

Abstract Submitted
for the DPP19 Meeting of
The American Physical Society

3D MHD spectroscopy towards real-time detection of multi-modes' stabilities TONG LIU, Dalian University of Technology, ZHIRUI WANG, M.D. BOYER, Princeton Plasma Physics Laboratory, B.-H PARK, National Fusion Research Institute, STEFANO MUNARETTO, General Atomics, NIKOLAS LOGAN, JONG-KYU PARK, Princeton Plasma Physics Laboratory, ZHENG-XIONG WANG, Dalian University of Technology — A 3D MHD spectroscopy method, utilizing the internal 3D coils to scan the frequency and poloidal spectrum of the applied 3D fields, is developed to perform active detection of multiple eigenmodes' stability in DIII-D and K-STAR experiments. Efficient wave packet coil waveforms have been developed to achieve fast updating of the plasma stability every 100ms. A new time dependent model is developed to extract multi-modes stability from the plasma response measured by multiple 3D sensors in the experiments. The time domain method and frequency domain method using the multi-pole transfer function are both applied in the data analysis to better understand their accuracy, robustness and efficiency while extracting mode stability. This work verifies the feasibility of real-time detection of plasma stability, which is essential to the disruption avoidance in the advanced tokamak operation. *Work supported under DE-FC02-04ER54698 and DE-AC02-09CH11466

Tong Liu
Dalian University of Technology

Date submitted: 10 Jul 2019

Electronic form version 1.4