

Abstract Submitted  
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**Spectral measurements of lower hybrid waves in the high-density multi-pass regime of Alcator C-Mod**<sup>1</sup> SEUNG GYOU BAEK, R.R. PARKER, S. SHIRAIWA, G.M. WALLACE, P.T. BONOLI, I.C. FAUST, A.E. HUBBARD, B.L. LABOMBARD, M. PORKOLAB, MIT, Y. TAKASE, T. SHINYA, University of Tokyo, R. VIEIRA, N. MUCIC, MIT — Spectral measurements of lower hybrid waves have been performed on the diverted Alcator C-Mod tokamak with an aim of identifying the root cause of the observed anomalous loss of LH current drive efficiency in the high-density multi-pass regime. A recent experiment conducted in the reversed-field configuration confirms the previously observed magnetic-configuration dependent parametric decay instabilities (PDI) in the forward-field configuration at  $\bar{n}_e \approx 1.1 \times 10^{20} \text{ m}^{-2}$ , suggesting edge/scrape-off-layer plasmas are playing an important role in determining the PDI onset. As the plasma density is raised toward  $\bar{n}_e \approx 1.5 \times 10^{20} \text{ m}^{-2}$ , decay spectra are observed to be dominated by PDI that are excited at the low-field-side (LFS) of the tokamak, regardless of magnetic-configuration types. While the quantification of pump depletion due to PDI needs further investigations, the measured pump peak power at the high-field-side is observed to maintain its strength up to  $\bar{n}_e \approx 1.5 \times 10^{20} \text{ m}^{-2}$ , indicating multi-pass propagations of LH waves. This also implies that strong single-pass Landau absorption could help recover the expected current drive efficiency. A set of LH magnetic probes is being designed to further examine how much the launched parallel wavenumber spectrum is affected by nonlinear effects on the first pass from the launcher to the plasma at the LFS.

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