

Instability of the magnetosphere-ionosphere convection and formation of auroral arcs

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Abstract. In this paper we study an instability of the plasma moving towards the Earth near the inner plasma sheet boundary. We include both the interchange instability of the plasma sheet and the magnetosphere-ionosphere interaction instability caused by an effect of field-aligned currents (connected with electron precipitation) on ionospheric conductivity. The instability leads to the separation of steady-state magnetospheric convection into parallel layers. This instability may be responsible for the appearance of quiet auroral arcs inside region 2 of field-aligned currents flowing out of the ionosphere. This instability allows us to explain also the existence of crossing auroral arcs.

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