Abstract Submitted
for the DPP16 Meeting of
The American Physical Society

Reduced Noise UV Enhancement of Etch Rates for Nuclear Tracks in CR-39 REBECCA SHEETS, DAVID CLARKSON, RUBAB UME, Dept of Physics & Astronomy, State Univ of NY at Geneseo, SEAN REGAN, CRAIG SANGSTER, Laboratory for Laser Energetics, STEPHEN PADALINO, JAMES MCLEAN, Dept of Physics & Astronomy, State Univ of NY at Geneseo
— The use of CR-39 plastic as a Solid State Nuclear Track Detector is an effective technique for obtaining data in high-energy particle experiments including inertial confinement fusion. To reveal particle tracks after irradiation, CR-39 is chemically etched in NaOH at 80°C for 6 hours, producing micron-scale signal pits at the nuclear track sites. Using CR-39 irradiated with 5.4 MeV alpha particles and 1.0 MeV protons, we show that exposing the CR-39 to high intensity UV light before etching, with wavelengths between 240 nm and 350 nm, speeds the etch process. Elevated temperatures during UV exposure amplifies this effect, with etch rates up to 50% greater than unprocessed conditions. CR-39 pieces exposed to UV light and heat can also exhibit heightened levels of etch-induced noise (surface features not caused by nuclear particles). By illuminating the CR-39 from the side opposite to the tracks, a similar level of etch enhancement was obtained with little to no noise. The effective wavelength range is reduced, due to strong attenuation of shorter wavelengths. Funded in part by a LLE contract through the DOE.

Rebecca Sheets
Dept of Physics & Astronomy, State Univ of NY at Geneseo

Date submitted: 15 Jul 2016 Electronic form version 1.4