Consequences of Modelling Auroral Electron Acceleration using Realistic Distribution Functions

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When modelling electron acceleration processes along auroral field lines, general practice is to use a Maxwellian distribution function to describe the ambient electron population. However, *in situ* measurements of the electron distribution function along geomagnetic field lines indicate that both in the auroral acceleration region, and at distances of 4-7R_E above the Earth's surface, there is often a high energy tail, which can be more accurately described using a Lorentzian, or kappa distribution function. It is therefore much more realistic to use a Lorentzian distribution function to describe the ambient plasma when investigating the acceleration of electrons along geomagnetic field lines towards the ionosphere. Previous self-consistent kinetic simulation studies of electron acceleration by inertial Alfvén waves in a Maxwellian plasma have shown that the amount of electrons which can be resonantly accelerated is strongly dependent upon the phase velocity of the wave. As the perpendicular scale length of the inertial Alfvén wave is shortened, the phase velocity of the wave decreases, and so more electrons are available to take part in the resonant acceleration process. We present simulation studies of the interaction between electron distribution functions with high energy tails and inertial Alfvén waves. We discuss the similarities and differences between the two plasma distribution functions in the context of auroral electron acceleration.