Enhanced Current Drive Due to Localized Electron Cyclotron Power Deposition in DIII–D,* R.W. Harvey, CompX, O. Sauter, CRPP, Lausanne, Y.R. Lin-Liu, T.C. Luce, R. Prater, General Atomics — Off-axis electron cyclotron current drive (CD) efficiency in the DIII–D tokamak has been observed to exceed calculated results using axisymmetric, Fokker-Planck (FP) theory; preliminary calculations with bounce-averaged FP codes show CD enhancement trapping effects are reduced, as may result from collisions.1 We examine localized CD efficiency using the non-bounce-averaged CQLP FP code2 which solves for \( f(v_{||}, v_{\perp}, \text{distance-s-long-B}) \), including the streaming operator. Electron current is driven by QL diffusion over a small region along B. To complete the circuit, the driven current circulates along B for ~100 turns, given by the (poloidal plasma circumference)/(beam size), a distance of order the mfp. Continuity is maintained by an effective electric field. The resulting modifications of the CD efficiency from the usual bounce-averaged axisymmetric value, including collisional reduction of trapping effects, will be presented.

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