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Investigation of Neoclassical Tearing Mode Stabilization by ECCD in KSTAR[1] Y.S. PARK, S.A. SABBAGH, J.H. AHN, J.W. BERKERY, Y. JIANG, Columbia U., B.H. PARK, M.H. WOO, M.J. CHOI, H.S. KIM, J.G. BAK, NFRI — In KSTAR, high performance plasma operation to date has been limited by the onset of strong $m/n = 2/1$ neoclassical tearing modes (NTMs) that significantly reduce the plasma confinement. Recent experiments demonstrated active stabilization of 2/1 NTMs by the electron cyclotron current drive (ECCD). In the experiment, the 2/1 mode is destabilized by an extended duration of ECH at the initial phase of the discharge which is found to play a critical role in the mode destabilization. The 2/1 mode initially has a small amplitude then it increases to greater than 10 G due to a slow plasma current ramp-up. The pre-programmed ECCD deposition location is varied in steps around the $q = 2$ surface inferred from the ECE imaging diagnostic. The mode amplitude is reduced by 80% when the ECCD is deposited on the region closest to the $q = 2$. Rather insufficient EC-power of 0.7 MW from a single gyrotron and the co-existing modes at higher q-surfaces presumably having a tearing parity with $n = 1$ could explain the observed partial stabilization. The stabilization experiment using an increased EC-power from two gyrotrons to achieve a complete mode stabilization is scheduled to run in the 2020 KSTAR operation, and the result from the run will be reported.

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