T=1 and T=0 states in the N=Z=43 nucleus, $^{86}$Tc

A. B. Garnsworthy$^{1,2}$, P. H. Regan$^1$, S. Pietri$^1$, D. Rudolph$^3$, Zs. Podolyák$^1$, S. J. Steer$^1$, F. Becker$^5$, P. Bednarczyk$^4$, J. Geri$^4$, M. Görská$^4$, H. Grawe$^4$, I. Kojouharov$^4$, H. Schaffner$^4$, H. J. Wollersheim$^4$, J. Grębosz$^{5,4}$, G. Benzi$^6$, B. Blank$^7$, C. Brandau$^1$, A. M. Bruce$^8$, L. Caceres$^{11}$, F. Camera$^6$, W. N. Catford$^1$, I. J. Cullen$^1$, Zs. Dombrády$^{10}$, P. Doornenbal$^4$, E. Estevez$^{11}$, H. Geissel$^4$, W. Gelletly$^1$, A. Heinz$^2$, R. Hoischen$^3$, G. Ilie$^{12}$, J. Jolie$^{12}$, G. A. Jones$^1$, A. Jungclaus$^9$, A. Kelic$^4$, M. Kmiecik$^5$, F. G. Kondev$^{13}$, T. Kurtukian-Nieto$^{11}$, N. Kurz$^4$, S. Lalkowski$^{14}$, Z. Liu$^1$, A. Maj$^5$, S. Myalski$^5$, F. Montes$^4$, M. Pfützner$^{14}$, T. Saito$^4$, T. Shizuma$^{1,16}$, A. J. Simons$^4$, S. Schwertel$^{17}$, S. Tachenov$^4$, P. M. Walker$^1$, E. Werner-Malento$^{4,15}$, O. Wieland$^6$

$^1$Department of Physics, University of Surrey, Guildford, GU2 7XH, UK
$^2$WNSL, Yale University, 272 Whitney Avenue, New Haven, CT, 06520, USA
$^3$Department of Physics, Lund University, S-22100, Lund, Sweden
$^4$GSI, Planckstrasse 1, D-64291, Darmstadt, Germany
$^5$The Henryk Niewodniczański Institute of Nuclear Physics, PL-31-342, Kraków, Poland
$^6$Università degli Studi di Milano and INFN sezione di Milano, I-20133, Milano, Cernusco, Italy
$^7$CENBG, le Haut Vigneau, F-33175, Gradignan Cedex, France
$^8$School of Engineering, University of Brighton, Brighton, BN2 4GJ, UK
$^9$Departamento de Teorica, Universidad Autonoma de Madrid, E-28049, Madrid, Spain
$^{10}$Institute for Nuclear Research, H-4001, Debrecen, Hungary
$^{11}$Universidad de Santiago de Compostela, E-15786, Santiago de Compostela, Spain
$^{12}$IKP, Universität zu Köln, D-50937, Köln, Germany
$^{13}$Nuclear Engineering Division, Argonne National Laboratory, Argonne, IL-60439, USA
$^{14}$Faculty of Physics, University of Sofia “St. Kliment Ohridski” Sofia, Bulgaria
$^{15}$IEP, Warsaw University, Hoża 69, PL-00-681, Poland
$^{16}$Japan Atomic Energy Research Institute, Kyoto, 619-0215, Japan
and
$^{17}$Physik Department E12, Technische Universität München, Garching, Germany

The low-lying structure of $^{86}$Tc has been studied using isomer-decay spectroscopy at GSI in the first experiment of the Stopped-Beam phase within the Rare Isotope INvestigation at GSI (RISING) campaign. Following projectile fragmentation of a 750 MeV/u beam of $^{107}$Ag, reaction products were separated and unambiguously identified using the FRagment Separator (FRS) in combination with its ancillary detectors. The ions were made to stop in a plastic stopper at the final focus of the FRS in the centre of the Stopped RISING γ-ray spectrometer. This high-efficiency, high-granularity array consists of 15 germanium cluster detectors in a compact configuration which provides a full photopeak efficiency in excess of 15% at 1.3 MeV. Internal decay of the previously identified [1] microsecond isomer in $^{86}$Tc was confirmed with the addition of two previously unobserved γ-rays which help to determine the excitation energy and spin of the isomeric state. As in other heavy odd-odd N=Z nuclei a notably lower density of states below 1 MeV excitation energy compared with neighbouring odd-odd nuclei away from the N=Z line [2] is observed with the lowest T=0 state identified in the preliminary analysis being a J$^π$=3$^+$ state located 1176 keV above the T=1 [3] groundstate. Results from this experiment will be discussed along with assignments of structure made from shell model calculations and systematics of N=Z nuclei.


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