

Electron cyclotron current drive efficiency in general tokamak geometry

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Abstract. Green's-function techniques are used to calculate electron cyclotron current drive (ECCD) efficiency in general tokamak geometry in the low-collisionality regime. Fully relativistic electron dynamics is employed in the theoretical formulation. The high-velocity collision model is used to model Coulomb collisions and a simplified quasi-linear rf diffusion operator describes wave-particle interactions. The approximate analytic solutions which are benchmarked with a widely used ECCD model, facilitate time-dependent simulations of tokamak operational scenarios using the non-inductive current drive of electron cyclotron waves.