Physics of zonal flow, density and field excited by finite beta drift waves[1] AMITA DAS, IPR, Bhat, Gandhinagar, India , PARVEZ GUZDAR, ROBERT KLEVA, IREAP, University of Maryland, College Park, MD, USA, PREDHIMAN KAW, IPR, Bhat, Gandhinagar, India — The excitation of zonal perturbations by finite beta drift waves can be investigated using the Floquet Theory. When the growth rate for this process is smaller than the drift frequency, the Floquet expansion can be truncated to a four-wave interaction involving the pump drift-wave, the zonal perturbations and the sum and difference drift-wave sidebands. This leads to nine coupled algebraic equations. First, a quadratic dispersion relation derived in our earlier work is discussed. The dispersion relation is recast into a standard form which helps identify the different physical processes responsible for the modulational instability providing a clearer picture of the role of finite beta effects in determining the parametric dependence of the growth rate on the dimensionless parameters. We compare results obtained by numerically solving the nine coupled equations with the simplified dispersion relation and show that in the range of validity of the theory the agreement for the growth rates computed by the two methods is very good.

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