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Lifetime Measurements and Deformation in ^{79}Sr[1] Y.K. RYU, R.A. KAYE, S.R. ARORA, Ohio Wesleyan University, S.L. TABOR, T. BALDWIN, D.B. CAMPBELL, C. CHANDLER, M.W. COOPER, C.R. HOFFMAN, J. PAVAN, M. WIEDEKING, Florida State University, J. DÖRING, GSI, Germany, Y. SUN, University of Notre Dame, S.M. GERBICK, O. GRUBOR-UROSEVIC, Purdue University Calumet, L.A. RILEY, Ursinus College — High-spin states in ^{79}Sr were produced following the ^{54}Fe(^{28}Si, $2pn$) fusion-evaporation reaction using a beam energy of 90 MeV at the Florida State University (FSU) Tandem-Linac facility, and the resulting de-exciting γ rays were detected with the FSU Ge array of 10 Compton-suppressed detectors. The ^{54}Fe target was thick enough so that all of the synthesized nuclei could stop completely in the target, resulting in Doppler-shifted γ-ray line shapes that could be analyzed using the Doppler-shift attenuation method. In all, 23 lifetimes were measured in three separate band structures using this method, and then used to infer transition quadrupole moments (Q_t) and quadrupole deformations (β_2) using the rotational model. The results show good qualitative agreement with the predictions of both cranked Woods-Saxon (CWS) and projected shell model (PSM) calculations. The band based on a $d_{5/2}$ single-particle orbit, verified in this study through $\gamma-\gamma$ coincidences, intensity measurements, and directional correlation of oriented nuclei (DCO) ratios, was found to have the largest average deformation ($\beta_{2,\mathrm{ave}} = 0.41$) among the three bands, in agreement with the CWS and PSM predictions.

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