

Low Altitude Signatures of Auroral Acceleration by Alfvén Waves

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Alfvén waves play a fundamental role in auroral particle acceleration. Quasi-static field-aligned currents and convection electric fields coupling the ionosphere and magnetosphere are a signature of the low frequency limit of these waves that is associated with large-scale auroral arcs. At intermediate frequencies, field-line resonances (FLRs) introduce additional field and particle acceleration signatures. At higher frequencies and shorter perpendicular scales the signatures of Alfvén wave acceleration becomes much more evident in association with bursty electron precipitation and intense ion heating. These bursty acceleration events are most frequently found near the dayside cusp and tail polar cap boundaries, suggesting that these Alfvén waves are a consequence of magnetic reconnection in these regions. Particle and field measurements from the low altitude FAST satellite provide a "snapshot" of the ionospheric foot point of these distant source regions.