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Spectroscopy of Neutrons Generated Through Nuclear Reactions with Light Ions in Short-Pulse Laser-Interaction Experiments C. STOECKL, C.J. FORREST, V.YU. GLEBOV, T.C. SANGSTER, Laboratory for Laser Energetics, U. of Rochester, W.U. SCHRODER, Dept. of Chemistry, U. of Rochester — Neutron and charged-particle production has been studied in OMEGA EP laser-driven light-ion reactions including D–D fusion, D–^{9}Be fusion, and ^{9}Be(D,n)^{10}B processes at deuteron energies from 1 to a few MeV. The energetic deuterons are produced in a primary target, which is irradiated with one short-pulse (10-ps) beam with energies of up to 1.25 kJ focused at the target front surface. Charged particles from the backside of the target create neutrons and ions through nuclear reactions in a secondary target placed closely behind the primary interaction target. Angle-dependent yields and spectra of the neutrons generated in the secondary target are measured using scintillator-photomultiplier–based neutron time-of-flight detectors and nuclear activation samples. A Thomson parabola is used to measure the spectra of the primary and secondary charged particles. This material is based upon work supported by the Department of Energy National Nuclear Security Administration under Award Number DE-NA0001944 and DE-FC02-04ER54789.

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