Abstract Submitted
for the DPP17 Meeting of
The American Physical Society

MHD stability analysis and global mode identification preparing for high beta operation in KSTAR[1] Y.S. PARK, S.A. SABBAGH, J.W. BERKERY, Y. JIANG, J.H. AHN, Columbia U., H.S. HAN, J.G. BAK, B.H. PARK, Y.M. JEON, J. KIM, S.H. HAHN, J.H. LEE, J.S. KO, Y.K. IN, S.W. YOON, Y.K. OH, NFRI, Z. WANG, PPPL, A.H. GLASSER, U. Washington — H-mode plasma operation in KSTAR has surpassed the computed n =1 ideal no-wall stability limit in discharges exceeding several seconds in duration. The achieved high normalized beta plasmas are presently limited by resistive tearing instabilities rather than global kink/ballooning or RWMs. The ideal and resistive stability of these plasmas is examined by using different physics models. The observed m/n =2/1 tearing stability is computed by using the M3D-C[1] code, and by the resistive DCON code. The global MHD stability modified by kinetic effects is examined using the MISK code. Results from the analysis explain the stabilization of the plasma above the ideal MHD no-wall limit. Equilibrium reconstructions used include the measured kinetic profiles and MSE data. In preparation for plasma operation at higher beta utilizing the planned second NBI system, three sets of 3D magnetic field sensors have been installed and will be used for RWM active feedback control. To accurately determine the dominant n-component produced by low frequency unstable RWMs, an algorithm has been developed that includes magnetic sensor compensation of the prompt applied field and the field from the induced current on the passive conductors.

[1]Supported by US DOE Contracts DE-FG02-99ER54524 and DE-SC0016614.

Young-Seok Park
Columbia University

Date submitted: 18 Jul 2017 Electronic form version 1.4