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Precision measurement of quenching factors for low-energy nuclear recoils at TUNL GRAYSON RICH, Triangle Universities Nuclear Laboratory and University of North Carolina at Chapel Hill, PHIL BARBEAU, CALVIN HOWELL, Triangle Universities Nuclear Laboratory and Duke University, HUGON KARWOWSKI, Triangle Universities Nuclear Laboratory and University of North Carolina at Chapel Hill — With detector technologies becoming increasingly sensitive to exotic events, a thorough understanding of signal yield as a function of deposited energy is required for appropriate interpretation of results from cutting edge detector systems. Elastic neutron scattering is a probe which has been used to mimic the nuclear recoils which may be produced in detection media by light-WIMP interactions or coherent neutrino-nucleus scattering (CNS). We have built at the Triangle Universities Nuclear Laboratory (TUNL) a facility which produces pulsed, collimated, low-energy, quasi-monoenergetic neutron beams using the ^{7}Li(p,n) reaction, resulting in fluxes of $\sim$ 1 neutrons / (s $\cdot$ cm^2) at $\sim$90 cm from the neutron-production target. The first precision results from this facility are reported for ultra-low-energy recoils in NaI(Tl) and CsI(Na) and future plans are outlined, including measurements on candidate materials for a CNS detector that can potentially be fielded at the Spallation Neutron Source of Oak Ridge National Laboratory as a part the Coherent Scatter Initiative (CSI). We discuss the implications of new, precise measurements of quenching factors on neutrino detectors and on current- and next-generation light-WIMP searches, particularly the DAMA experiment.

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