

Abstract Submitted  
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**Equilibrium Flux Surface Calculations for the W7AS and NCSX Stellarators.**<sup>1</sup> A. REIMAN, M. ZARNSTORFF, D. MONTICELLO, S. HUDSON, L. KU, Princeton Plasma Physics Laboratory, Princeton, NJ, A. WELLER, J. GEIGER, Max-Planck-Institut für Plasmaphysik, Greifswald, Germany, AND THE W7-AS TEAM — Calculations of equilibrium flux surface loss in the W7AS stellarator using the PIES code are found to be consistent with the observed maximum  $\beta$  values. A stochastic region is calculated to appear at the plasma edge when the magnitude of  $\beta$  is above a threshold value, and the stochastic region is calculated to broaden as  $\beta$  increases further. An interesting discovery is that the field line trajectories behave as if the flux surfaces are broken locally near the outer mid-plane and remain intact elsewhere. This is consistent with the expectation, which has been widespread in the stellarator community, that the 3D surfaces are broken by the strong local compression and distortion produced by the Shafranov shift. An estimate of the heat transport due to the field line stochasticity is consistent with the observed global energy confinement time. Divertor control coil currents are calculated to have a strong effect on the width of the stochastic region, and these calculations are consistent with the observed variation of the maximum  $\beta$ .

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