

Abstract Submitted  
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**A New Investigation of  $^{94}\text{Zr}$  with the  $(n, n'\gamma)$  Reaction**<sup>1</sup> E.E. PETERS, A. CHAKRABORTY, B.P. CRIDER, A. KUMAR, M.T. MCELLISTREM, F.M. PRADOS-ESTÉVEZ, S.W. YATES, University of Kentucky, Lexington, KY 40506 — Measurements of the low-lying structure of  $^{94}\text{Zr}$  with the  $(n, n'\gamma)$  reaction revealed anomalous behavior not observed in other nuclei [1]. The B(E2) for the transition from the  $2_2^+$  state at 1671.4 keV to the ground state was found to be larger than that from the  $2_1^+$  to the ground state, 7.8(7) W.u. [1] vs. 4.9(3) W.u. [2], respectively. This nucleus then became the only example where such an inversion of the B(E2) strength occurs. Recently, we have carried out  $(n, n'\gamma)$  measurements using metallic zirconium, zirconium (IV) oxide, and zirconium (IV) hydroxide samples of natural isotopic composition. The lifetime of the  $2_2^+$  state was determined by the Doppler-shift attenuation method and the B(E2;  $2_2^+ \rightarrow 2_1^+$ ) was obtained; the results differ significantly from those published [1]. A new analysis of the original  $\gamma$ -ray data [1] failed to reveal the source of this discrepancy. However, powder x-ray diffraction and scanning electron microscopy performed on each sample material, including that used previously [1], provide clues to the answer.

[1] E. Elhami *et al.*, Phys. Rev. C **75**, 011301(R) (2007).

[2] D. Abriola and A.A. Sonzogni, Nucl. Data Sheets **197**, 2423 (2006).

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