Abstract Submitted
for the APR99 Meeting of
The American Physical Society

Sorting Category: O.5 (Theoretical)

Effect of Trapped Electrons and Collisionality on Electron Cyclotron Current Drive and Comparison with Experiments on the DIII–D Tokamak[1] Y.R. LIN-LIU, V.S. CHAN, T.C. LUCE, R. PRATER, General Atomics, O. SAUTER, CRPP/EPFL, R.W. HARVEY, CompX — Experiments on DIII–D have shown that the normalized figure of merit $n_e I_p R/PT_e$ for Electron Cyclotron Current Drive is independent of minor radius.[2] This is surprising since trapping of current-carrying electrons is expected to reduce the driven current for off-axis deposition. However, theoretical treatments of the trapping effect have been based on the collisionless assumption at all energies. This assumption is clearly invalid for lower energy electrons. We present a quantitative study of this effect by using adjoint techniques to calculate the collisionality dependence of the ECCD. Both approximate analytic and numerical solutions of the adjoint equation for current drive (without invoking bounce average) are considered. The impact of finite collisionality on off-axis ECCD on the DIII–D experiments and the projection to high performance advanced tokamak conditions in DIII-D will be discussed.

[1]Supported by U.S. DOE Grant DE-FG03-95ER54309 and in part by the Swiss National Science Foundation.
[2]T.C. Luce *et al.*, to be published in Proc. IAEA Meeting, Yokohama, Japan, 1998.

Y.R. Lin-Liu
linliu@gav.gat.com
General Atomics

☐ Prefer Oral Session
☒ Prefer Poster Session

Special instructions: Sherwood; this abstract replaces abstract 70589

Date submitted: December 3, 1998 Electronic form version 1.4