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Characterization of MHD instabilities, plasma rotation alteration, and RWM control analysis in the expanded H-mode operation of KSTAR[1] Y.S. PARK, S.A. SABBAGH, J.W. BERKERY, J.M. BIALEK, Columbia University, J.G. BAK, W.H. KO, S.G. LEE, Y.M. JEON, S.H. HAHN, K.-I. YOU, K.D. LEE, NFRI, Korea, J.K. PARK, PPPL, G.S. YUN, H.K. PARK, Postech, Korea — The Korea Superconducting Tokamak Advanced Research (KSTAR) has expanded its H-mode operational space to higher beta and lower internal inductance, moving toward design target operation. Plasmas have reached normalized beta of 1.9, stored energy of 340 kJ, and energy confinement time of 171ms evaluated by EFIT reconstructions. Advances from the fall run campaign will be reported. Rotating modes having n = 1, 2 tearing parities are observed by internal and external measurements and their characteristics and stability dependence on plasma rotation profile are analyzed and compared to initial observations. Initial alteration of the plasma rotation profile by applied non-axisymmetric fields is investigated and has characteristics of non-resonant braking. Computation of active RWM control using the VALEN code examines the impact of available sensors for control. Both off-axis and midplane sensors are analyzed, and with off-axis sensors the mode can be stabilized up to normalized beta of 4.5 (C_beta = 86%) and up to 3.6 (44%) with and without compensation of the prompt applied field of the control coils from the sensors, respectively. Power and bandwidth requirements for RWM stabilization are also calculated by including sensor noise and power supply time delay.

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