

# PLASMA CONFIGURATION DESIGN OF THE NATIONAL COMPACT STELLARATOR EXPERIMENT (NCSX)\*

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The design study for the National Compact Stellarator Experiment (NCSX) has now succeeded in developing a reference configuration that satisfies the key physics requirements. Quasi-axisymmetry has been used to provide good drift trajectories. Ballooning stabilization has been accomplished by strong axisymmetric shaping, yielding a stellarator configuration whose core is in the second stability regime for ballooning modes. A combination of externally generated shear and nonaxisymmetric corrugation of the plasma boundary provides stability to external kink modes even in the absence of a conducting wall. The resulting configuration is also found to be robustly stable to vertical modes, increasing the freedom to do axisymmetric shaping. Stability to neoclassical tearing modes is conferred by a monotonically increasing iota profile. These physics requirements will be discussed, as well as the means of achieving them.

\*This work supported in part by US DoE contract No. DE-AC02-76-CHO-3073.