Abstract Submitted
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A non-linear 4-wave resonant model for non-perturbative fast ion interactions with Alfvénic modes in burning plasmas FULVIO ZONCA, Associazione EURATOM-ENEA sulla Fusione, LIU CHEN, Department of Physics and Astronomy, University of California, Irvine — We adopt the 4-wave modulation interaction model, introduced by Chen et al [1] for analyzing modulational instabilities of the radial envelope of Ion Temperature Gradient driven modes in toroidal geometry, extending it to the modulations on the fast particle distribution function due to nonlinear Alfvénic mode dynamics, as proposed in Ref. [2]. In the case where the wave-particle interactions are non-perturbative and strongly influence the mode evolution, as in the case of Energetic Particle Modes (EPM) [3], radial distortions (redistributions) of the fast ion source dominate the mode nonlinear dynamics. In this work, we show that the resonant particle motion is secular with a time-scale inversely proportional to the mode amplitude [4] and that the time evolution of the EPM radial envelope can be cast into the form of a nonlinear Schrödinger equation a la Ginzburg-Landau [5].

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