Examining Radial-Interchange in Outer Planet Magnetospheres using JERICHO: a Kinetic-Ion, Fluid-Electron Hybrid Model

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Josh A. Wiggs¹, C. S. Arridge¹ & C. Paty²

¹Department of Physics, Lancaster University, UK ²Department of Earth Sciences, University of Oregon, USA
Radial Interchange at the Outer Planets

- Have plasma sources in inner magnetospheres of Jupiter and Saturn
- Plasma is transported into middle and outer magnetosphere by RI instability

What’s happening inside here? Region is too small to probe with current state-of-the-art

Liu et al, 2010

After: Southwood & Kivelson, 1989
JERICHO – Model Topology
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Radial-Interchange Instability – Model Run

$t = 1.0\Omega_i$
Radial-Interchange Instability – Initial Analysis

- See $\sim 10^1$ instabilities form on front of plasma injection
- No gravity included in model and no velocity shear along interface of injection
- See narrow channels of tenuous plasma being form between dense fingers