

Abstract Submitted
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Non-inductive Plasma Start-up and Current Ramp-up in NSTX-

U R. RAMAN, T.R. JARBOE, Univ. of Washington, S.C. JARDIN, C.E. KESSEL, D. MUELLER, PPPL, B.A. NELSON, Univ. of Washington, F. POLI, G. TAYLOR, PPPL, NSTX RESEARCH TEAM, PRINCETON PLASMA PHYSICS LABORATORY TEAM — Results from NSTX Transient Coaxial Helicity Injection (CHI) experiments have demonstrated generation of 300kA start-up currents, and when these discharges were coupled to induction they attained 1MA of plasma current consuming 65% of the inductive flux of standard inductive-only discharges in NSTX. The NSTX-U device, which is now under construction at PPPL, will have numerous improvements to enhance transient CHI start-up. These are: (1) factor of two increase in toroidal field, (2) more than 2.5 times the injector flux, (3) increased CHI voltage, (4) full lithium coverage to reduce low-Z impurities and (5) 1 MW ECH system for increasing the electron temperature of CHI discharges to allow direct coupling to NBI current drive using a new second more tangential neutral beam system. In support of NSTX-U objectives for full non-inductive start-up and current ramp-up, the TSC code has been used for a full discharge simulation in which a transient CHI discharge is used as the front end of the non-inductive current ramp-up simulation. This work supported by U.S. DOE Contracts DE-AC02-09CH11466 and DE-FG02-99ER54519 AM08.

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