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Propagation of global shear Alfven waves in gyrokinetic tokamak plasmas Y. NISHIMURA, Z. LIN, I. HOLOD, L. CHEN, UC-Irvine, V. DECYK, UCLA, S. KLASKY, ORNL, K. MA, UC-Davis, M. ADAMS, Columbia University, S. ETHIER, T. HAHM, W. LEE, J. LEWANDOWSKI, G. REWOLDT, W. WANG, PPPL — Employing the electromagnetic gyrokinetic simulation models,[1,2] Alfven wave dynamics in global tokamak geometry is studied. Based on a small parameter expansion by the square-root of the electron-ion mass ratio, the fluid-kinetic hybrid electron model[2] solves the adiabatic response in the lowest order and solves the kinetic response in the higher orders. We verify the propagation of shear Alfven waves in the absence of drives or damping mechanisms by perturbing the magnetic field lines at $t = 0$ in a global eigenmode structure. The Alfven wave experiences continuum damping.[3] In the presence of energetic particles, excitations of toroidal Alfven eigenmode (TAE) is expected within the frequency gap.[4] With the η_i gradient drive, at a critical β value, the kinetic ballooning mode (KBM)[5] is excited below the ideal MHD limit.

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Yasutaro Nishimura
UC-Irvine

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