Institute for Space Weather Sciences Colloquium

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Transverse Dimensions Associated with Alfvenic Turbulence in the Corona

In the last decade, Alfvénic fluctuations remained a major focus of research on coronal heating and the origin of solar wind. Theoretical studies postulated that predominantly outward propagating waves carry a significant fraction of energy and momentum from the lower solar atmosphere and dissipate in corona, via MHD turbulence, thereby heating the plasma and accelerating the solar wind. In this presentation, I will briefly discuss some basic observational characteristics of these waves in the corona, their diagnostic capabilities to infer magnetic fields. I will also talk about the wave energy injection scales in the corona, which are also known as perpendicular correlation length(s). This parameter is key to Alfvén wave driven turbulence models where it strongly influences the energy dissipation below and above the sonic point, while affecting the solar wind acceleration profiles in the solar corona and beyond. I will compare the estimates of perpendicular correlation lengths at the base of the solar corona with those obtained from in-situ measurements and numerical models. Finally, I will highlight how the inhomogeneous nature of lower and middle corona can affect the observed wave energy injection scales that needs to be accounted for in future numerical Alfvén wave turbulence studies.

Dr. Rahul Sharma currently works at the Department of Mathematics, Physics and Electrical Engineering, Northumbria University, UK. Dr. Sharma's research interest is in Solar Physics, Image Analysis and Astrophysics.