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Interchange turbulence in a dipole-confined plasma[1] BO LI, Peking University, DARIN ERNST, JAY KESNER, MIT — The plasma interchange turbulence and convective transport in magnetic dipole and hard-core Z-pinch fields are explored with flux-driven radially global two-fluid simulations, using a new field-aligned turbulence code. We find that the nonlinear evolution of the interchange mode produces coherent structures of electric potential in the bad curvature region. The large-scale convective cells propagate in the azimuthal direction and have long azimuthal wavelengths comparable to the system size. For the Z-pinch field, the pressure profile is broad and the radial transport is large. For the dipole field, the pressure profile becomes much steeper and strong azimuthal shear flows are generated, and the radial transport is reduced even though the system is driven by stronger heat sources.

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