complex magnetic field. In particular, propagating MHD kink waves have recently been observed to be ubiquitous throughout the solar atmosphere, but, until now, information on critical details of the transport of the kink wave energy throughout the Sun's atmosphere were lacking. Here, the ubiquity of the waves is exploited for statistical studies in the highly dynamic solar chromosphere. This large-scale investigation allows for the determination of the chromospheric kink wave velocity power spectra, a missing link necessary for determining the energy transport between the photosphere and corona. Crucially, the power spectra contains evidence for horizontal photospheric motions being an important mechanism for kink wave generation in the quiescent Sun. In addition, a comparison to measured coronal power spectra is provided for the first time, revealing frequency-dependent transmission profiles suggesting there is enhanced damping of kink waves in the lower corona.