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Triple Langmuir Probe Circuit Response to Dynamic Loading

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Recently, an array of Langmuir probes was installed in the divertor region of the Na-
tional Spherical Tokomak eXperiment (NSTX) and has been successfully tested [1].
The array is backed by a custom designed electronics system that allows biasing the
probes, collecting the signals, reducing noise and amplifying circuitry and is suited
to operate both as a single Langmuir probe and as a triple Langmuir probe (TLP).
While the probe data has been useful in understanding the plasma characteristics
during steady plasma discharges in NSTX, certain modifications aid interpretation
of the transient events (∼ μs scale) such as during Edge Localized Modes (ELMs).
During high-flux transients, the bias circuit may drift from the nominal values before
on-board control circuitry can respond. The details of the circuit, its response to
dynamic loading and the resulting impact on signal interpretation is presented. [1]
M.A. Jaworski, J. Kallman, R. Kaita, H. Kugel, B. LeBlanc, R. Marsala, and D.N.
Ruzic, “Biasing, acquisition and interpretation of a dense Langmuir probe array in

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