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Investigating the response of scintillators for the detection of laser accelerated protons[1] NATHAN COOK, Stony Brook University, OLIVIER TRESCA, Brookhaven National Laboratory, VITALY YAKIMENKO, SLAC National Accelerator Laboratory — Radiation pressure acceleration with ultraintense laser pulses presents an exciting new scheme for obtaining energetic protons from a gas jet target. One of the advantages conferred by using a gaseous laser and target is the potential for a fast (1 Hz) repetition rate. This requires diagnostics which are not only comprehensive for a single shot, but also capable of repeated use. We consider several scintillators as candidates for an imaging diagnostic for protons accelerated to MeV energies by a CO_2 laser focused on a gas jet target. We have measured the response of chromium-doped alumina (Chromox), CsI:Tl, and a polyvinyl toluene (PVT) screen to protons in the $2 - 12$ MeV range using a CCD camera. We have calibrated the luminescent yield in terms of photons emitted per incident proton for each scintillator. We also discuss photon scattering in each and determine its impact on their respective resolutions. In addition, we consider the impact of radiation intensity on the materials, including radiation damage and the presence of an afterglow. Our analysis reveals a near order of magnitude greater yield from Chromox in response to proton beams in this energy range. Moreover, Chromox displays improved radiation resistance, making it the best choice for a flexible diagnostic tool

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