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# Observation of electromagnetic fluctuations correlating with the inter-ELM pedestal evolution on EAST

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Pedestal fluctuations and the correlations with the H-mode pedestal evolution between edge localized modes (ELMs) in the EAST tokamak is investigated. A new high frequency (>150 kHz) electromagnetic mode (HFM) during the inter-ELM phases is observed and reported here. The HFM and edge electrostatic coherent mode (ECM, ~50 kHz) and magnetic coherent mode (MCM, ~ 32 kHz) are observed co-existing between ELMs. After the ELM crash, the pedestal electron temperature recovered faster than the pedestal electron density. The onset of ECM is found to saturate or slow the increase of the pedestal electron density, while the onset of HFM and MCM are found to correlate with the saturation of the pedestal electron temperature till the next ELM burst. The characteristics of the electromagnetic fluctuations (HFM and MCM) in the high pedestal normalized electron collisonality ($\nu^*_{e,ped}$) case are studied in detail. For the characteristics in the poloidal direction: the HFM propagates in the electron diamagnetic drift direction in the laboratory frame with an average poloidal wave number $\bar{k}_\theta^{HFM} \approx 0.17 cm^{-1}$, while the MCM propagates in the ion diamagnetic drift direction in the laboratory frame with an average poloidal wave number $\bar{k}_\theta^{MCM} \approx 0.12 cm^{-1}$. The toroidal mode number (n) of the MCM is determined to be n =1. For the characteristics in the radial direction: both the HFM and MCM propagate radially inwards to the core plasma in the laboratory frame with an average radial wave number $\bar{k}_R^{HFM} \approx 0.08 cm^{-1}$ and $\bar{k}_R^{MCM} \approx 4.64 cm^{-1}$ respectively. The bispectral analysis shows that the HFM and MCM have strong interactions during the inter-ELM phases. In both high and relative low $\nu^*_{e,ped}$ case, the HFM is observed on both low and high field side, which is not the feature of kinetic ballooning modes. These studies may contribute to a better understanding of the pedestal evolution.

References

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Note: Abstract should be in 1 page.