

Abstract Submitted
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Design of off-midplane launcher (LH3) for Alcator C-Mod S.
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C-MOD TEAM — Improving LHCD efficiency at density above $10^{20}m^{-3}$ is crucial for approaching AT regimes on Alcator C-Mod. In this density regime, an unexpected loss of LHCD efficiency has been observed. Modeling and experiments suggest that such loss is intrinsic to the strong multipass absorption regime and can be overcome by improving the wave single pass absorption. For this purpose, an additional launcher (LH3) was designed. Besides doubling total injected LH power, LH3 will be located off-midplane and will enhance the waves single pass absorption by velocity space synergy with the existing launcher (LH2). The poloidal location and launched $N_{//}$ were selected based on a large parameter scan using a ray-tracing code. About 300kA of LH driven current was predicted at $1.4e20m^{-3}$ using 1.3MW of forward power. LH3 has a grill of 4x16 active waveguides and is based on a eight-way splitter design, which splits the microwave power into four ways in the poloidal direction and two ways in the toroidal direction. Coupling studies using commercial FEM software and the ALOHA code predict good coupling in a wide range of $N_{//}$ (from 2.2 to 2.7). Details of RF design and progress of launcher fabrication will be reported.

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