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**Investigation of the harmonic coherent modes in the EAST pedestal region** CHU ZHOU, ADI LIU, JINLIN XIE, TAO LAN, WANDONG LIU, GE ZHUANG, WEIXIN DING, WENZHE MAO, University of Science and Technology of China, GUIDING WANG, University of California, Los Angeles, LIANG WANG, YONG LIU, Institute of Plasma Physics, Chinese Academy of Sciences, X.L. ZOU, CEA, IRFM, F-13108 Saint-Paul-lez-Durance, France, JIANQIANG HU, MINGYUAN WANG, JIN ZHANG, XI FENG, JIAXU JI, ZHAOYANG LIU, University of Science and Technology of China — A coherent mode structure, with up to 7 harmonics of a fundamental frequency of 12-15 kHz, has been observed in pedestal region during EAST H-mode phase driven by lower hybrid current drive (LHCD). Although such harmonic coherent mode (HCM) has a few similar features as the edge harmonic oscillation (EHO) in the DIII-D QH-mode, some differences between these two modes can still be discerned. The HCM peaks in the steep gradient region of pedestal (near the pedestal top), and has the toroidal mode numbers ranging from  $n = 1$  to 7. The edge radial electric field well during the H-mode phase with HCM is much deeper than that without ELM. Moreover, the appearance of HCM is always accompanied by the suddenly decreased  $\alpha$  signals, and the amplitude of fundamental branch is usually smaller than that of higher-order ones, which could be roughly explained by the free energy redistributed among all the harmonic branches through the amplitude correlation method. Bi-spectral analysis indicates that strong coupling between HCM and high frequency turbulence exists at the HCM peaking location, implying the important role of turbulence in HCM saturation process.

Adi Liu  
University of Science and Technology of China

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