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**Selective photo-activation analysis with laser-driven x-rays** SUDEEP BANERJEE, GRIGORY GOLOVIN, NATHAN POWERS, CHENG LIU, SHOUYUAN CHEN, CHAD PETERSEN, JUN ZHANG, ISAAC GHEBREGZIABHER, BAOZHEN ZHAO, KEVIN BROWN, JARED MILLS, DONALD UMSTADTER, Dept. of Physics and Astronomy, University of Nebraska, Lincoln NE 68588, DAN HADEN, Nebraska Wesleyan University, Lincoln NE 68504, JACK SILANO, HUGON KARWOWSKI, University of North Carolina, Chapel Hill, NC 27599 — We discuss a technique for the identification of nuclear isotopes by *selective* photo-activation analysis. A narrow divergence beam of high-energy photons is produced when a laser driven electron beam Compton backscatters off a counter-propagating high-intensity laser pulse. The x-rays from this compact laser-driven synchrotron light source are MeV energy, narrow-bandwidth, tunable, polarized, and bright ($10^8$ photons $s^{-1}$). Such characteristics make these x-rays well-suited for nuclear interrogation by means of triggering ($\gamma$,f) and ($\gamma$,xn) reactions. The narrow bandwidth of the x-ray light can be exploited to selectively activate nuclei with isotopic sensitivity, without causing unwanted background from collateral activation. Additionally, the polarized nature of the x-rays can be used to study anisotropy of neutron emission, for precise identification of isotopes. Activation by laser-driven synchrotron x-rays will be compared with activation by bremsstrahlung.

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