



Experimental investigation of LHCD's effect on plasma rotation on EAST

Bo Lyu¹, Xianghui Yin¹, Jin Yang¹, Fudi Wang¹, Jun Chen², Ruijie Hu², Jia Fu¹, Yingying Li¹, Hongming Zhang¹, Bojiang Ding¹, Miaohui Li¹, Fukun Liu¹, Yuejiang Shi³, Minyou Ye², Baonian Wan¹

¹*Institute of Plasma Physics, Chinese Academy of Sciences, Hefei, 230031, China*

²*Department of Engineering and Applied Physics, University of Science and Technology of China, Hefei, 230026, China*

³*Department of Nuclear Engineering, Seoul National University, Seoul, 151-742, Korea*

*E-mail: blu@ipp.ac.cn

Development of new 4.6GHz LHCD system on EAST extends the research on LHCD's effect on plasma rotation. It was found that a typical ~20 km/s co-current rotation change per MW LHCD power was driven, along with efficient current drive. Rotation change was seen to be linearly correlated with changes in internal inductance and increase with safety factor and evolves over the similar timescale of current density. Hysteresis between rotation and T_e plasma stored energy was observed, suggesting different response time between the electron heating and rotation acceleration by LHCD. Profiles of the rotation after the LHCD injection show that the change of the rotation arise from the region where LHCD deposited and then transport to the whole profile, confirming the previous LHCD's rotation drive was originated at the plasma edge. Additionally, for NBI target plasma, the counter-rotation change was observed upon the injection of the LHCD and switched to co-rotation change with the injection of the LHCD. To further study the parametric dependence, several controlled experiments were performed, which shows that the change magnitude of rotation induced by LHCD decreases with plasma current (I_p), plasma density and increase with LHCD power. Finally, a comparison between the rotation driven by 4.6G LHCD and 2.45G LHCD on EAST is also presented, in which higher frequency LHCD could induce more rotation change, due to the better heating and CD efficiency associated with higher-frequency LHW.