Monte-Carlo orbit/full wave simulation of ion cyclotron resonance frequency (ICRF) wave damping on resonant ions in tokamaks

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Abstract. To investigate the experimentally observed interaction between beam ion species and FW, a Monte-Carlo code, ORBIT-RF, has been upgraded to incorporate a steady-state neutral beam ion slowing-down distribution, a quasilinear high harmonic rf diffusion operator and the wave fields from the two-dimensional ion cyclotron resonance frequency (ICRF) full wave code (TORIC). Comparison of ORBIT-RF simulation of power absorption with TORIC calculation, which assumes Maxwellian plasma distributions, attains agreement within a factor of two. The experimentally measured enhanced neutron rate is reproduced to within 30% from ORBIT-RF simulation using a single dominant toroidal and poloidal wave number.

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