Abstract Submitted
for the DPP20 Meeting of
The American Physical Society

ELM Detection Capability for Disruption Event Characterization and Forecasting J. BUTT, S.A. SABBAGH, Y.S. PARK, J.H. AHN, J.W. BERKERY, Y. JIANG, J.D. RIQUEZES, Columbia University — Edge-Localized Modes (ELMs) can deposit high energy loads from the plasma onto tokamak walls, and pose serious constraints to the successful operation and lifetime of reactor-scale tokamaks such as ITER. Further, ELMs can trigger more detrimental plasma instabilities that can disrupt the plasma. ELM detection is therefore an important capability to determine the threat ELMs may pose in plasma termination. The initial implementation of an ELM-detection capability for the Disruption Event Characterization and Forecasting (DECAF) code is presented. A set of criteria based on relevant plasma signals (e.g. D_α light, stored energy, energy confinement time) are used to make the detection. The detector works in conjunction with other DECAF "events", which characterize disruption-relevant instabilities and other phenomena, such as the L-mode-to-H-mode transition. The presented ELM-detection capability used a database of plasmas from KSTAR and NSTX for detection validation. The ELM-detection event is also currently being developed for the real-time DECAF code as part of active real-time disruption prediction and avoidance research on KSTAR. *US DoE grant DE-SC0016614.

Jalal-ud-din Butt
Columbia University

Date submitted: 09 Jul 2020 Electronic form version 1.4