Abstract Submitted
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Wavelength Dependence of UV Effect on Etch Rate and Noise in CR-39[1] MICAH WIESNER, NATHAN TRAYNOR, JAMES MCLEAN, STEPHEN PADALINO, SUNY Geneseo, CRAIG SANGSTER, MICHELLE MCCLUSKEY, Laboratory for Laser Energetics — The use of CR-39 plastic as a SSNTD is an effective technique for recovering 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 also exhibit etch-induced noise, either surface roughness or pit-like features not caused by nuclear particles, which negatively affects the ability of observers to distinguish actual pits. When CR-39 is exposed to high intensity UV light after nuclear irradiation and before etching, an increase in etch rates and pit diameters is observed. UV exposure can also increase noise, which in the extreme can distort the shapes of particle pits. Analyzing the effects of different wavelengths in the UV spectrum we have determined that light of the wavelength 255 nm increases etch rates and pit diameters while causing less background noise than longer UV wavelengths. Preliminary research indicates that heating CR-39 to elevated temperatures ($\sim$ 80 °C) during UV exposure also improves the signal-to-noise ratio for this process.

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