Abstract Submitted
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Self-Consistent Simulation of High Power Electromagnetic Wave Heating in Three Dimensional Tokamak Geometry[1] E.F. JAEGER, L.A. BERRY, D.B. BATCHELOR, ORNL, R.W. HARVEY, CompX, RF SCIDAC TEAM — In tokamak plasmas, high power electromagnetic wave heating in the ion cyclotron range of frequencies (ICRF) often gives rise to supra-thermal ion populations or "ion tails." Previous self-consistent simulations [1] of these tails have included only a single toroidal harmonic in the wave solution, and are thus limited to two spatial dimensions. In this work, these calculations are extended to three spatial dimensions by including a full spectrum of toroidal harmonics for specific antenna geometries. By summing the quasi-linear diffusion coefficients over all toroidal harmonics and iterating between wave and Fokker-Planck solutions, a self-consistent three dimensional solution is obtained for the wave electric field and ion distribution function. This is possible because the quasi-linear diffusion coefficients are flux-surface-averaged quantities, and thus can be summed directly over toroidal harmonics using Parseval's theorem. [1] E. F. Jaeger, L. A. Berry, S. D. Ahern, *et al.,* Phys. Plasmas **13**, 056101-1 (2006).

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