

THEORETICAL DESCRIPTION OF THE ^{94}Mo AND ^{95}Mo NUCLEI

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The ^{94}Mo and ^{95}Mo nuclei have two and three neutrons outside the $N=50$ closed shell, respectively, while the 28-50 proton shell is open. Therefore, we treat ^{94}Mo and ^{95}Mo on the same footing and within the same parametrization by coupling the corresponding valence-shell neutron to the quadrupole vibration of ^{92}Mo . Such an interplay of few valence-shell neutrons and the vibrational degree of freedom gives rise to the coexistence of quasivibrational, quasirotational, and clustering phenomena¹⁾. In the present calculation, we use the parametrization taken in a very simple-minded way directly from experiment (without parameter fitting). In interpreting the results, however, we should keep in mind possible physical renormalizations of parameters and effects of the neglected anharmonicities. We diagonalized the Hamiltonian in the corresponding basis $|(j_1 j_2)J, NR; I\rangle$ for ^{94}Mo and $|(j_1 j_2)J_{12}, j_3|J, NR; I\rangle$ for ^{95}Mo . Here, N represents the number and R the angular momentum of the cluster, and I is the total angular momentum. The calculated spectra for ^{94}Mo and ^{95}Mo ²⁾ are compared with experiment in Fig. 1. We calculated the electromagnetic properties and transfer reactions by using the resulting wave functions. Specifically, quasivibrational pattern of $E2$ transitions, which represented the challenge to earlier descriptions of these nuclei, is reproduced. In ^{94}Mo , the experimental $B(E2)$ values for the $2_1^+ \rightarrow 0_1^+$, $2_2^+ \rightarrow 0_1^+$, $2_2^+ \rightarrow 2_1^+$, $4_1^+ \rightarrow 2_1^+$ transitions are 0.054, 0.0011, 0.031, and 0.067 (eb)², respectively (with experimental errors of about 20%), and the calculated $B(E2)$ values are 0.050, 0.001, 0.033, and 0.057, respectively. For ^{95}Mo , recent $B(E2)$ values for the $3/2_1^+ \rightarrow 5/2_1^+$, $7/2_1^+ \rightarrow 5/2_1^+$, $1/2_1^+ \rightarrow 5/2_1^+$, and $9/2_1^+ \rightarrow 5/2_1^+$, are 0.057, 0.010, 0.010, and 0.032, respectively and the calculated $B(E2)$ values are 0.052, 0.005, 0.021, and 0.026, respectively. Interesting properties are the quadrupole moment $Q(5/2_1^+)$ (-0.019 ± 0.012 and -0.02 , experimentally and theoretically, respectively), and the ratio of the cross sections

