Connecting Atmospheric and Sub-Surface Oscillations Through Sunspots: Implications for Travel Times

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Recent modelling of MHD wave propagation from the interior helioseismic wave field into sunspot atmospheres has focussed on explaining several seemingly anomalous behaviours, particularly regarding "wave travel time" perturbations as measured by Time-Distance Helioseismology. This will be discussed in the context of mode conversion theory, paying particular attention to the extent to which travel time perturbations (with respect to the quiet sun) are primarily thermal or magnetic in origin. This has implications for the types of waves we should expect to see above sunspot umbrae and penumbrae.

Keywords: MHD waves; sunspots; mode conversion.