

Abstract Submitted
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Characterization of onset of parametric decay instability of lower hybrid waves in ITER-relevant high-density plasmas¹ SEUNG GYOU BAEK, P.T. BONOLI, R.R. PARKER, S. SHIRAIWA, G.M. WALLACE, M. PORKOLAB, PSFC, MIT, Y. TAKASE, University of Tokyo, D. BRUNNER, I.C. FAUST, A.E. HUBBARD, B.L. LABOMBARD, C. LAU, PSFC, MIT — Lower hybrid (LH) current drive experiments on Alcator C-Mod have revealed that the density corresponding to the onset of parametric decay instability (PDI) is as low as $\bar{n}_e \approx 1 \times 10^{20} m^{-3}$, suggesting that PDI may be a remaining parasitic loss mechanism to explain the observed loss of current drive efficiency in high density plasmas. Convective growth due to parallel coupling is most likely to explain the observed PDI. Depending on the magnetic configurations, PDI is excited at different locations with different strength, while a similar level of hard X-ray is observed as long as \bar{n}_e is similar. PDI is excited at the high-field side edge in lower null plasmas with the decrease in the pump power, indicating that the single pass absorption is weak and pump depletion can occur below conventional PDI limit. In upper null plasmas, PDI is excited at the low-field side edge with no apparent indication of pump depletion. More extensive spectral measurements are necessary to fully understand the role of this seemingly weak PDI at the LFS to gauge the effect of the observed PDI in high single-pass absorption plasmas as will be in ITER.

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Seung Gyou Baek
PSFC

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