Abstract Submitted
for the DNP08 Meeting of
The American Physical Society

Observation of an excited state in $^{101}$Sn via the $\alpha$-decay of $^{105}$Te$^1$

SEAN LIDDICK, IAIN DARBY, University of Tennessee, ROBERT GRZYWACZ, University of Tennessee and Physics Division Oak Ridge National Laboratory, KRZYSZTOF RYKACZEWSKI, Physics Division Oak Ridge National Laboratory, ROBERT PAGE, University of Liverpool, CARL GROSS, Physics Division Oak Ridge National Laboratory, JON BATCHELDER, UNIRIB — The doubly magic nucleus $^{100}$Sn is a key test nucleus for the nuclear shell model. Required information in this region is knowledge of single-particle energies, particularly the energy separation between the $\nu d_{5/2} - \nu g_{7/2}$ orbitals. For the $^{100}$Sn region, the energy separation can be best extracted from the energy of the first excited state in $^{101}$Sn. In experiments performed at the HRIBF using the RMS $\alpha$-decay chains of $^{109}$Xe $\rightarrow$ $^{105}$Te $\rightarrow$ $^{101}$Sn were observed following implants of $^{109}$Xe ions into a DSSD, fully instrumented with Digital Signal Processing, placed within the $\gamma$-array CARDS. Double $\alpha$-decay pulse shapes provide a unique and clean coincidence requirement which resulted in the observation of a $\gamma$-ray, interpreted as being emitted from the first excited state in $^{101}$Sn. These results will be presented and the implications for the single-particle level assignments will be discussed.

$^1$DOE Grants DE-AC05-00OR22725 (ORNL), DEFG02- 96ER40983 (UT), DEFC03- 03NA00143 (NNSA) and by the U.K. STFC