

## P2.1085 Linkage between LHCD and density fluctuation in edge region on EAST

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See full abstract here:

<http://ocs.ciemat.es/EPS2019ABS/pdf/P2.1085.pdf>

Studies in EAST show that lower recycling and higher source frequency are preferred to improve LHCD (lower hybrid current drive) capability at high density due to the mitigation of parasitic effects of edge plasma, mainly ascribed to parametric instability (PI) and collisional absorption (CA) in edge region [1, 2]. A link between the degradation of current drive (CD) efficiency and the spectral broadening is found, showing that the spectral broadening has a negative and significant effect on CD efficiency. Recently, experimental effect of density fluctuation in edge region on LHCD, another candidate related to parasitic effect, has been observed for the first time in EAST. Results show that density fluctuation is affected by RMP application at density of  $3.5 \times 10^{19} \text{m}^{-3}$ . The current drive capability indicated by the loop voltage improves with the decreasing density fluctuation. Meanwhile, the internal inductance enhances, indicating a peaked plasma current profile. Such degradation of LHCD at higher density fluctuation is mainly ascribed to the effect of density fluctuation in edge region on launching wave, which is firstly evidenced by the frequency spectrum measurement, leading to more power deposited in the edge region. Results are encouraging considering that the LHCD tool is essential for control of current profile in reactor grade plasmas. Also, the development of LH wave number measurement in the edge region for further mechanism understanding and the preliminary result obtained in EAST will be reported.

[1] B J Ding et al., Nucl. Fusion 53 (2013) 113027.

[2] B J Ding et al., Nucl. Fusion 58 (2018) 126015.

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