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Threshold-Free Measurement of the NaI(Tl) Quenching Factor¹ WILLIAM THOMPSON, REINA MARUYAMA, JAY HYUN JO, ESTELLA BAR-BOSA DE SOUZA, Yale University, DAVID CINTAS, MARIA MARTINEZ, MARISA SARSA, Universidad de Zaragoza, SAMUEL HEDGES, PHIL BAR-BEAU, Duke University, GRAYSON RICH, University of Chicago — In this talk, I will present a new threshold-free measurement of the quenching factor of NaI(Tl) detectors. Though a handful of measurements of this quenching factor exist, there is disagreement on the precise value of the quenching factor below about 20 keV_{nr}, directly in the regions of interest for WIMP direct detection and coherent neutrinonucleus elastic scattering searches. Additionally, previous measurements are known to have overestimated the quenching factor at low energies due to imperfect knowledge of the trigger efficiency of their NaI(Tl) detector setups. Our measurement seeks to address both of these concerns. We tested multiple NaI(Tl) detectors to search for variations in the quenching factor between detectors. Additionally, we perform a threshold-free measurement by triggering on an array of backing detectors rather than on the NaI(Tl) detector itself.

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