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The Non-Bounce-Averaged Calculation of Electron Cyclotron Current Drive Efficiency for Recent DIII-D Experiments[1] Y.R. LIN-LIU, V.S. CHAN, General Atomics, O. SAUTER, CRPP/EPFL, R.W. HARVEY, CompX — The standard approach of modeling electron cyclotron current drive (ECCD) in tokamaks has been based on the bounce-averaged Fokker-Planck theory. It assumes that the effective collision frequency is much smaller than the bounce frequency for trapped electrons at all energies. This assumption is invalid at low energies and gives pessimistic estimate of ECCD efficiency. A non-bounce-averaged Fokker-Planck code (CQLP) is used to calculate electron response for the DIII-D ECCD experimental parameters.[2] The ECCD efficiency at finite collisionality is evaluated and compared with a scaling law deduced from a boundary-layer analysis in the small inverse apect ratio limit, which predicts a modest improvement in current drive efficiency. The numerical calculation is extended to consider an enhancement of ECCD efficiency in the presence of dc electric field.

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[2]T.C. Luce *et al.*, General Atomics Report GA-A23018 (1999).

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