Abstract Submitted
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Initial Characterization of Magnetic Field-Aligned ICRF Antenna[1] M.L. GARRETT, S.J. WUKITCH, A.N. JAMES, P. KOERT, C. LAU, Y. LIN, B. LIPSCHULTZ, D.R. MILLER, R. OCHOUKOV, M.L. REINKE, J.L. TERRY, MIT PSFC — A principle challenge of ICRF heating in tokamaks with high-Z walls is the minimization of impurity contamination associated with ICRF operation. This impurity contamination is attributed to both source and transport mechanisms. The source mechanism introduces impurities by sputtering of PFCs by energetic ions. The transport mechanism alters core impurity concentration through spatial variation of plasma potentials in front of the antenna, establishing local E × B drifts that affect edge transport via the formation of convective cells. In each case, RF sheath formation driven by ICRF $E_{||}$, is implicated as the root cause. A new magnetic field-aligned antenna was optimized to reduce RF sheath formation. Using FEM with a 3-D toroidal cold plasma model, $E_{||}$ dependence on toroidal phasing and magnetic pitch angle were investigated. In each case, the field-aligned antenna had reduced integrated E-parallel relative to the existing non-aligned antenna geometry. The field-aligned antenna has been installed on Alcator C-Mod and initial characterization is complete. Both core molybdenum concentration and molybdenum source measurements at the antenna are lower during operation of the field-aligned antenna relative to the non-aligned antenna. Latest results will be presented.

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