Abstract Submitted
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Internal measurement of low-frequency magnetic fluctuations in DIII-D ELMy H-mode pedestal[1] JIE CHEN, D. BROWER, W.X. DING, UCLA, Z. YAN, UW-Madison, R. GROEBNER, General Atomics, T.L. RHODES, UCLA, S. HASKEY, PPPL, K. BARADA, UCLA, F. LAGGNER, PPPL, S. BANERJEE, College of William and Mary — Faraday-effect polarimetry has showed high-frequency (100-500 kHz) broadband magnetic turbulence identified as micro-tearing modes in DIII-D ELMy H-mode pedestal [1]. Here we report low-frequency (1-100 kHz) magnetic fluctuations also observed in the pedestal for the same plasma conditions. The low-frequency magnetic fluctuations have line-averaged (lower-bound) δb/b=2.5x10^4 and $|\delta b/b|/|\delta n/n|$=0.025 at the peak frequency ˜10 kHz, where δb is line-averaged radial magnetic fluctuation amplitude measured by polarimetry and δn is local density fluctuation measured at the same frequency by Beam-Emission-Spectroscopy (BES). BES measurements establish that the low-frequency density fluctuations are localized in the pedestal and propagate in the ion diamagnetic direction (plasma frame). These observations indicate the existence of an ion direction, electromagnetic instability in the ELMy H-mode pedestal. BALOO and ELITE calculation suggest kinetic-ballooning modes and peeling-ballooning modes, which are unstable and have magnetic feature, are potential candidates for the measured fluctuations. [1] J. Chen et al., APS-DPP invited talk, Fort Lauderdale (2019).

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