

The Curious and Tantalizing Case of Tantalum 180

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Abstract

The Ta 180 nucleus is the rarest naturally occurring isotope. It exists in an isomeric state with a half-life time of $t_{1/2} > 1.2 \times 10^{15}$ years at an excitation energy of 75 keV and spin 9^- . The ground state is a $J = +6$ and its half-life time 8.1 hours. Because of the large spin gap, electromagnetic transitions are strongly suppressed. One can ask the question whether exciting the isomer to higher state will lead to a population of the ground state. Several experiments have provided an answer to this question. There is however a large discrepancy between theory and experiment. We will discuss the various aspects of these studies.