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Three-wave Coupling Model of the Hasegawa-Wakatani Turbulence Model JUHYUNG KIM, P.W. TERRY, Department of Physics, University of Wisconsin-Madison — We present a three-wave coupling analysis of the Hasegawa-Wakatani (HW) model with complex linear frequencies. A three-wave coupling model with complex linear frequencies based on a generalized one-field fluid model (such as Hasegawa-Mima) was analyzed with emphasis on the effect of the linear complex frequencies on the nonlinear frequency characteristics of each wavenumber. [1] The HW model consistently includes dynamically incoherent fluctuations, which were separately considered in the one-field model [1], and the phase relation between density and electrostatic fluctuations, which determines the level of the particle flux. In contrast to previous work with the HW model, it is shown numerically how the frequency spectrum and the phase relations in the steady state are dependent on the linear frequencies and linear growth rates. Theoretical implications of linearly unstable/stable modes on frequency spectra and the random-phase approximation in HW will be discussed.

[1] J.-H. Kim and P. W. Terry, Phys. Plasmas 18, 092308 (2011)

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