Abstract Submitted
for the DPP07 Meeting of
The American Physical Society

Sorting Category: 5.6.6 (E)

Magnetic Flexibility of NCSX.[1] M.C. ZARNSTORFF, S. HUDSON, L. MAINGI, D. MIKKELSEN, N. POMPHREY, PPPL, NCSX TEAM — The National Compact Stellarator Experiment (NCSX), currently under construction, is a modular quasi-axisymmetric stellarator designed to study confinement and stability of high-beta plasmas. It has 18 modular coils, 18 planar weak toroidal field coils, and 6 pairs of poloidal field coils. Each type of coil is powered separately, providing a wide range of 3D shape flexibility. This equilibrium flexibility space has been explored to determine the range available, to identify candidate equilibria for early experiments, and to analyze the expected plasma characteristics. Vacuum equilibria, with well formed flux surfaces are found for iota (magnetic rotational transform) ranging from 0.19 to 0.9 and low effective helical ripple $< 1\%$. The effective ripple can be varied by more than a factor of 10, at fixed rotational transform. At low effective ripple, the ripple generated neoclassical transport is predicted to be negligible. At the maximum ripple, the ripple generated transport reduces the predicted plasma temperature, and this change is large enough to be measurable. The change in transform from the center to the edge can be varied from –0.1 to +0.25. Similar variations have been calculated for finite beta equilibria. Calculations of flux-surface quality and the effect on transport and stability will be discussed.

[1]Supported by U.S. DoE Contract DE-AC02-76-CHO-3073.

Michael Zarnstorff
zarnstorff@pppl.gov
PPPL

☐ Prefer Oral Session
☒ Prefer Poster Session

Date submitted: 24 Jul 2007 Electronic form version 1.4