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Kinetic Equilibrium Reconstruction Validation and Stability Analysis of KSTAR Plasmas supporting Disruption Event Characterization and Forecasting[1] YANZHENG JIANG, STEVEN SABBAGH, YOUNG SEOK PARK, JOHN BERKERY, JAE HEON AHN, JUAN RIQUEZES, Columbia University, J. KO, J.H. LEE, S.W. YOON, NFRI, A.H. GLASSER, Fusion theory and computation, Inc., ZHIRUI WANG, PPPL — Validated kinetic equilibrium reconstructions are an essential requirement for accurate stability and disruption prediction analyses to support continuous operation of high beta KSTAR tokamak plasmas. Present analysis significantly expands prior reconstruction capability. [1] Pressure profiles are created from Thomson scattering and charge exchange spectroscopy data, and allowance for fast particle pressure. This supplements external magnetics and shaping field current data, and includes vacuum vessel and passive plate currents following an approach used in NSTX. [2] Up to 25 channels of MSE data, including tests of the new background polychrometer diagnostic, are used to constrain the magnetic field pitch angle to reconstruct the safety factor, q, profile. Comparison with MHD activity shows that m/n = 2/1 and 3/2 mode positions from ECE data compare well to rational surface positions. Approaches are taken to minimize variation of the equilibria within data error to reduce uncertainty in stability analysis used for disruption event characterization and forecasting (DECAF). [1] Y.S. Park, S.A. Sabbagh, J.W. Berkery, et al., Nucl. Fusion 51 (2011) 053001. [2] S.A. Sabbagh, A.C. Sontag, J.M . Bialek, et al., Nucl. Fusion 46 (2006) 635.

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