Abstract Submitted
for the DPP11 Meeting of
The American Physical Society

Numerical analysis of radio-frequency sheath-plasma interactions in the ion cyclotron range of frequencies[1] H. KOHNO, Massachusetts Institute of Technology, J.R. MYRA, D.A. D'IPPOLITO, Lodestar Research Corporation — In this study a numerical code that solves self-consistent RF sheath-plasma interactions in the SOL for ICRF heating is developed based on a nonlinear finite element technique and is applied to various problems represented by simplified models for the poloidal plane of a tokamak. The present code solves for plasma waves based on the cold plasma model subject to a sheath boundary condition. Using the developed finite element code, some new properties of the RF sheath-plasma interactions are discovered. For example, it is found in the 1D domain that multiple roots can be present due to the resonance of the propagating slow wave and its nonlinear interaction with the sheath. An approach that deals with the singularity in the sheath boundary condition will also be presented.

[1]This work was supported by the U.S. DOE Contracts DE-FG02-91ER54109, DE-FC02-01ER54648, DE-FG02-97ER54392, and DE-FC02-05ER54823.

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Date submitted: 13 Jul 2011 Electronic form version 1.4