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Initial experimental results of fast wave propagation study on LAPD with a phased-array RF antenna X. YANG, T. DEHAAS, TAE Technologies, B. VAN COMPERNOLLE, T. CARTER, P. PRIBYL, UCLA, F. CECCHERINI, I. ALLFREY, J. SCHROEDER, TAE Technologies, R. GOULDING, C. LAU, ORNL, N. BERTELLI, M. ONO, PPPL, S. SHIRAIWA, J. WRIGHT, PSFC, MIT — High harmonic fast wave (HHFW) electron heating is explored as a possible heating method for advanced beam-driven field reversed configuration (FRC) plasmas, such as TAE Technologies' current experimental device, C-2W (also called "Norman") [1]. To investigate the HHFW physics and gain operating experience in relevant plasma conditions, a prototype RF experiment on the LAPD machine at UCLA has been initiated. A phased-array RF antenna has been designed, built, and installed on LAPD through an international, multi-institutional, public-private collaboration. The fast wave propagation at low power was studied while varying the phasing between antenna straps, the antenna radial position, and the plasma edge density profile. The RF magnetic fields of HHFW at both the near and far fields were measured by B-dot probes and the measurements were used to validate the results of full wave simulations with PETRA-M code. The preliminary experiments on LAPD show promising results that fast wave can couple and propagate into the plasma at all antenna phases, even when the antenna is retracted close to the wall. [1] H. Gota et al., Nucl. Fusion 59, 112009 (2019).

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