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Category Number and Subject: 6.20 DIII-D Tokamak

☐ Theory   ☒ Experiment

**Neutron Detection With Ultra-Fast Digitizer and Pulse Identification Techniques on DIII-D,\*** Y.B. Zhu, W.W. Heidbrink, *U. California Irvine*; D.A. Piglowski, *General Atomics* – A prototype system for neutron detection with an ultra-fast digitizer and pulse identification techniques has been implemented on the DIII-D tokamak. The system consists of a cylindrical neutron fission chamber, a charge sensitive amplifier, and a GaGe Octopus 12-bit CompuScope digitizer card installed in a Linux computer. Digital pulse identification techniques have been successfully performed at maximum data acquisition rate of 50MSPS with on-board memory of 2GS. Compared to the traditional approach with fast nuclear electronics for pulse counting, this straightforward digital solution has many advantages, including reduced expense, improved accuracy, higher counting rate, and easier maintenance. The system also provides the capability of neutron-gamma pulse shape discrimination and pulse height analysis. Plans for the upgrade of the old DIII-D neutron counting system with these techniques will be presented.

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