



Characterization of neutron beams generated in high-intensity interactions for nuclear physics experiments

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The advent of multi-PW laser facilities world-wide opens new opportunities for nuclear physics. With this perspective, we developed a high efficiency neutron counter taking into account the specifics of a high intensity laser environment. Using GEANT4 simulations and prototype testings, we report on the design of a modular neutron-counter based on boron-10 enriched scintillators and high-density polyethylene moderator. This detector has been calibrated using a plutonium-beryllium neutron source and commissioned during an actual neutrons producing laser experiment at the LULI2000 facility (France). An overall efficiency of 4.37(59)% has been demonstrated during calibration with a recovery time of a few hundreds microseconds after laser-plasma interaction. We also tested using units of this detector in neutron time-of-flight configuration during the commissioning of the 1PW arm of the Apollon laser facility. Neutrons produced by the conversion of proton accelerated by the 1PW arm of Apollon facility have been detected, of which we will present preliminary results.