Abstract Submitted
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Resonant and non resonant particle dynamics in Alfvén Mode excitations FULVIO ZONCA, Associazione EURATOM-ENEA sulla Fusione, C.P. 65 – 00044 Frascati, Italy, LIU CHEN, Department of Physics and Astronomy, University of California, Irvine CA 92717-4575 — The resonant excitations of Alfvén Modes in toroidal plasmas by fast ions is considered in the present work, revisiting previous analyses that demonstrated in general the existence of two types of modes; *i.e.*, a discrete shear Alfvén gap mode, or Alfvén Eigenmode (AE), and an Energetic Particle continuum Mode (EPM) [1]. Here, we demonstrate that the resonant fast ion dynamics in toroidal plasmas is dominated by the magnetic drift curvature coupling in the vorticity equation, while the non-resonant response has various contributions, whose relative weight depends on the ratio of the characteristic fast ion orbit width, ρ_{LE}, to the perpendicular mode wavelength, $\lambda_\perp$. Specifically, we demonstrate that the optimal wavelength ordering for analyzing energetic ion transport in burning plasmas is $\lambda_\perp \gtrsim \rho_{LE}$, considered in [1], for which both resonant and non-resonant fast ion behaviors are dominated by the magnetic drift curvature coupling, that fully accounts for the energetic ion dynamics, including the *charge uncovering* effect [2].

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