

Sources for Alfvén Waves Above the Auroral Oval

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In this presentation we examine FAST and Cluster spacecraft observations to identify sources for the multi-scale Alfvén waves commonly observed above the auroral oval. Several case studies are explored in detail which show that surface Alfvén waves on the magnetopause and reconnection may provide large Poytning fluxes of Earthward directed Alfvén waves on multiple scales extending from ion gyro-radii up to those appropriate for MHD. From conjunctive observations from FAST and Cluster it is demonstrated that these waves populate the flux tubes on which they are observed with ionospheric plasmas through field-aligned electron and transverse ion acceleration.