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Rotating MHD Mode Analysis Including Real-time data on KSTAR Supporting Disruption Event Characterization and Forecasting J.D. RIQUEZES, S.A. SABBAGH, J.W. BERKERY, Y.S. PARK, J.H. AHN, Y. JIANG, J. BUTT, Columbia Univ, E. FREDRICKSON, PPPL, J.G. BAK, NFRI — A low ceiling in disruptivity (i.e. percentage of shots with major disruptions in a run campaign) for reactor scale, advanced tokamak operation at high performance highlights the need for accurate forecasting tools that can guide dynamic control of auxiliary systems meant for disruption avoidance, suppression, or mitigation. Survey studies of disruption databases have shown Neoclassical Tearing Modes (NTM) to be an important precursor to disruption events. The formation of saturated magnetic island chains on rational surfaces can lead to a plasma rotation drag in which the mode locks to the wall and subsequently disrupts the plasma. A characterization of the drag dynamics, primarily based on data taken from a toroidal array of Mirnov probes, has been developed and validated using NSTX/-U and KSTAR databases. A real-time causal counterpart to the offline analysis has also been advanced that employs a real-time Mirnov probe data acquisition system and Fourier decomposition recently being developed for the KSTAR Plasma Control System (PCS). A comparison of the two approaches is made and implications for successful NTM characterization and disruption forecasting is considered. *Supported by US DOE grants DE-SC0016614 and DE-FG02-99ER54524.

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