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Computational Modeling of the HBT-EP ICRF Heating System[1]

J.M. HANSON, A. KLEIN, Y. LIU, M.E. MAUEL, D.A. MAURER, G.A. NAVRATIL, T.S. PEDERSEN, N. STILLITS, Columbia University, M.D. CARTER, ORNL, R.W. JAMES, USCG Academy, Stevens Institute of Technology, HBT-EP TEAM — We describe computational modeling of the HBT-EP dual strap, inside launch ICRF heating system. RF heating is applied at 4.5MHz to deuterium discharges as a means of Beta enhancement. Experiments to date have shown weak antenna-plasma coupling. In order to better quantify loading measurements of the HBT-EP ICRH antenna and aid in optimizing and understanding plasma antenna coupling, two computational models have been developed to calculate antenna parameters. The first is a simple, 2D current stick model that provides information about the local vacuum magnetic field and spectral mode structure generated by the antenna. Results from this model indicate that coupling may be improved by adjusting the antenna's radial position or toroidal size. The second model is implemented using the RANT3D code[2]. RANT3D solves Maxwell's Equations given the 3D geometry of the antenna and an impedance matrix for the plasma edge. Progress made using RANT3D to confirm earlier results and suggestions for improving the current antenna design will be presented.

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[2]M. D. Carter, *et al.* Nuc. Fusion, **36**, 209 (1996).

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