

Band Termination in ^{82}Sr .

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High-spin states were populated in ^{82}Sr with the $^{56}\text{Fe}(^{30}\text{Si}, 2p2n)$ reaction at a beam energy of 128 MeV. The 5pnA- ^{30}Si beam was provided by the N.S.F. tandem accelerator at Daresbury Laboratory. A total of 4×10^9 (raw fold ≥ 5) $\gamma - \gamma$ events were recorded in 9 shifts with the Eurogam array of 45 Ge detectors. Within 1 shift of beam time it was possible to observe the highest known transitions in ^{82}Sr . However, after a further 8 shifts and using triples matrices gated on each of the rotational bands it was only possible to add 1-2 *higher* spin transitions to the known level scheme. The collective rotational bands were observed to fragment to other levels around the same spin.

These data reveal the first observation of band termination in the $A \approx 80$ region. Indeed none of the rotational bands based on collective states survive beyond $I \approx 25\hbar$ where the population of the low-lying single-particle states compete strongly. Band termination in this region can be understood from the Cranked-Nilsson-Strutinsky calculations. The $g_{9/2}$ orbitals reach maximum occupation for both protons and neutrons with a maximum angular momentum of $25\hbar$. In order to generate higher angular momentum states excitations to the $f_{5/2}$ orbits are required. These states lie above the deformed shell gap and therefore, considerably higher in excitation energy.

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