

Abstract Submitted
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Properties and applications of mono-energetic gamma-rays from laser-Compton scattering FELICIE ALBERT, SCOTT ANDERSON, GERRY ANDERSON, SHAWN BETTS, DAVID GIBSON, CHRISTIAN HAGMANN, MICAH JOHNSON, MIKE MESSERLY, MIROSLAV SHVERDIN, FREDERIC HARTEMANN, CRAIG SIDERS, DENNIS MCNABB, CHRISTOPHER BARTY, Lawrence Livermore National Laboratory — Properties of a Mono-Energetic Gamma-Ray (MEGa-Ray) Compton scattering source are presented. It produces 0.1 MeV-0.9 MeV photons. Its experimental key parameters are: its size (0.01 mm²), divergence (10x6 mrad²), duration (ps), spectrum (15% bandwidth) and intensity (10⁵ photons/shot), which yield an on-axis peak brightness of $\sim 10^{15}$ photons/mm²/mrad²/s/0.1% bandwidth at 0.478 MeV. We detected the 0.478 MeV nuclear resonance fluorescence (NRF) line of ⁷Li. A LiH sample was in the beam path, and the NRF scattered photons were detected by a germanium detector oriented at 90° with respect to the incident beam axis. The resulting spectrum shows the 0.478 MeV line of ⁷Li, with several characteristic lines from the interaction. With this experiment, we have shown that MEGa-Ray sources will provide a unique specific isotope detection capability. This work performed under the auspices of the U.S. Department of Energy by Lawrence Livermore National Laboratory under Contract DE-AC52-07NA27344.

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