High-precision gamma-ray spectroscopy of $^{82}\text{Rb}$ and $^{72}\text{As}$, two important medical isotopes used in positron emission tomography\(^1\)

MICHAEL NINO, Hofstra University, E. MCCUTCHAN, S. SMITH, A. SON-ZOGNI, L. MUENCH, Brookhaven National Laboratory, J. GREENE, M. CARPENTER, S. ZHU, Argonne National Laboratory, C. LISTER, University of Massachusetts Lowell — Both $^{82}\text{Rb}$ and $^{72}\text{As}$ are very important medical isotopes used in imaging procedures, yet their full decay schemes were last studied decades ago using low-sensitivity detection systems; high quality decay data is necessary to determine the total dose received by the patient, the background in imaging technologies, and shielding requirements in production facilities. To improve the decay data of these two isotopes, sources were produced at the Brookhaven Linac Isotope Producer (BLIP) and then the Gammasphere array, consisting of 89 Compton-suppressed HPGe detectors, at Argonne National Laboratory was used to analyze the gamma-ray emissions from the daughter nuclei $^{82}\text{Kr}$ and $^{72}\text{Ge}$. Gamma-ray singles and coincidence information were recorded and analyzed using Radware Gf3m software. Significant revisions were made to the level schemes including the observation of many new transitions and levels as well as a reduction in uncertainty on measured $\gamma$-ray intensities and deduced $\beta$-feedings. The new decay schemes as well as their impact on dose calculations will be presented.

\(^1\)DOE Isotope Program is acknowledged for funding ST5001030. Work supported by the U.S. DOE under Grant No. DE-FG02-94ER40848 and Contract Nos. DE-AC02-98CH10946 and DE-AC02-06CH11357 and by the Science Undergraduate Laboratory Internships Program (SULI).