Abstract Submitted
for the DPP08 Meeting of
The American Physical Society

Physics of the Alfvénic Aurora ROBERT LYSAK, YAN SONG, JESSE WOODROFFE, University of Minnesota — Many measurements of auroral particles, in particular recent measurements from the FAST satellite, indicate that in many cases the auroral energy distribution is broad in energy and strongly field-aligned in pitch angle. These observations suggest that the cold ionospheric electrons are being accelerated in time-dependent fields. Such electrons are seen in conjunction with strong kinetic Alfvén waves, and so have been termed the "Alfvénic aurora." The Alfvénic aurora is predominant at the polar cap boundary of the aurora as well as in the auroral arc that brightens during substorm onset, suggesting it is a transitional phase to the quasi-static aurora. Kinetic Alfvén waves are accompanied by a parallel electric field when the perpendicular wavelength is the order of the electron inertial length or the ion acoustic gyroradius. These scales are a few kilometers for auroral parameters, comparable in size to the narrowest auroral arcs. The critical question in understanding this mechanism is accounting for this narrow scale. Phase mixing, ionospheric feedback, and nonlinear interactions will be investigated to determine their potential roles in this development.

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Date submitted: 11 Jul 2008 Electronic form version 1.4