New Decay Studies of $^{66}$Ga

SURESH KUMAR, University of Delhi, India and Argonne National Laboratory, I. AHMAD, M.P. CARPENTER, J. CHEN, J.P. GREENE, F.G. KONDEV, S. ZHU, Argonne National Laboratory — High-energy $\gamma$ rays with energies up to 5.0 MeV are emitted in the radioactive decay of $^{66}$Ga ($T_{1/2}=9.49$ h). Thus, this radionuclide appears to be a suitable candidate for energy and efficiency calibrations of high-resolution, $\gamma$-ray spectrometers that are employed in studies of very neutron-rich nuclei which have large $Q_\beta$ values. In addition, accurate emission probabilities of this isotope are of interest to medical imaging applications, owing to the existence of large $\beta^+$ decay branches, which need to be characterized with better accuracy. Decay studies of $^{66}$Ga were initiated using the $\gamma$-ray spectroscopy technique. The source was produced by means of the $^{66}$Zn(p,n) reaction at a beam energy of 12 MeV. Singles and $\gamma-\gamma$ coincidences measurements were carried out using a single Ge detector and Gammasphere, respectively. The previously known $^{66}$Ga decay scheme was extended and many new $\gamma$ rays were placed in the daughter nuclide $^{66}$Zn.

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