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KSTAR stability and rotation control results for high normalized beta plasmas exceeding the ideal MHD no-wall stability limit[1] Y.S. PARK, S.A. SABBAGH, Columbia University, Y.M. JEON, S.G. LEE, W.H. KO, S.H. HAHN, J.G. BAK, K.-I. YOU, NFRI, Korea, J.K. PARK, PPPL, M.J. CHOI, G.S. YUN, H.K. PARK, Postech, Korea — Plasma stability parameters in KSTAR have reached and exceeded the $n = 1$ ideal no-wall limit computed for H-mode profiles. Normalized beta up to 2.9 has been achieved and sustained with plasma internal inductance near 0.75. The ratio β_N/l_i has exceeded 3.6 (an 80% increase over the prior year). Plasma stored energy has exceeded 0.5 MJ. Non-axisymmetric field spectra with dominant $n = 2$ component were applied to alter the plasma rotation profile by non-resonant neoclassical toroidal viscosity (NTV). The rotation profile was significantly altered without tearing activity or mode locking. Changing the in-vessel control coil current in steps altered rotation in a controlled fashion without hysteresis. The core rotation was lowered by 50% as measured by charge exchange spectroscopy, x-ray crystal spectrometer, and supported by magnetic diagnostics. H-mode energy confinement was maintained at reduced rotation while the resultant profile was peaked, as found in L-mode. Tearing mode onset conditions and mode locking criteria due to the applied $n = 1$, 2 applied fields were investigated. Additionally, ELMs were mitigated using sufficient $n = 2$ field strength by using midplane coils alone. Advances from the recent run campaign will be reported.

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