

Abstract Submitted  
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Sorting Category: 6.6.2 (Theoretical)

**Electron Cyclotron Heating and Current Drive in DIII-D at High Power Density**<sup>1</sup> 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<sup>2</sup> 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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<sup>2</sup>J.Y. Hsu and S.C. Chiu, Phys. Rev. Lett. **45**, 1561 (1980).

Prefer Oral Session  
 Prefer Poster Session

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

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