

IDENTIFICATION OF EXCITED STATES IN THE $T_z = + 1/2$ NUCLEUS ^{75}Rb : THE QUEST FOR EXPERIMENTAL SIGNATURES OF COLLECTIVE NEUTRON-PROTON CORRELATIONS¹

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Excited states in the $T_z = 1/2$ nucleus ^{75}Rb were observed for the first time using the $^{40}\text{Ca}(^{40}\text{Ca}, \alpha p)$ reaction at 128 MeV. Identification was achieved using events detected by the Daresbury recoil separator in coincidence with γ rays detected in the 45 element EUROGAM I Ge-detector array. Threefold events were used to build a decay scheme which consists of two rotational bands observed to $I^\pi = (45/2^+)$ and $I^\pi = (33/2^-)$. The positive parity band in ^{75}Rb behaves similarly to a negative-parity band in ^{74}Kr and contains a region of alignment at $\hbar\omega \approx 0.75$ MeV. These data, and those of ^{77}Sr , can be interpreted by treating protons and neutrons separately in a cranked shell model approach despite a recent suggestion for the presence of $T = 1$ neutron-proton pairing correlations in the neighboring self-conjugate, odd-odd ^{74}Rb ground state band. Our study suggests that some experimental observables such as the energy levels and moments of inertia, may not be able to differentiate between different $T = 1$ pairing phases in these $T_z = 1/2$ nuclei.

¹Abstract of published paper: Phys. Rev. C**56**, 2 (1997).

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