Abstract Submitted
for the DPP09 Meeting of
The American Physical Society

Correlation Effects in ICRF Diffusion Coefficients[1] YU. PETROV, R.W. HARVEY, CompX, E.F. JAEGER, L.A. BERRY, D.B. BATCHELOR, ORNL, P.T. BONOLI, J.C. WRIGHT, MIT/PSFC — RF quasi-linear (QL) theory of wave-plasma interaction assumes at each resonant surface that a group of ions has no gyrophase-memory from the previous crossings. In contrast, the DC (Diffusion Coefficient) code obtains coefficients by direct numerical integration of the Lorentz force equation for ion motion in combined equilibrium and RF fields from the AORSA full-wave code, thus keeping gyrophase information. For a single toroidal mode, strong correlation effects are observed in form of peaks and dips in momentum space. Nevertheless, for a C-Mod minority ion ICRF heating test case, the radial profiles of power absorption calculated by the CQL3D Fokker-Planck code using DC results, agree well with those calculated by AORSA based on QL theory, at least at early times where the ion distribution is isotropic about the B-field. However, as the ion distribution develops anisotropy, differences in power absorption appear. We also examine effects of multiple ICRF toroidal modes in ITER.

[1]Supported under US DOE grants ER54649 and ER54856.

Yuri Petrov
CompX

Date submitted: 17 Jul 2009 Electronic form version 1.4