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Demonstration of coupling CHI started discharges to induction in NSTX R. RAMAN, B.A. NELSON, T.R. JARBOE, University of Washington, D. MUELLER, M.G. BELL, L. ROQUEMORE, B. LEBLANC, H.W. KUGEL, PPPL, V. SOUKHANOVSKII, LLNL — Experiments in NSTX have now unambiguously demonstrated the coupling of toroidal plasmas produced by the technique of Coaxial Helicity Injection (CHI) to inductive sustainment and ramp-up of the toroidal plasma current. In these discharges, the central Ohmic transformer with zero precharge was used to apply an inductive loop voltage to the decaying CHI started discharges. This resulted in an initial slower decay of the plasma current followed by a ramp up as the electron temperature increased. The coupled discharges have ramped up to >700kA. In addition, discharges that used 4MW of neutral beam heating, transitioned into an H-mode demonstrating compatibility of this startup method with conventional high-performance H-mode operation. The electron temperature in the coupled discharges reached over 800eV and the resulting plasma had low inductance, which is preferred for long-pulse high performance discharges. These exciting new results from NSTX in combination with the world record 160kA non-inductively generated startup currents in a ST or Tokamak previously obtained in NSTX demonstrate that CHI is a viable solenoid-free plasma startup method for future STs and Tokamaks. *This work supported by U.S. DOE Contracts # DE-AC02-76CH03073and DE-FG02-99ER54519 AM08*

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