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 National 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]


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