CAN WE REALLY SOLVE BY MEANS OF MHD WAVES THE CORONAL HEATING ENIGMA?

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The latest satellite and ground-based observations have provided a wealth of evidence of waves and oscillations present in the magnetised solar atmosphere. Our understanding of the solar structures and their dynamics has been considerably changed in light of the high spatial, temporal and spectral resolution observations (e.g. DST/ROSA, IBIS, CoMP, STT/CRISP; SOHO, TRACE, STEREO, Hinode, SDO, and now IRIS). Detecting MHD waves allows us to perform sub-resolution solar magneto-seismology (SMS) of magnetic waveguides in the Sun's entire atmsophere.

Here I will concentrate on the role of a range of MHD waves (e.g. Alfvén, kink and sausage waves) that are present in various waveguides in the solar atmosphere, and will discuss the latest status of observations of these fundamentally important waves. The current theoretical interpretations of the detected solar atmospheric wave and oscillatory phenomena within the framework of MHD energisation of the solar magnetic plasma will be presented. The photospheric origin, generation mechanism(s) and the propagation of these waves into the upper solar atmosphere will be also addressed. Finally, I will report our latest findings of potential MHD wave flux transport in the solar atmosphere with some very surprising new results that may bring us closer to solve the solar atmospheric heating problem.