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Absolute Flux Calibration of Neutron Time-of-Flight Detectors for Laser-Generated Neutron Beam Experiments[1] F. TREFFERT, C. B. CURRY, G. D. GLENN, C. SCHOENWAELDER, S. H. GLENZER, M. GAUTHIER, SLAC National Accelerator Laboratory, N. FOTIADIS, C. PROKOP, Los Alamos National Laboratory, H. QUEVEDO, UT Austin, M. ZIMMER, M. ROTH, TU Darmstadt — Neutron beams are a powerful tool to probe the structure, composition and evolution of nuclear material or biological systems. With the recent development of high repetition rate, high power lasers, laser-generated neutron sources are promising to reach favorable beam characteristics including short pulse duration, high single-shot fluxes and controllable energy profiles. Collocation of such a neutron source with an X-ray free electron laser will enable pump-probe studies of radiation damage in fusion materials, requiring precise characterization of the absolute neutron number and energy distribution. Here we present an approach to absolutely calibrate the neutron yield obtained with nTOF detectors using neutron beams of known flux and energy at flight path 60R at Los Alamos Neutron Science Center with 0.1-400 MeV energy range and peak fluxes of 10^{-4} n/MeV/bunch. We will show that this new technique is more robust to determine neutron yields and can be used to cross calibrate bubble detector data. An application of this calibration technique will be shown on nTOF traces acquired during an experimental campaign at the Texas Petawatt laser facility.

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