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High precision gamma-ray spectroscopy for enhancing the use of medical radioisotopes[1] E.A. MCCUTCHAN, A.A. SONZOGNI, S. ZHU, Brookhaven National Laboratory — Precise knowledge of the radiation emitted by unstable nuclei is needed in both the production and use of medical isotopes. The decay of many isotopes which now find use in nuclear medicine were last studied more than 30 years ago using very primitive detection setups and without a particular function in mind. Since then, the field of gamma-ray spectroscopy has made tremendous advances, now often using multiple high-purity germanium (HPGe) detectors employing Compton-suppression technology and high efficiency gamma-gamma coincidence spectroscopy. In the present work, we make use of these new techniques to significantly improve the knowledge of decay schemes of several isotopes with applied uses. Sources of isotopes were produced and purified at the University of Wisconsin then shipped to Argonne National Laboratory where high-precision, gamma-ray measurements were performed using the state-of-the-art gamma-ray spectrometer, Gammasphere, consisting of 100 Compton-suppressed HPGe detectors. An overview of results on a number of isotopes will be presented including studies of emerging PET imaging isotopes, 72As and 61Cu. New decay schemes will be presented and their impact on the use of isotope discussed.

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