

**Abstract Submitted for the 56th Annual Meeting  
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Theory     Experiment

**Offline Development of Plasma Boundary Controllers for the KSTAR Tokamak,\*** S. Ballinger, *Columbia U*; N.W. Eidietis, D.A. Humphreys, A.W. Hyatt, A.S. Welander, *General Atomics*; S.H. Hahn, *NFRI* – The KSTAR TokSys [1] tokamak simulator, implemented in Matlab<sup>®</sup>/Simulink, has been extended to include a plasma boundary control system to allow automated offline tuning of shape control feedback loops. Offline control development minimizes resources expended tuning controllers during actual run time, and automated tuning is desirable in order to optimize the large number of shape control gains. The new simulation includes simplified versions of the rtEFIT/Isoflux [2] controller used in the KSTAR plasma control system, allowing full-closed-loop analysis of the plasma shape control. Results presented include application of robust design methods to optimizing control of KSTAR’s plasma boundary, and analysis to understand observed differences in boundary control between KSTAR and other superconducting devices.

[1] D.A. Humphreys *et al.* Nucl. Fusion **86**, 1116 (2007).

[2] J.R. Ferron *et al.* Nucl. Fusion **38**, 1055 (1998).

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