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A New Measurement of the 60 keV Transition in Am-241 Decays using Metallic Magnetic Calorimeters

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The 60 keV transition in Am-241 decay is one of the most important calibration standards for low energy gamma-rays. The current literature value of 59.5409(1) keV is based on measurements with high-purity Ge detectors and a Tb-161 reference source in 1993, and its 0.1 eV uncertainty gives it significant weight for cryogenic detector calibration. We have re-measured the energy of this transition in Am-241 decays with metallic magnetic calorimeter (MMC) gamma detectors with an energy resolution of 80 eV and demonstrated high linearity and reproducibility. For calibration, we have made a Yb-169 source, whose gamma emissions are known extremely accurately from measurements using crystal spectrometers, through Tm-169(d,2n)Yb-169 at the 88"Cyclotron. We will discuss statistical and systematic uncertainties of the measurements and provide a preliminary recommendation for an improved value of the Am-241 gamma-ray energy.

Less than 5 years of experience since completion of Ph.D

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Student (Ph.D., M.Sc. or B.Sc.)

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