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Overview of Transient CHI Plasma Start-up in NSTX and HIT-II
R. RAMAN, T.R. JARBOE, B.A. NELSON, University of Washington, D. MUELLER, M.G. BELL, Princeton Plasma Physics Laboratory — The capability for solenoid-free current generation provides greater flexibility in a tokamak reactor design by allowing access to lower aspect ratio configurations. NSTX is testing the method of transient coaxial helicity injection as a way of generating this current. This current is produced by discharging a capacitor across the lower divertor plates in the presence of toroidal and poloidal magnetic fields. This causes an expanding plasma to detach from the lower divertor plates resulting in the formation of a closed flux equilibrium. The method was originally developed in the HIT-II ST at the Univ. of Washington, where up to 100 kA of closed flux current was generated. Coupling this to induction resulted in CHI started discharges to consistently outperform what was possible by induction alone, producing nearly 300 kA of current using only 52 mWb of solenoid flux. Recently application of this method on NSTX has resulted in the production of record levels of non-inductively generated closed flux current (>160 kA). Initial tests on NSTX have allowed coupling this current to induction from the central solenoid. *This work supported by U.S. DOE Contracts # DE-AC02-76CH03073 and DE-FG02-99ER54519 AM08*

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