



## **Magnetospheric interchange instability with non-linear ionospheric feedback**

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Presented model includes the interchange instability developing due to magnetospheric plasma pressure gradients, field-aligned currents associated with the plasma structures formed by the instability, non-linear dependence of the ionospheric conductances on the field-aligned currents, polarisation electric fields generated by the ionospheric conductance disturbances, and effects of the polarisation electric field on the motion of magnetospheric plasma. In particular, this model can well explain generation of the high-latitude Sun-aligned auroral arcs occurring during northward IMF, when the interchange instability develops at the magnetospheric boundary between the plasmashet plasma coming from the nightside and the magnetosheath flux tubes entering the closed magnetosphere from the dayside due to reconnection beyond the cusp. Observed characteristics of these arcs, including the electric field and current patterns, are consistent with the presented model, and the observed double-arc fine structure of the arcs can be generated owing to the non-linear ionospheric feedback.