

Biased Electrodes for SOL Control in NSTX

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Four fixed electrodes were installed near the outer midplane of NSTX to attempt to control the width of the scrape-off layer (SOL) by creating a strong nonaxisymmetric poloidal electric field [1-3]. These electrodes can be DC biased at up to ± 100 V and ± 30 Amps, which could potentially create an $E_{\text{pol}} \geq 100$ V/cm and an $E \times B$ radial flow speed of $V_r \geq 3 \times 10^6$ cm/sec, which is ~ 30 times larger than the normal radial transport speed in the SOL. During positive electrode biasing clear changes in the local plasma density and floating potential were measured by Langmuir probes located between the electrodes. However, so far only small changes in the D_α profile and SOL turbulence have been seen ~ 1 meter upstream along B by the gas puff imaging diagnostic. The relationship between the applied electrode potential and the resulting plasma electric fields will be discussed, along with comparisons to previous related experiments [4-6]. *This work supported by U.S. DOE Contract # DE-AC02-76CH03073.*

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