

Abstract Submitted  
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**Identification of new transitions and levels in  $^{163,165}\text{Gd}$  and  $^{163}\text{Tb}$  from  $\beta$  decay studies** C.J. ZACHARY, Vanderbilt University, N.T. BREWER, Physics Division, Oak Ridge National Laboratory, E.H. WANG, Vanderbilt University, J.C. BATCHELDER, UNIRIB/Oak Ridge Associated Universities, R. GRZYWACZ, University of Tennessee, Knoxville, C.J. GROSS, K.P. RYKACZEWSKI, Physics Division, Oak Ridge National Laboratory, J.H. HAMILTON, A.V. RAMAYYA, Vanderbilt University — An investigation of  $\gamma$ -rays emitted following  $^{163,165}\text{Eu}$   $\beta$  decay to  $^{163,165}\text{Gd}$  and  $^{163}\text{Gd}$   $\beta$  decay to  $^{163}\text{Tb}$  has been performed. Data were collected at the LeRIBSS station of the Holifield Radioactive Ion Beam Facility at Oak Ridge National Laboratory with an array of four Clover HPGe detectors for  $\gamma$ -rays and 2 plastic scintillators for  $\beta$  detection. The  $\gamma$ -rays were identified as belonging to  $^{163}\text{Gd}$ ,  $^{165}\text{Gd}$ , and  $^{163}\text{Tb}$  via mass selection and  $\gamma$ - $\gamma$ - $\beta$  or  $\gamma$ - $\gamma$  coincidence. In total 71 new  $\gamma$ -ray transitions were observed in  $^{163}\text{Gd}$  and 3 new  $\gamma$ -ray transitions from  $^{165}\text{Gd}$  have been identified for the first time. Among the new transitions in  $^{163}\text{Gd}$  the data show evidence for transitions of near 50 keV and high energy transitions of up to 2 MeV depopulating from the same energy level. This feature is atypical in previous nuclear structure studies and needs further experimental and theoretical consideration. Additionally the first observation of 11  $\gamma$ -rays from  $^{163}\text{Tb}$ , between already known levels, has been made.

Christopher Zachary  
Vanderbilt University

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