Abstract Submitted
for the DPP99 Meeting of
The American Physical Society

Sorting Category: 5.1.1.2 (Experimental)

Minimal Plasma Response Models for Design of Tokamak Equilibrium Controllers with High Dynamic Accuracy[1]

D.A. HUMPHREYS, M.L. WALKER, J.A. LEUER, General Atomics

— We describe a model of linearized plasma shape and position response which is based on low poloidal mode number ($m \leq 2$, approximately vertical and major radial) displacements of the plasma current distribution. The model introduces minimal plasma degrees of freedom while providing sufficient accuracy for high performance controller design. The effects of significant variation in plasma poloidal beta, internal inductance, and separatrix configuration are taken into account. Models which can predict plasma shape and position variation with reasonable accuracy are particularly important for design of dynamic controllers in devices with significant variation in auxiliary heating input power and plasma shape — conditions common in the DIII–D tokamak. Model predictions are validated using experimental response data from DIII–D. Application of the plasma response model to design of multivariable dynamic plasma controllers recently implemented on DIII–D is described.

[1]Supported by U.S. DOE Contract DE-AC03-99ER54463.

☐ Prefer Oral Session
☒ Prefer Poster Session

D.A. Humphreys
humphrys@gav.gat.com
General Atomics

Special instructions: DIII-D Poster Session 2, immediately following JA Leuer

Date printed: July 16, 1999

Electronic form version 1.4