Abstract Submitted
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Shear-Flow Instability Saturation by Stable Modes: Hydrodynamics and Gyrokinetics[1] ADRIAN FRASER, M.J. PUESCHEL, P.W. TERRY, E.G. ZWEIBEL, University of Wisconsin-Madison, Madison, Wisconsin — We present simulations of shear-driven instabilities, focusing on the impact of nonlinearly excited, large-scale, linearly stable modes on the nonlinear cascade, momentum transport, and secondary instabilities. Stable modes, which have previously been shown to significantly affect instability saturation [Fraser *et al.* PoP 2017], are investigated in a collisionless, gyrokinetic, periodic zonal flow using the GENE code by projecting the results of nonlinear simulations onto a basis of linear eigenmodes that includes both stable and unstable modes. Benchmarking growth rates against previous gyrokinetic studies and an equivalent fluid system demonstrates comparable linear dynamics in the fluid and gyrokinetic systems. Cases of driven and decaying shear-flow turbulence are compared in GENE by using a Krook operator as an effective forcing. For comparison with existing hydrodynamic and MHD shear-flow instability studies, we present results for the shear layer obtained by similar means with the code Dedalus.

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