

Abstract Submitted
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Spin measurements for $^{147}\text{Sm}+n$ resonances: Further evidence for non-statistical effects¹

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We have determined spins of resonances in the $^{147}\text{Sm}(n, \gamma)$ reaction by using the DANCE detector at LANSCE to measure multiplicities of γ -ray cascades following neutron capture. These new spin assignments, together with previously determined resonance parameters, allowed us to extract separate level spacings and neutron strength functions for $J = 3$ and 4 resonances. Furthermore, although all the evidence indicates that very few resonances of either spin have been missed below $E_n = 700\text{eV}$, reduced-neutron-width and level-spacing distributions do not agree with the expected distributions for resonances in the energy range $350 < E_n < 700$ eV. The new spin assignments also allowed us to reanalyze $^{147}\text{Sm}(n, \alpha)$ data and obtain more reliable α widths. Although our new α widths are somewhat different from previous work, recently reported non-statistical effects revealed by these widths remain. Taken together, the neutron-width, α -width, and level-spacing data indicate the onset of some non-statistical effect near $E_n = 350\text{eV}$. We will discuss possible explanations for these effects and their possible relation to similar effects previously observed in $^{232}\text{Th} + n$ resonances.

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