Abstract Submitted
for the DPP15 Meeting of
The American Physical Society

Coupling an ICRF core spectral solver to an edge FEM code JOHN WRIGHT, SYUNICHI SHIRWAIWA, MIT-PSFC, RF SCIDAC TEAM — The finite element method (FEM) and the spectral approaches to simulation of ion cyclotron (IC) waves in toroidal plasmas each have strengths and weaknesses. For example, the spectral approach (eg TORIC) has a natural algebraic representation of the parallel wavenumber and hence the wave dispersion but does not easily represent complex geometries outside the last closed flux surface, whereas the FEM approach (eg LHEAF) naturally represents arbitrary geometries but does not easily represent thermal corrections to the plasma dispersion. The two domains: thermal core with flux surfaces and cold edge plasma with open field lines may be combined in such as way that each approach is used where it works naturally. Among the possible ways of doing this, we demonstrate the method of mode matching. This method provides an easy way of combining the two linear systems without significant modifications to the separate codes. We will present proof of principal cases and initial applications to minority heating.

John Wright
MIT-PSFC

Date submitted: 22 Jul 2015 Electronic form version 1.4