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Calibration of ^{22}Na Using the Sum-Peak Counting Method MOLLIE BIENSTOCK, State University of New York at Geneseo, RYAN FITZGERALD, National Institute for Standards and Technology — A calibrated positron emitter, ^{22}Na, is needed for nuclear cross section measurements. The calibration of this source was performed using a self-calibrating sum-peak counting method which has the potential to replace calibrated sources for various other applications. The sum-peak method was used with three different detector setups: a single high purity germanium detector, a 4"x5" NaI well detector and the same NaI well detector paired with a 3"x3" NaI detector, obtaining a 4π-counting geometry. The ^{22}Na decays via positron emission mostly to an excited state of ^{22}Ne which promptly deexcites and emits a 1275 keV gamma ray. The 511 keV gamma ray produced from the positron annihilation sums with the 1275 keV gamma generating a 1786 keV peak in the observed spectra. The total counts in the three peaks as well as the total counts observed in the spectrum are used to calculate a value for the activity of the source. In order to get a better understanding of the source and the detector geometries, a simulation of the setups was generated using EGSnrc: software that uses Monte Carlo simulations to model radiation transport. Using this program, and subsequent Monte Carlo calculations, a model of the spectra produced from each setup was created and used to fit theory to data and get a more accurate number for the activity of the source. Results obtained from this experiment are being compared to independent measurements from HPGe gamma ray spectrometry and 4π NaI integral counting using calibrated detectors.

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