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High frequency mode generation by toroidal Alfven eigenmodes

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Nonlinear generation of high frequency mode (HFM) by toroidal Alfven eigenmode (TAE) observed in HL-2A tokamak is analyzed using nonlinear gyrokinetic theory. It is found that, the HFM can be dominated by $|nq - m| = 1$ perturbations with predominantly ideal magnetohydrodynamic if the two primary TAEs are co-propagating; while the HFM can be characterized by $nq - m = 0$ electrostatic perturbations if the two primary TAEs are counter-propagating. Here, n and m are respectively the toroidal and poloidal mode numbers, and q is the safety factor. The nonlinear process is sensitive to the equilibrium magnetic geometry of the device.

References

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