

Experiment/Theory of Solenoid-free initiation and ramp-up of plasma current

CHI Experiments in NSTX*

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The Spherical Torus is a magnetic confinement concept that has the advantages of high beta and a projected high fraction of bootstrap current drive. The favorable properties of the ST arise from its very small aspect ratio, which leaves very restricted space for a central solenoid to induce the toroidal current. This makes sustained non-inductive operation necessary for the success of the ST concept. Coaxial Helicity Injection is a promising candidate for initial plasma generation and for edge current drive during the sustained phase. CHI is implemented on NSTX by driving current along field lines that connect the inner and outer lower divertor plates. A 50kA, 1kV DC power supply is connected across the inner and outer vessel components, which are insulated from each other by ceramic rings at the bottom and top.

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