Abstract Submitted
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Towards including finite orbit effects in self-consistent calculations of ion cyclotron heating in non-Maxwellian plasmas D.L. GREEN, L.A. BERRY, E.F. JAEGER, ORNL, M. CHOI, GA, RF SCIDAC TEAM — In burning plasma experiments, the combination of neutral beam injection, high power electromagnetic heating and fusion products give rise to significant non-thermal ion populations. The resulting non-Maxwellian plasma affects ICRF wave propagation and heating. Self-consistent simulation of these effects has been achieved by an iterative coupling of a full-wave electromagnetic solver with a bounce-averaged Fokker-Planck (F-P) code under the zero banana width approximation.[1] Investigating the effects of finite width particle orbits is possible by iterating with a Monte-Carlo calculation of the ion distribution function in place of the F-P code. Here we present progress towards coupling the all-orders global wave solver AORSA with the ORBIT-RF Monte-Carlo code. ORBIT-RF solves the Hamiltonian guiding center equations under coulomb collisions and ICRF quasi-linear (QL) heating taking the QL diffusion coefficients calculated from the AORSA wave fields as inputs. However, completing the self-consistent, time dependent calculation requires adapting the resulting Monte-Carlo particle list to a distribution function suitable for input to AORSA. Issues associated with calculating the differentiable bounce-averaged distribution function from discrete particle data will be discussed.

[1]E. F. Jaeger, et al., Phys. of Plasmas, 13, 056101-1, 2006

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