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A nugget from FOCUS:

Efficient Initiation of Photonuclear Reactions Using Quasi-Monoenergetic Electron Beams from Laser Wakefield

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Recent interest in using high-intensity laser-plasma interactions to generate energetic charged particles and gamma rays has increased due to an array of applications in radiography, radioisotope production, nuclear physics and nuclear medicine, which can be explored at university laboratories. In this work, we report on the application of nearly monoenergetic high-energy relativistic electron beams, accelerated in the laser wakefield, to perform gamma-nuclear activation of carbon, copper and photo-fission of natural uranium targets. Through the bremsstrahlung emission in high Z converter, such electron bunches are beneficial for the efficient generation of tens of MeV γ -rays, necessary to induce photo-nuclear reactions. Gamma-ray spectroscopy of the irradiated C, Cu and U samples has shown that approximately 10^6 photonuclear reactions has been produced per Joule of laser energy. This is the highest rate produced with a table-top laser system up to date. The results of this work have been submitted for publication in Appl. Phys. Lett. (2006).