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Non-local wave-particle interactions of kinetic Alfven waves on auroral field lines ROBERT LYSAK, YAN SONG, University of Minnesota — Recent observations from the FAST satellite as well as a number of sounding rocket missions have shown two distinct modes of auroral electron acceleration: the classic inverted-V signature consisting of a beam broad in pitch angle but narrowly confined in energy, and a lower energy, field-aligned acceleration that has been attributed to kinetic Alfven waves. Moreover, observations indicate that these two particle populations often co-exist, suggesting that Alfvenic acceleration can occur on field lines with a quasi-static potential drop. Electrons of appropriate energy and magnetic moment can be trapped between this potential drop and their magnetic mirror points. Calculations indicate that trapped electrons of a few hundred electron volts have bounce periods of 1-5 seconds, comparable to the period of waves in the ionospheric Alfven resonator, a structure produced by the gradients in the Alfve n speed above the auroral ionosphere. This suggests that a bounce resonant instability may occur that would excite waves in the resonator that could play a role in the acceleration of low-energy field-aligned electrons. A non-local kinetic theory including trapped electrons has been developed to determine what role such bounce resonance plays in the auroral acceleration process.

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