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Modeling of ICRF coupling with realistic antenna structure on EAST

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Radiofrequency in ion cyclotron range of frequency (ICRF) is essential for plasma heating on EAST and ITER tokamak. Coupling is an issue that restricting the higher power operation of ICRF on EAST. In this work, we model the ICRF coupling by constructing numerical representations for both the antenna hardware and the 3D EAST plasma [1]. Detailed structure of ICRF antenna hardware is constructed as geometry into the FDTD plasma model in VSim software [2]. The plasma parameters can be represented in the simulation by importing EQDSK or g-files, or by applying an approximate analytic expression. The effects of magnetic field amplitude and curvature on ICRF coupling are studied. We discuss the reflection ratio in the simulation and compare to the experiments. By modifying the filter in simulations, we study the physics of slow wave excitation in the immediate vicinity of the antenna hardware and SOL. We show the comparison of these effects on ICRF coupling between the majority deuterium and helium plasmas on EAST.

References

1. J.H. Zhang, et al., Nucl. Fusion, 57, 066030 (2017).
2. T. G. Jenkins and D. N. Smithe, Plasma Sources Sci. Technol. 24, 015020 (2015).