Comparison of Quasi-linear and Exact Ion Cyclotron Resonant Diffusion[1] R.W. HARVEY, YU. PETROV, CompX, E.F. JAEGER, XCEL, D.B. BATCHELOR, L.A. BERRY, ORNL, P.T. BONOLIL, MIT — These studies investigate the validity of ICRF quasilinear(QL) diffusion theory by comparison with coefficients calculated from Lorentz orbits in full-wave fields. We also compare power deposition and distribution functions obtained with the coupled CQL3D Fokker-Planck code[1], using the two RF diffusion sets. Results are obtained within the context of the Alcator C-Mod ICRF experiment. QL theory is examined using the new, parallelized, diffusion coefficient code, DC, which calculates RF diffusion by suitable average of results of direct numerical integration of the Lorentz force equation for ion motion in the combined equilibrium fields and the RF full wave EM fields from the AORSA full-wave code. Resulting tail ion distributions with DC are substantailly smoothed in pitch angle compared to QL results.

[1] R.W. Harvey and M. McCoy, The CQL3D Fokker Planck Code, www.compxco.com
[2] E.F. Jaeger et al, Nucl. Fusion **46**, (2006) S397-S408

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