Search for excited states in $^{101}\text{Sn}$

D. Seweryniak, M.P. Carpenter, S. Gros, R.V.F. Janssens, T.L. Khoo, T. Lauritzen, C.J. Lister, D. Peterson, A. Robinson, X. Wang, S. Zhu, Argonne National Laboratory, G. Lotay, P.J. Woods, University of Edinburgh, A.A. Hecht, N. Hoteling, W.B. Walters, University of Maryland — Single-particle excitations near closed shells are critical in understanding nuclear structure. Single-particle energies in the doubly-magic self-conjugate $^{100}\text{Sn}$ nucleus are not known. Studies of nuclei around $^{100}\text{Sn}$ are at the current sensitivity limit. A search for gamma-ray transitions in $^{101}\text{Sn}$, which contains only one neutron outside of the $^{100}\text{Sn}$ core, was carried out at the Argonne Tandem-Linac Accelerator System. $^{101}\text{Sn}$ nuclei were produced using the $^{46}\text{Ti}(^{50}\text{Cr},3\text{n})^{101}\text{Sn}$ reaction with a cross section of about 50 nb. Beta-delayed protons with energies and decay times consistent with previous $^{101}\text{Sn}$ decay studies were observed in a Double-Sided Si Strip Detector at the focal plane of the Argonne Fragment Mass Analyzer. In-beam gamma rays were detected in the GAMMASPHERE array of Ge detectors and were correlated with $^{101}\text{Sn}$ beta-delayed protons. Implications of the $^{101}\text{Sn}$ gamma-ray spectrum for the structure of $^{101}\text{Sn}$, $^{100}\text{Sn}$ and neighboring nuclei will be discussed.

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