Sorting Category: 5.1.1.2 (Theoretical)

Ray Tracing Modeling of Fast Wave Absorption by Beam Ions[1] T.K. MAU, UC-San Diego, C.C. PETTY, General Atomics, M. PORKOLAB, MIT — The CURRAY ray tracing code[2] is used to investigate the absorption of fast waves by energetic beam ions in the higher harmonic frequency ranges. For analyzing a large number of data points, the energetic ions are approximated locally by an anisotropic Maxwellian distribution obtained from the TRANSP code. Wave absorption along the rays is calculated near ion harmonics using the full kinetic treatment and including the thermal anisotropy. Higher-order thermal effects in the wave dispersion have been included in calculating the field polarization factors. Good agreement with a simple analytic formula[3] has been obtained in cases with $k_\perp^2 \rho_i^2 \ll 1$. The results will be benchmarked and parametrized with those using calculated distribution functions in the weak RF limit. This approximate absorption model will be tested on experiments in DIII-D, where interactions of the fast wave with neutral beam ions at $\omega/\omega_{ci} \sim 4 - 7$ have been observed.

Tak Kuen Mau
mau@fusion.ucsd.edu
UCSD

☐ Prefer Oral Session
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Special instructions: primary

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