Study of mixed-symmetry states in $^{94}_{40}$Zr with (n,n′γ) reaction[1]

ESMAT ELHAMI, University of Kentucky, S.N. CHOUDRY, B. CRIDER, S. MUKHOPADHYAY, J.N. ORCE, M. SCHECK, M.T. MCELLISTREM, S.W. YATES, University of Kentucky, A.P. TONCHEV GROUP, TUNL/Duke University, D. WEISSHAAR, NSCL
— The low-spin structure of $^{94}_{40}$Zr has been studied with the $(n, n'\gamma)$ reaction at the University of Kentucky 7 MV Van de Graaff acelerator facility and at TUNL at Duke University. Branching ratios, lifetimes, multipolarities and spin assignments have been determined. The 2^+_2 state at 1671.4 keV has been identified as the lowest mixed-symmetry state in ^{94}Zr; $B(M1; 2^+_{1,ms} \rightarrow 2^+_1)$ = 0.33(5) μ^2_N. This state has an anomalous decay behavior, i.e., $B(E2; 2^+_{1,ms} \rightarrow 0^+_1)$ = 8(1) W.u. is unusually larger compared to the $B(E2; 2^+_1 \rightarrow 0^+_1)$ = 4.9(11)W.u. The analysis of angular distribution data reveals even more anomalies in the states above the mixed-symmetry, $2^+_{1,ms}$, state. For example, the 4^+_2 state, at 2330 keV decays strongly to the 2^+_1 state, $B(E2; 4^+_2 \rightarrow 2^+_1)$ = 19(2) W.u. compared to the 4^+_1 state at 1470 keV, $B(E2; 4^+_1 \rightarrow 2^+_1)$ = 0.88(2) W.u. Some results from the angular distributions data at E_n=2.8 and 3.5 MeV will be presented to address this issue.

Esmat Elhami
University of Kentucky

Date submitted: 26 Jun 2007   Electronic form version 1.4