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Studies of Alfvénic instabilities by a kinetic-fluid model Y. NISHIMURA, C.Z. CHENG, Plasma and Space Science Center, National Cheng Kung University, Tainan 70101, Taiwan — Employing a kinetic-fluid simulation model[1], Alfvénic instabilities driven by energetic particles are studied in tokamak plasmas. The kinetic-fluid model incorporates all the particle dynamics through the pressure tensor by taking the second order moment of the particle simulation while the electromagnetic field quantities are evolved in the fluid equations. The kinetic-fluid model retains the ion and electron wave-particle interaction for both the bulk and the energetic plarticle components. Global Alfven oscillation, continuum damping, and the generation of the TAE gap[2] in the toroidal geometry are demonstrated in the MHD limit.[3] Kinetic particles[4 5] are then incorporated into the fluid set of equations to excite the instabilities (bulk ions/electrons replace the pressure evolution equation). This work is supported by National Cheng Kung University Top University Project.

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