

Abstract Submitted
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Effects of lithiation and frequency on lower hybrid current drive experiment on EAST¹ S. G. BAEK, G. M. WALLACE, P. T. BONOLI, MIT PSFC, M. H. LI, B. J. DING, Y. C. LI, Y. F. WANG, C. B. WU, G. H. YAN, M. WANG, W. GAO, S. LIN, Q. ZANG, H. ZHAO, ASIPP, S. SHIRAIWA, PPPL — EAST lower hybrid current drive (LHCD) experiments at two frequencies show that lithiation extends LHCD toward high density and has a more significant impact on the scrape-off-layer (SOL) properties than changes in Greenwald fraction achieved by the varying the plasma current (300 kA to 700 kA). Density ramp experiments show that LHCD remains up to $\sim 4 \times 10^{19} \text{ m}^{-3}$ with a density scaling of hard X-ray emission of $n_e^{-2.5}$ ($n_e^{-3.5}$) at 4.6 (2.45) GHz, compared to a scaling of $n_e^{-3.5}$ (n_e^{-5}) without lithiation. Indications of stronger RF power losses are observed at a lower source frequency (2.45 GHz). A faster rise in the density at the launcher shows a higher level of ionizations, which also coincides with the onset of parametric decay instabilities. Both phenomena agree with the expected frequency scaling. A stronger non-linear increase in the divertor D_α signal is observed at 2.45 GHz, which indicates that divertor becomes denser and colder. RF power may be dissipated more there due to higher collisionality. The rise in the density at the launcher may partially be responsible for an early onset of D_α signal observed at a lower RF frequency, implying that control of the launcher density may be one way to mitigate parasitic RF losses at the edge and improve CD efficiency at 2.45 GHz.

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