Abstract Submitted
for the DPP15 Meeting of
The American Physical Society

Enhancement of Particle Track Etch Rate in CR-39 by UV Exposure MICAH WIESNER, RUBAB UME, JAMES MCLEAN, State Univ of NY - Geneseo, CRAIG SANGSTER, SEAN REGAN, Laboratory for Laser Energetics — The use of CR-39 plastic as a Solid State Nuclear Track Detector is effective for obtaining data in high-energy particle experiments including inertial confinement fusion. To reveal particle tracks after irradiation, CR-39 is chemically etched at elevated temperatures with NaOH, producing signal pits at the nuclear track sites that are measurable by an optical microscope. CR-39 pieces sometimes also exhibit etch-induced noise, either surface features not caused by nuclear particles. When CR-39 is exposed to high intensity UV light after nuclear irradiation with 5.4 MeV alpha particles and before etching, an increase in etch rates and pit diameters is observed, though UV exposure can also increase noise. We have determined that light from a low pressure mercury vapor lamp (predominantly wavelength 253.7 nm) increases etch rates and pit diameters while causing minimal background noise. Heating CR-39 to elevated temperatures ($\sim$80 °C) during UV exposure also improves the signal-to-noise ratio for this process. Surprisingly, initial data from CR-39 irradiated with 3.4 MeV protons and exposed to UV show reduced pit diameters. This material is based in part upon work supported by the Department of Energy National Nuclear Security Administration under Award Number DE-NA0001944.

Micah Wiesner
State Univ of NY - Geneseo

Date submitted: 20 Jul 2015 Electronic form version 1.4