Abstract Submitted
for the DPP16 Meeting of
The American Physical Society

Real Time Computation of Kinetic Constraints to Support Equilibrium Reconstruction[1] W.J. EGGERT, E. KOLEMEN, D. ELDON, Princeton University — A new method for quickly and automatically applying kinetic constraints to EFIT equilibrium reconstructions using readily available data is presented. The ultimate goal is to produce kinetic equilibrium reconstructions in real time and use them to constrain the DCON stability code as part of a disruption avoidance scheme. A first effort presented here replaces CPU-time expensive modules, such as the fast ion pressure profile calculation, with a simplified model. We show with a DIII-D database analysis that we can achieve reasonable predictions for selected applications by modeling the fast ion pressure profile and determining the fit parameters as functions of easily measured quantities including neutron rate and electron temperature on axis. Secondly, we present a strategy for treating Thomson scattering and Charge Exchange Recombination data to automatically form constraints for a kinetic equilibrium reconstruction, a process that historically was performed by hand.

[1]Work supported by US DOE DE-AC02-09CH11466 and DE-FC02-04ER54698.

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Date submitted: 14 Jul 2016 Electronic form version 1.4