



Electric potential differences across auroral generator interfaces

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Strong high-altitude auroral electric fields are often associated with magnetosospheric interfaces. The high-altitude electric field profile depends on the properties of the plasmas on either side of the interface, as well as on the total electric potential difference across the structure. We have explored the role of this cross-field electric potential difference for the case of a tangential discontinuity interface. A Vlasov description is used to model how the equilibrium configuration depends on the transverse potential difference. We find that there exist limits to the potential difference, beyond which no equilibrium configuration of the interface can be sustained. It is further demonstrated how the plasma densities and temperatures affect the type of electric field profile in the transition, with monopolar electric fields appearing when the temperature contrast is large, supporting the observed association of monopolar fields with the plasma sheet boundary. The role of shear flow tangent to the interface is also examined.