

SYSTEMATICS OF EVEN-EVEN $T_z = 1$ NUCLEI IN THE $A = 80$ REGION: HIGH-SPIN ROTATIONAL BANDS IN ^{74}Kr , ^{78}Sr , AND ^{82}Zr ¹

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High-spin states of $T_z = 1$ nuclei were studied with the reactions $^{58}\text{Ni}(^{28}\text{Si}, 3\alpha)^{74}\text{Kr}$, $^{58}\text{Ni}(^{28}\text{Si}, 2\alpha)^{78}\text{Sr}$, and $^{58}\text{Ni}(^{28}\text{Si}, 2p2n)^{82}\text{Zr}$ at 130 MeV beam energy. The Gammasphere array in conjunction with the 4π charged-particle detector array Microball was used to detect γ rays in coincidence with evaporated light charged particles. The known $\pi=+$, $\alpha=0$ yrast bands were extended to $I=28\hbar$ at 20 MeV excitation energy. For all three nuclei, a number of positive- and negative-parity sidebands were established; altogether 15 new rotational bands were found. The data are discussed using the pairing-and-deformation self-consistent total Routhian surface (TRS) model: High-spin structures of ^{74}Kr and ^{78}Sr are governed by the shell gaps at large prolate deformation while ^{82}Zr seems to exhibit shape coexistence. Nearly identical bands were established which may be explained as arising from the fp orbits acting as spectators at very elongated shapes. The experimental data in these $T_z=1$ nuclei are in good agreement with predictions of the TRS model using conventional $T=1$ like-nucleon pairing correlations.

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