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New Band Structures in Neutron-Rich ^{108}Mo , and $^{108,110,112}\text{Ru}$ J.H. HAMILTON, Y.X. LUO, A.V. RAMAYYA, C. GOODIN, K. LI, J.K. HWANG, S. LIU, Vanderbilt Univ., S.J. ZHU, H.-B. DING, X.L. CHE, Tsinghua Univ., J.O. RASMUSSEN, I.Y. LEE, LBNL, D. ALMEHED, S. FRAUENDORF, V. DIMITROV, Univ. Notre Dame, J.Y. ZHANG, N.J. STONE, Univ. of TN, G.M. TERAKOPIAN, A.V. DANIEL, JINR, M.A. STOYER, LLNL, R. DONANGELO, Univ. Fed. do Rio Janeiro, J.D. COLE, INL — New insights into the structures of ^{108}Mo , and $^{108,110,112}\text{Ru}$ are identified in the spontaneous fission of ^{252}Cf . The 5.7×10^{11} triples and higher fold prompt gamma coincidences opened up the possibility to see new weakly populated band structures in these nuclei. Two phonon γ -bands that decay only to the one phonon γ -band were discovered in ^{108}Mo and $^{110,112}\text{Ru}$. We discovered in ^{108}Mo and $^{108,110,112}\text{Ru}$ $\Delta I=1$, doublet bands. Our theoretical calculations indicate ^{108}Ru is γ -soft and $^{110,112}\text{Ru}$ are more rigid triaxial nuclei. The non-yrast band in ^{108}Ru shows an energy level staggering not seen in its yrast partner band nor in $^{110,112}\text{Ru}$. This staggering is proposed to be related to its γ -soft shape perturbing its chiral structure. The doublet bands in ^{108}Mo and $^{110,112}\text{Ru}$ will be shown to have all the properties expected for chiral vibrational bands. Tilted axis cranking calculations for $^{110,112}\text{Ru}$ strongly support the chiral vibrational interpretation of these bands but do not support their being accidentally degenerate energy doublets built on different configurations.

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