On Drift Wave Instabilities Excited by Strong Plasma Gradients in Toroidal Plasmas

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Motivated by the recent global gyrokinetic simulations of electrostatic drift wave instabilities (DWIs) in the strong pressure gradient region of toroidal plasmas[2–4], we have carried out the corresponding analytical and numerical investigations. Our results show that, for sufficiently strong plasma gradients, the eigenmodes of DWIs are predominantly bounded by the plasma non-uniformities. Thus, in the region of strong plasma gradients, the DWI eigenmodes are essentially of cylindrical type and render the ballooning structures irrelevant. Our results are consisent with the gyrokinetic simulation observations.

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