Abstract Submitted
for the DPP16 Meeting of
The American Physical Society

Operational characteristics and non-inductive plasmas on NSTX-U[1] DENNIS MUELLER, PPPL — Start-up and ramp-up of NSTX-U plasmas with nearly full solenoid pre-charge required higher loop voltage than on NSTX in agreement with modeling. NSTX-U has operated with a plasma current (I_p) of 0.65 MA at a toroidal field (B_T) of 0.63 T for 2s in L-Mode. These plasmas allowed for the initial investigation of error field correction which found a difference between correction during Ip flattop and during ramp-up. Plasma control using feedback on the X-Point locations or the X-point height and outer strike point locations is routinely used. Because an ST does not have a single coil set that controls the inner gap, it was challenging to control the time at which the plasma diverted. A novel approach was used to trade off accuracy on the outer plasma shape to achieve a reproducible inner gap. These control tools allowed study of ELMy H-mode operation at I_p = 1 MA with boronized walls. A major long-term goal for NSTX-U is totally non-inductive operation. The plan calls for initiating the plasma with coaxial helicity injection (CHI) heatied by ECH, then current drive and heating by HHFW and NBI. CHI will be used in the new geometry to demonstrate results comparable to NSTX and provide information to inform plans to upgrade the available voltage from 1.65 to 2 kV next year. Low I_p plasmas will be used to study the dependence of current drive on neutral beam voltage and injection angle.

[1]Work Supported by U.S.D.O.E. Contract No. DE-AC02-09CH11466

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Date submitted: 15 Jul 2016 Electronic form version 1.4