

Abstract Submitted
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**National Spherical Torus Experiment (NSTX)
Facility/Diagnostic Overview**¹ M. ONO, Princeton University, NSTX TEAM
— The capabilities of the NSTX experimental facility and diagnostics continue to improve. The new TF joints are performing well at 4.5 kG. New in-board shaping coils were installed to produce plasmas with simultaneously high elongation ~ 2.5 and high triangularity ~ 0.8 needed for advanced operation. The EFC/RWM system with six external coils driven by three switching power amplifiers (1 kHz, 6 kA-turn) is now fully operational. With these new tools, we significantly expanded the NSTX operating parameters, achieving the highest controlled elongation of 2.75, a shape factor $q_{95}I_p/aB_T$ of 37 MA/m-T, plasma volume of 14 m³, stored energy of 430 kJ, normalized beta of 7.4 % MA/m-T, bootstrap current fraction of 60 % at 700 kA, and longest plasma pulse length of 1.5 s or about 4 times the resistive skin time. In the area of the plasma diagnostics, ten additional Thomson scattering channels are providing detailed measurement of the H-mode pedestal and internal barrier regions. The 8 channel MSE diagnostic is providing crucial $j(r)$ measurements including high electron confinement reversed shear plasmas. A tangential microwave scattering system to measure electron-transport- relevant fluctuations is being commissioned.

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