Abstract Submitted
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Two-fluid MHD Regime of Drift Wave Instability[1] SHANG-CHUAN YANG, University of Science and Technology of China, PING ZHU, University of Science and Technology of China, University of Wisconsin-Madison, JIN-LIN XIE, WAN-DONG LIU, University of Science and Technology of China — Drift wave instabilities contribute to the formation of edge turbulence and zonal flows, and thus are believed to play essential roles in the anomalous transport processes in tokamaks. Whereas drift waves are generally assumed to be local and electrostatic, experiments have often found regimes where the spatial scales and the magnetic components of drift waves approach those of magnetohydrodynamic (MHD) processes. In this work we study such a drift wave regime in a cylindrical magnetized plasma using a full two-fluid MHD model implemented in the NIMROD code. The linear dependency of growth rates on resistivity and the dispersion relation found in the NIMROD calculations qualitatively agree with theoretical analysis. As the azimuthal mode number increases, the drift modes become highly localized radially; however, unlike the conventional local approximation, the radial profile of the drift mode tends to shift toward the edge away from the center of the density gradient slope, suggesting the inhomogeneity of two-fluid effects.

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