

Abstract Submitted  
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**DIII-D Neutron Measurement: Status and Plan for Simplification and Upgrade**<sup>1</sup> Y.B. ZHU, W.W. HEIDBRINK, UC Irvine, P.L. TAYLOR, General Atomics, D. FINKENTHAL, Palomar College — Neutron diagnostics play key essential roles on DIII-D. Historically an 18-channel 2.45MeV D-D neutron measurement system based on  $^3\text{He}$  and  $\text{BF}_3$  proportional counters was inherited from Doublet-III including associated electronics and CAMAC data acquisition. Three fission chambers and two neutron scintillators were added in the 1980s and middle 1990s respectively. For Tritium burn-up studies, two 14MeV D-T neutron measurement systems were installed in 2009 and 2010. Operation and maintenance experience have led to a plan to simplify and upgrade these aging systems to provide a more economical and reliable solution for future DIII-D experiments. On simplification, most conventional expensive NIM and CAMAC modules will be removed. Advanced technologies like ultra-fast data acquisition and software-based pulse identification have been successfully tested. Significant data reduction and efficiency improvement will be achieved by real-time digital pulse identification with a field-programmable gate array. The partly renewed system will consist of 4 neutron counters for absolute calibration and 4 relatively calibrated neutron scintillators covering a wide measurement range.

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