

Abstract Submitted
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Streamers and zonal flows in interchange-unstable Boussinesq plasmas¹ MIKHAIL MALKOV, PATRICK DIAMOND, UCSD — The interchange instability can be described in the framework of two-dimensional Boussinesq fluid approximation. Assuming very low viscosity and thermoconductivity for such a plasma, we reduce the Boussinesq system to simple moment (Galerkin) equations. However, in contrast to conventional treatments of moment systems that invoke truncations and ad hoc closures, we propose an incomplete closure. It is based on integral inequalities and is in that sense exact even though not fully determined. Nevertheless, the proposed closure constraints the system dynamics to allow predictions of streamers or zonal flows as time asymptotic states depending on the initial conditions. These findings are instrumental in constructing the time asymptotic quasi-stationary solutions of the original Boussinesq equations which are also discussed.

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Mikhail Malkov
UCSD

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