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Measurements of proton energy spectra using a radiochromic film stack T.M. FILKINS, JESSICA STEIDLE, D.M. ELLISON, JEFFREY STEIDLE, C.G. FREEMAN, S.J. PADALINO, SUNY Geneseo, G. FIKSEL, S.P. REGAN, T.C. SANGSTER, Laboratory for Laser Energetics — The energy spectrum of protons accelerated from the rear-side of a thin foil illuminated with ultra-intense laser light from the OMEGA EP laser system at the University of Rochester's Laboratory for Laser Energetics (LLE) was measured using a stack of radiochromic film (RCF). The film stack consisted of four layers of Gafchromic HD-V2 film and four layers of Gafchromic MD-V2-55 film. Aluminum foils of various thicknesses were placed between each piece of RCF in the stack. This arrangement allowed protons with energies of 30 MeV to reach the back layer of RCF in the stack. The stack was placed in the detector plane of a Thomson parabola ion energy (TPIE) spectrometer. Each piece of film in the stack was scanned using a commercially available flat-bed scanner (Epson 10000XL). The resulting optical density was converted into proton fluence using an absolute calibration of the RCF obtained at the SUNY Geneseo 1.7 MV Pelletron accelerator laboratory. In these calibration measurements, the sensitivity of the radiochromic film was measured using monoenergetic protons produced by the accelerator. Details of the analysis procedure and the resulting proton energy spectra will be presented. Funded in part by a grant from the DOE through the Laboratory for Laser Energetics.

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