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On the nature of 0^+ states in ^{64}Ni from Coulomb excitation[1]

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— Recent experimental work on the doubly-magic nucleus ^{68}Ni has shown that shape coexistence occurs despite its rigidly spherical ground state [1]. Several low-lying 0^+ states have been discovered and attributed to different minima in the nuclear potential associated with oblate and prolate deformations. Consequently, it is important to question if such 0^+ excitations can also occur in the most neutron-rich, stable Ni isotope, ^{64}Ni, and whether or not they can be tied to shape coexistence. Two low-lying 0^+ states have previously been observed in ^{64}Ni, but additional information beyond their excitation energy and spin is needed in order to investigate their properties. A high-statistics Coulomb excitation experiment was performed at the ATLAS facility at ANL, where a ^{208}Pb target was bombarded by a ^{64}Ni beam at an energy of 272 MeV. The experimental setup involved the new GRETINA tracking array in conjunction with the Compact Heavy Ion COunter, CHICO2. Thirteen transitions were observed in ^{64}Ni, including the 1521- and 1680-keV γ-rays associated with the de-excitation of the 0_2^+ and 0_3^+ states, respectively. B(E2) reduced transition probabilities were obtained for all observed states. [1] S. Leoni et al., PRL 118, 162502 (2017).

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