Abstract Submitted
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Evaluation of plasma torque by RF waves in a tokamak using a combined Full-wave code and bounce-averaged Fokker-Plank code[1] JUNG-PYO LEE, JOHN WRIGHT, MIT-PSFC, ROBERT HARVEY, CompX, RON PARKER, PAUL BONOLI, PETER CATTO, MIT-PSFC — RF power injection with an asymmetric wave spectrum relative to the static magnetic field direction is a significant source of torque in a tokamak. In order to investigate the ion toroidal rotation and neoclassical radial pinch generated by the RF wave, it is necessary to first compute the torque density on a flux surface. We propose theoretically that there exist two equivalent methods to evaluate the momentum source term, and apply each method to the case of Lower hybrid wave injection in the Alcator C-Mod device. One method is to use the electric field and the susceptibility in a full-wave code (TORLH), and the other is to use the distribution function and Kennel-Engelmann quasilinear diffusion coefficient in a bounce-averaged Fokker-Plank Code (CQL3D). For self-consistency between the electron distribution function and RF electric field, the Fokker-Plank code is iterated with the wave code. Both methods were found to yield the same result with acceptable error. Furthermore the effective parallel refractive index of the RF waves was deduced from the relation between the torque and the power deposition.

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Jungpyo Lee
MIT-PSFC

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