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Theory Experiment

An Improved Detector Electronics and Data Acquisition System Design for Thomson Scattering Diagnostic on DIII-D,*

C.-Liu, C.L. Hsieh, B.D. Bray, D. Sellers, *General Atomics* – The detector electronics and data acquisition system for the Thomson scattering diagnostic on DIII-D is being upgraded to replace the present CAMAC-based system. Besides more modern electronics, the proposed design contains a number of improved features. For instance, to reduce the gain drift with temperature in the avalanche photodiode, the diode will be mounted on a thermally insulated copper block and maintained at an elevated temperature using feedback control. Since the plasma background light plays a dominant role in the measurement noise, a model is used to analyze the noise contribution in regard to the time widths of the electronic output pulse and the signal integration gate. The building blocks of the detector electronics are GHz OpAmps and the ns analog switches. The method of differential gating [1] is used to cancel the charge injection induced by the high speed operation in the analog switch.

[1] X. Wang, AIP Conf. Proceeding 333, Beam Instrumentation Workshop, Vancouver, Canada (1994).

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