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Electron Cyclotron Heating and Current Drive in DIII-D at High Power Density

R.W. HARVEY, CompX, R. PRATER, Y.R. LIN-LIU, General Atomics — Numerical calculations of the electron gyro-orbits passing through a beam of X-mode second harmonic electron cyclotron waves simulating the off-axis ECCD experiments on DIII-D have shown that nonlinear modifications of diffusion from that predicted from RF quasilinear theory sets in at RF injected power density comparable to that used in experiments. Previous work finds that power absorption is increased. Enhanced absorption increases the Fisch-Boozer current while reducing the backward Ohkawa current, leading to increased off-axis current drive efficiency. A direct comparison will be made between QL diffusion coefficients obtained using (1) the standard ray-tracing-based CQL3D QL calculation, and (2) the numerical orbit calculation of diffusion in a toroidal magnetic field due to a coherent diverging Gaussian beam model of the injected power. Nonlinear effects on DIII-D EC current drive will be assessed.

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Prefer Oral Session
Prefer Poster Session

Special instructions: Current Drive - Wave Particle, immediately following CC Petty

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