

Abstract Submitted
for the DPP15 Meeting of
The American Physical Society

Prospects of ITER Instability Control¹ EGEMEN KOLEMEN,
Princeton University — Prospects for real-time MHD stability analysis, plasma response calculations, and their use in ELM, NTM, RWM control and EFC will be discussed. ITER will need various controls to work together in order to achieve the stated goal of $Q \geq 10$ for multiple minutes. These systems will allow operating at high beta while avoiding disruptions that may lead to damage to the reactor. However, it has not yet been demonstrated whether the combined real-time feedback control aim is feasible given the spectrum of plasma instabilities, the quality of the real-time diagnostic measurement/analysis, and the actuator set at ITER. We will explain challenges of instability control for ITER based on experimental and simulation results. We will demonstrate that it will not be possible to parameterize all possible disruption avoidance and ramp down scenarios that ITER may encounter. An alternative approach based on real-time MHD stability analysis and plasma response calculations, and its use in ELM, NTM, RWM control and EFC, will be demonstrated.

¹Supported by the US DOE under DE-AC02-09CH11466

Egemen Kolemen
Princeton University

Date submitted: 21 Jul 2015

Electronic form version 1.4