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Modeling of ICRF wave propagation and heating in EAST with the full-wave code TORIC E.M. EDLUND, P.T. BONOLI, M. PORKOLAB, S.J. WUKITCH, MIT Plasma Science and Fusion Center — Access to advanced tokamak (AT) scenarios in EAST depends on efficient coupling of the launched ion-cyclotron range of frequency (ICRF) power for heating and lower-hybrid waves to the plasma for steady-state current drive. This work builds on recent predictions from the full-wave code TORIC that have shown significant reductions in loading, resulting in improved heating efficiency, by operating with smaller phasing between antenna straps [1]. The density regime of typical EAST experiments produces perpendicular wavelengths of the fast-wave that are comparable to the minor radius of the plasma, resulting in cavity-resonance effects and requiring full-spectrum analysis for accurate calculations of the antenna coupling. This study examines the effects of antenna phasing, as well as plasma density, temperature and current as control parameters for achieving good coupling of the ICRF power in the pursuit of the optimal conditions for AT plasmas. This work is funded by the US DOE under contract DoE Grant DE-SC0010492.

[1] E. M. Edlund, P. T. Bonoli, M. Porkolab, S. J. Wukitch, 21st Topical Conference on Radiofrequency Power in Plasmas (2015)

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