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**RF heating and current drive with dominant electron Heating in Long Pulse Discharges on EAST** XINJUN ZHANG, YANPING ZHAO, FUKUN LIU, JIAFANG SHAN, XIANZU GONG, BOJIANG DING, MAO WANG, HANDONG XU, CHENGMING QIN, XIAOJIE WANG, MIAOHUI LI, JINPING QIAN, BAONIAN WAN, LIQUN HU, YUNTAO SONG, JIANGANG LI, Institute of Plasma Physics, Chinese Academy of Sciences — The efficient heating and current drive (H&CD) with dominant electron heating capability using Radio Frequency (RF) Continuous Wave (CW) actuators (LHW, ICRF, ECRH) has been successfully demonstrated with ITER-like low torque conditions in recent EAST fully non-inductive long-pulse H-mode discharges. The plasma was sustained by  $\sim 70\%$  RF H&CD together with  $\sim 30\%$  bootstrap current fraction. A high electron temperature plasma (core  $T_e > 4.0 \text{ keV}$ ) was obtained, resulting in lower reduced loop voltage, through the investigation possibly due to the synergistic effect between ECRH and LHCD. In separate experiments, the characteristic effect of LH wave frequency (a comparison of 2.45 GHz and 4.6 GHz LHW) on LHCD showed that the higher LH frequency is preferred favorable for current drive at high density. The improvement in LHCD at higher frequency is mainly ascribed to a reduction in the Parametric Instability (PI) and to a lesser extent, Collisional Absorption (CA) in the edge region. Finally, new recent experiments shows that the higher frequency LH improves penetration of the coupled RF power into the plasma core, also leading to a better effect on plasma characteristics more efficient core heating. The detailed results will be given.

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