Deformed Structures and Shape Coexistence in Zr-98

BRUNO OLAIZOLA, Univ of Guelph, 8PI COLLABORATION — The nuclear structure of the zirconium isotopes evolves from a mid-open neutron shell deformed region ($^{80}\text{Zr}$), through a closed shell ($^{90}\text{Zr}$), to a closed subshell ($^{96}\text{Zr}$), and then to a sudden reappearance of deformation ($^{100}\text{Zr}$). This rapid onset of deformation across the Zr isotopes is unprecedented, and the issue of how collectivity appears and disappears in these isotopes is of special interest. Until recently, only $^{98}\text{Zr}$ (and maybe $^{100}\text{Zr}$) had indirect and weak evidence for shape coexistence, with only speculative interpretation of the experiments. Recent results from high precision B(E2) measurements provided direct evidence of shape coexistence in $^{94}\text{Zr}$ and suggested that it may happen in many other nuclei in this region. In order to provide direct evidence of shape coexistence in $^{98}\text{Zr}$ a high-statistical-quality $\gamma\gamma$ experiment was carried out with the $8\pi$ spectrometer at ISAC-TRIUMF. The array consists of 20 Compton-suppressed hyper-pure germanium detectors plus $\beta$ particle and conversion electron detectors. Excited states up to $\sim 5$ MeV in $^{98}\text{Zr}$ were populated in the $\beta^-$ decay of $^{98}\text{Y}$ $J^\pi = (0^-)$ and $^{98m}\text{Y}$ $J=(4,5)$. Preliminary results on key branching ratios will be presented.

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