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Theory Experiment

Proposed Next-Generation Thomson Scattering Diagnostic on DIII-D,* D.M. Ponce, *ORISE*, C. Liu, B.D. Bray, C.-L. Hsieh, *General Atomics* – The present paper describes the next generation Thomson scattering system developed at DIII-D. It is motivated by the need of increased time resolution to determine electron density and temperature evolution over the discharge lifetime as well as to replace obsolete hardware no longer commercially available. The new system includes a new overall low noise amplifier detector system that incorporates a TEC cooling circuit to reduce the systematic errors incurred due to temperature fluctuations in the APD detectors. The amplification circuitry incorporates a sample-and-hold branch for the dc signal and an integrating circuit for the pulsed signal offering an integrating gate smaller than 45 ns. The new system will have a new digitizing system that will replace the existing CAMAC data acquisition crates. The overall system's time resolution will be enhanced by a new laser system with individual laser beams capable of delivering 1 Joule, 10 ns pulses at a 100 Hz repetition rate. This represents a factor of 5 increase in the time resolution over the existing system.

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