Abstract Submitted
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High-brightness near-GeV energy electron beams from a laser wakefield accelerator for long-standoff nuclear interrogation[1] NATHAN POWERS, SUDEEP BANERJEE, VIDYA RAMANATHAN, NATHANIEL CUNNINGHAM, NATE CHANDLER-SMITH, DONALD UMSTADTER, University of Nebraska-Lincoln, RANDY VANE, DAVID SCHULTZ, Oak Ridge National Laboratory, SHAUN CLARKE, SARA POZZI, University of Michigan, UNIVERSITY OF NEBRASKA-LINCOLN TEAM, OAK RIDGE NATIONAL LAB TEAM, UNIVERISTY OF MICHIGAN TEAM — High-brightness monochromatic electron beams are generated in a wakefield accelerator driven by a 100 TW laser. The energy can be varied from 20-800 MeV by varying laser and plasma parameters. Stable electron beams are obtained using self-injection and optical injection. The ability of these beams to penetrate large thicknesses of dense material and an angular spread of <5 mrad makes them suitable as active interrogation probes for long standoff nuclear activation of concealed nuclear materials. A series of (γ,xn) activation measurements were performed to demonstrate the viability of this technique. MCNP and GEANT Monte Carlo simulations are used to aid experiment design and interpretation.

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