Microsecond isomers in ^{125}Sb.

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Isomeric states with $J^\pi = 5^-$ and 7^- are observed in all even A $^{116-132}$Sn isotopes and, prior to this work, $J^\pi = 15/2^-$ and $19/2^-$ states with microsecond lifetimes had been observed in ^{127,129,131}Sb. These states have been explained as the odd $g_{7/2}$ proton coupled to the isomer in the $^{(A-1)}$Sn core [1]. This paper reports on an experiment at the Australian National Laboratory to assign the spin and parity and measure the lifetime of two microsecond isomers in ^{125}Sb identified independently in the work of Liu [2] and Orce [3].

The nuclei were populated using the ^{124}Sn(^{7}Li,α2n)^{125}Sb reaction at a beam energy of 37 MeV. Data from a conversion electron measurement confirms that the two states (at 1972 and 2113 keV) have J^π values of $15/2^-$ and $19/2^-$ respectively. Their lifetimes were measured as 5.7(3) and 28.0(7) μs respectively. The energies of these states fit very well with the systematics of the known isomeric states in the heavier antimony isotopes and with those observed in the ^{124}Sn core. Data will be presented on the conversion electron and lifetime measurements and the systematics of the energies of the microsecond isomeric states will be compared with shell model calculations.

References

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