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Ray tracing for ICRF, including mode conversion and caustics[1]
ANDRE JAUN, NADA, Royal Inst. of Technology, Stockholm, EUGENE R. TRACY, College of William & Mary, ALLAN N. KAUFMAN, LBNL/UCBerkeley, ALAIN J. BRIZARD, St Michael's College, VT — We report on our program to apply ray methods to ICRF heating in tokamak geometry. With particular attention to mode-conversion regions and to caustics, we have implemented our algorithms [1] for ray splitting, to obtain the evolution, along a ray, of wave amplitude, polarization, phase, and focusing [2]. Since these methods require a hermitian dispersion matrix to yield a real-valued ray hamiltonian, they must be supplemented by an algorithm to deal with wave damping from resonant particles, to be discussed in this poster. The goal of this effort is to greatly speed up the calculation of the power deposition profile, and of current drive and flow drive, in realistic tokamak equilibria, achieving in seconds, using ray-tracing, what now takes hours using full-wave simulations.
1. E R Tracy, A N Kaufman, A Jaun, Phys Lett A290 (2001) 309; "Local fields for asymptotic matching in multidimensional mode conversion" (submitted for publication, 2006).
2. A Jaun, E R Tracy, A N Kaufman, "Eikonal waves, caustics, and mode conversion in tokamak plasmas" (submitted for publication, 2006)

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