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DT High Energy Measurements and Comparison of Multiple Spectra in a He-4 Gas Neutron Detector HANNAH E. GARDINER, TING ZHU, SASMIT GOKHALE, University of Florida, CODY PARKER, ANDREA RICHARD, THOMAS MASSEY, Ohio University, JAMES E. BACIAK, ANDREAS ENQVISST, KELLY A. JORDAN, University of Florida — Neutron spectroscopy is important for a variety of applications to nuclear energy, national security, and basic science research. Currently, organic scintillator neutron detectors are used as a diagnostic tool for neutron spectroscopy in DT fusion research. However, these neutron measurements generate contaminants in common organics from deuteron or carbon break-up that affects the light output spectrum. A potential solution to this problem is to use a He-4 fast neutron gas scintillator detector system. He-4 has excellent gamma rejection due to a low charge density, pulse shape discrimination, and lower light yield and deposited energy from gamma interactions. The detector will also not degrade due to high intensity background gamma radiation. The detector was irradiated with 14.1 MeV neutrons at the Edwards Accelerator Lab at Ohio University. We report on the effectiveness of the He-4 detector system to measure the resulting high energy neutrons and compare this spectrum to other neutron spectra taken with this detector.

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