

## **Recent Progress in the Design, R&D, and Fabrication of NCSX**

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The NCSX project is an innovative magnetic fusion configuration consisting of a stellarator plasma with three field periods surrounded by eighteen modular coils (six per field period). A vacuum vessel fills the internal volume of the modular coils to provide maximum space for plasma shape flexibility. The complete NCSX system also includes toroidal (TF) and poloidal field (PF) coils, a cryostat, power subsystems, and numerous other subsystems.

The design of the stellarator core is proceeding well. Considerable analysis and R&D have been performed to underpin the design. Key analyses include structural analysis of the modular coils, TF and PF coils, and vacuum vessel. Prototype modular coil winding forms and prototype vacuum vessel segments have been fabricated to establish the manufacturability of the designs and to qualify suppliers for the production contracts. Extensive winding R&D has been conducted, including the fabrication of several prototype articles with full scale cross-sections. Testing to determine the properties of the epoxy impregnated cable conductor has been conducted. Analysis and R&D results are presented and discussed.

NCSX fabrication activities have begun. A winding facility for the modular coils has been constructed including clean rooms, turning fixtures, and an autoclave. A test facility for testing the modular coils at cryogenic temperatures has also been constructed. The NCSX Test Cell has been cleared of legacy equipment and the shield walls are being reconfigured. Long lead procurements for the modular coil winding forms and vacuum vessel subassemblies are being placed with industry. NCSX fabrication activities are discussed.

Procurement plans and plans for field period assembly, final assembly, and integrated systems testing are in place. Future plans for getting to First Plasma are presented.