Abstract Submitted
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Scoping Study of Lower Hybrid Current Drive for CFETR[1] G.M. WALLACE, S.G. BAEK, P.T. BONOLI, S. SHIRAIWA, MIT PSFC, C.B. WU, B.J. DING, M.H. LI, ASIPP — A scoping study for lower hybrid current drive (LHCD) was performed for the China Fusion Engineering Test Reactor (CFETR) "hybrid scenario ($R_0 = 7$ m, $a = 2.2$ m, $B_0 = 6.4$ T, $I_p = 7.6$ MA, $n_{e0} = 1.2 \times 10^{20}$ m^{-3}, $T_{e0} = 30$ keV). The πScope workflow engine was used to set up a large number of parametric scans of the antenna position, launched $n_{||}$, and power balance between low field side (LFS) and high field side (HFS) antennas with a total power of 20MW. Ray tracing/Fokker-Planck simulations predict off-axis current drive with a broad profile near r/a of 0.6-0.9 and high efficiency (1.3 MA per 20 MW, $\eta = 5.5 \times 10^{19}$ AW^{-1}m^{-2}) for waves launched from the HFS. Waves launched from the LFS damp at larger radius ($r/a \sim 0.9$) with similar efficiency to HFS launch. A modest increase in efficiency (5%) is found when synergy between the HFS and LFS antennas is considered in single pass damping scenarios. The effect of scattering from density blobs on the LFS is implemented through rotation of the perpendicular wavenumber. This effect can be ignored for HFS launch due to the quiescent nature of the HFS SOL in double null configurations.

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