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Generation of 300 MeV Quasi-Monochromatic Electron Beams from Laser Wakefield and Initiation of Photonuclear Reactions A. MAKSIMCHUK, S. REED, N. NAUMOVA, V. CHVYKOV, B. HOU, G. KALINTCHENKO, P. ROUSSEAU, G. MOUROU, V. YANOVSKY, FOCUS Center and Center for Ultrafast Optical Science, University of Michigan, J.R. BEENE, D.R. SCHULTZ, D.W. STRACENER, C.R. VANE, Physics Division, Oak Ridge National Laboratory — In the interaction of 30 fs, 40 TW Ti:sapphire Hercules laser at the University of Michigan, which is focused to the intensity of 10^{19} W/cm^{2}onto a supersonic He gas jet with electron density close to the resonant density, we observed quasi-monoenergetic electron beams with energy up to 300 MeV and angular divergence of about 10 mrad. The results on characterization of relativistic electron beam in terms of energy spread, its charge, divergence and pointing stability will be presented. 2D PIC simulations performed for the parameters close to the experimental conditions show the evolution of the laser pulse in plasma, electron injection, and the specifics of electron acceleration observed in experiments. Resulted relativistic electron beams have been used to perform gamma-neutron activation of ^{12}C and ^{63}Cu and photo-fission of ^{238}U. We demonstrated that approximately 10^6 reaction per shot has been produced in each case. This work was supported by the NSF through the Physics Frontier Center FOCUS. JRB, DRS, DWS, and CRV acknowledge support by the DOE under contract DE-AC05-00OR22725 with UT-Battelle, LLC.

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