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'Predict-first' transport and stability analyses of KSTAR plasmas supporting disruption event characterization and forecasting[1] J.-H. AHN, S. A. SABBAGH, Y. S. PARK, Y. JIANG, Columbia University, M. D. BOYER, Z. R. WANG, PPPL, J. S. KANG, L. TERZOLO, NFRI, A. H. GLASSER, Fusion Theory and Computation Inc. — KSTAR plasmas have reached high stability parameters with normalized beta β_{N} reaching 4.3 at relatively low plasma internal inductance l_i ($\beta_{\mathrm{N}}/l_i > 6$), including operation at high $\beta_{\mathrm{N}} > \beta_{\mathrm{N}}^{\mathrm{no-wall}}$ [1]. Transport analyses are conducted to best understand a disruption-free path toward the KSTAR design target of $\beta_{\mathrm{N}} = 5$ while aiming to maximize the non-inductive current fraction f_{NI}. Interpretive TRANSP code analyses indicate that f_{NI} in existing high-performance KSTAR plasmas have reached up to 75%. The predictive capability of TRANSP is used to investigate the effects of the second NBI system recently installed on KSTAR. Extrapolations based on past KSTAR plasma global energy confinement quality (H98y2) and the Greenwald density fraction reveal possible scenarios of fully non-inductive plasmas (f_{NI}˜100%) in the range $\beta_{\mathrm{N}} = 3$–5 with varied NBI source usage These 'predict-first' analyses are used to design high-β scenario development experiments for the 2019 run campaign. Ideal and resistive stability of MHD modes in these plasmas are evaluated using the DCON code including the effect of passive stabilizing structure in the device supporting disruption forecasting
[1] Y.S. Park, S.A. Sabbagh, et al., Phys. Plasmas **24** (2017) 012512.

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