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Magnetic field-aligned ICRF antenna to minimize RF sheaths*
M.L. GARRETT, S.J. WUKITCH, P. KOERT, D.G. WHYTE, MIT Plasma Science and Fusion Center — One of the primary challenges of ICRF heating is the minimization of impurities associated with ICRF operation. A new magnetic field-aligned antenna was optimized for magnetic flux coupling, power handling, and minimized integrated E-parallel. Initial simulations performed using both slab and cylindrical geometry suggested nearly complete cancellation of E-parallel. Using 3-D toroidal models, the cancellation of E-parallel is more modest, suggesting 3-D geometrical effects are important. Using FEM with a 3-D toroidal cold plasma model, four antenna phases were analyzed for the field-aligned antenna: [0,π,0,π], [0,0,π,π], [0,π,π,0], [0,0,0,0]. In each case, the field-aligned antenna had reduced integrated E-parallel relative to the existing non-aligned antenna geometry, with the greatest reduction for monopole [0,0,0,0] phasing. The new field-aligned ICRF antenna has been installed on Alcator C-mod. Results will be presented characterizing operational sensitivity to both field line pitch and toroidal phasing. EM analysis will be compared with current and voltage data from eight pairs of I-V probes installed in the antenna box. *Supported by USDoE award DE-FC02-99ER54512

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