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Modification of Launched ICRF Wave Number Spectrum[1] M.L. GARRETT, S.J. WUKITCH, MIT Plasma Science & Fusion Center — A principle challenge of ICRF heating in tokamaks with high-Z walls is the minimization of impurity contamination associated with ICRF operation. A source mechanism introduces impurities by sputtering of PFCs by energetic ions. Additionally, a transport mechanism alters core impurity concentration through spatial variation of plasma potentials in front of the antenna, establishing local E x B drifts that affect edge transport. Here, RF sheath formation driven by ICRF E-parallel, is implicated as the root cause. Recent results on Alcator C-Mod using a field-aligned (FA) antenna suggest that the launched wave spectrum may differ significantly from the predicted wave spectrum for certain toroidal phasings. A novel method for modifying the launched ICRF wave number spectrum and improving the cancellation of E-parallel involves directly imposing a potential bias on different regions of the antenna structure. 3D FEM simulations using a cold plasma tensor were implemented using DC and RF biasing on local limiters, tiles, and antenna septa. The effect of biasing antenna structures was investigated to determine the feasibility of improving E-parallel cancellation for different toroidal antenna phasings.

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Mike Garrett
MIT Plasma Science & Fusion Center

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