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HIGH SPIN ISOMERIC STATES IN ^{197}Pb

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High spin isomeric states in ^{197}Pb have been investigated by in-beam gamma ray technics. These states are produced in (heavy ion, xn) reactions. The various experiments performed are summarized in table I.

The proposed level scheme is presented in figure. 1. As can be seen on the figure, the ^{197}Pb level scheme looks like those of ^{198}Pb and ^{196}Pb if the $13/2^+$ isomeric state is related to the 0^+ ground state in even lead isotopes. The 55 ns half life is due to a small unobserved E2 transition between the $33/2^+$ and $29/2^+$ states. Low-energy E1 transitions ($21/2^- \rightarrow 21/2^+$; 32 keV and $21/2^- \rightarrow 19/2^+$; 57 keV) account for the 700 ns half-life.

The higher spin states are well reproduced by a quasi-particle calculation (T.D.3 approximation with an S.D.I. interaction; $G_{\text{SDI}} = 0.165 \text{ MeV}$) what favours a pure configuration interpretation, as was observed for the 12^+ and 10^+ levels in the even isotopes. The same agreement is not obtained for the lower lying levels, especially $17/2^+$ and $15/2^+$; the position of these states, compared to that of the 2^+ level suggests that they are members of the multiplet resulting from the weak coupling of a 2^+ core excitation with an $i13/2$ quasi-particle.

TABLE I

	Reaction used	Accelerator and laboratory	Beam energy in MeV
Excitation functions	$\begin{cases} ^{186}\text{W}(^{16}\text{O}, 5n) \\ ^{198}\text{Hg}(\alpha, 5n) \end{cases}$	Cyclotron-Louvain-la-Neuve-Belgium	80 to 115
Half-life measurements	$\text{W}(^{16}\text{O}, 5n)$	Variable energy cyclotron Orsay, France	50 to 75
γ_1 - γ_2 coincidences			97
$\gamma_1, \gamma_2 \geq 100 \text{ keV}$	$\text{Re}(^{14}\text{N}, 4n)$	Cyclotron-Louvain-la-Neuve-Belgium	
$\gamma_1 \leq 100 \text{ keV}$	$^{186}\text{W}(^{16}\text{O}, 5n)$	Tandem M. P. Orsay-France	73
$\gamma_2 \geq 100 \text{ keV}$			86.5

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