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Shape coexistence in and near ^{68}Ni

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The nuclei in the vicinity of ^{68}Ni have been the subject of considerable experimental and theoretical work focused on studying the evolution of nuclear structure. Situated at the $Z = 28$ proton shell closure and the fragile $N = 40$ subshell closure, ^{68}Ni is an important nucleus to understand as a progression is made from stable to increasingly exotic nuclei. The nature and decay of the first excited state in ^{68}Ni has been thoroughly investigated in recent years. The first excited state has a spin and parity of 0^+, can be described by the excitation of neutrons across the $N = 40$ gap, and has been interpreted as a moderately oblate-deformed state that coexists with the spherical ground state. A second low-energy excited 0^+ state is also known to exist in ^{68}Ni. Based on comparisons with theoretical calculations, the second excited 0^+ state has been proposed to be strongly prolate deformed and based primarily on the excitation of protons across the $Z = 28$ gap, leading to the inference that three different 0^+ states with three distinct shapes coexist below 3 MeV in ^{68}Ni. Additional studies suggest that shape coexistence is not unique to ^{68}Ni in this neutron-rich region near $Z = 28$. For instance, in the neighboring even-even isotope ^{70}Ni, theory predicts that a prolate-deformed minimum in the potential energy surface occurs at even lower energy than in ^{68}Ni, and experimental evidence is consistent with the theoretical prediction. The results of recent experiments studying shape coexistence in the region, particularly investigations of ^{68,70}Ni, will be presented and theoretical interpretations will be discussed.