Abstract Submitted
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A Finite-Orbit-Width Fokker-Planck solver for modeling of RF Current Drive in ITER[1] YU.V. PETROV, R.W. HARVEY, CompX — The bounce-average (BA) finite-difference Fokker-Planck (FP) code CQL3D [1,2] now includes the essential physics to describe the RF heating of Finite-Orbit-Width (FOW) ions in tokamaks. The FP equation is reformulated in terms of constants-of-motion coordinates, which we select to be particle speed, pitch angle, and major radius on the equatorial plane thus obtaining the distribution function directly at this location. A recent development is the capability to obtain solution simultaneously for FOW ions and Zero-Orbit-Width (ZOW) electrons. As a practical application, the code is used for simulation of alpha-particle heating by high-harmonic waves in ITER scenarios. Coupling of high harmonic or helicon fast waves power to electrons is a promising current drive (CD) scenario for high beta plasmas. However, the efficiency of current drive can be diminished by parasitic channeling of RF power into fast ions such as alphas or NBI-produced deuterons, through finite Larmor-radius effects. Based on simulations, we formulate conditions where the fast ions absorb less than 10% of RF power. [1] R.W. Harvey and M.G. McCoy, "The CQL3D Fokker Planck Code" (www.compxco.com/cql3d). [2] Yu.V. Petrov and R.W. Harvey, PPCF 58, 115001 (2016).

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