



HAL
open science

HIGH SPIN ISOMERIC STATES IN ^{197}Pb

H. Richel, G. Albouy, G. Auger, J. Lagrange, M. Pautrat, C. Roulet, H. Sergolle, J. Vanhorenbeeck

► **To cite this version:**

H. Richel, G. Albouy, G. Auger, J. Lagrange, M. Pautrat, et al.. HIGH SPIN ISOMERIC STATES IN ^{197}Pb . Congress of the French Physical Society, 1977, Poitiers, France. pp.C3-168-C3-168, 10.1051/jphyscol:1978327 . jpa-00217431

HAL Id: jpa-00217431

<https://hal.science/jpa-00217431>

Submitted on 4 Feb 2008

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

HIGH SPIN ISOMERIC STATES IN ¹⁹⁷Pb

H. RICHEL (*), G. ALBOUY, G. AUGER, J. M. LAGRANGE, M. PAUTRAT,
C. ROULET, H. SERGOLLE and J. VANHORENBEECK (*)

Institut de Physique Nucléaire, B.P. 1, 91406 Orsay, France

High spin isomeric states in ¹⁹⁷Pb 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 ¹⁹⁷Pb level scheme looks like those of ¹⁹⁸Pb and ¹⁹⁶Pb 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⁻ → 21/2⁺; 32 keV and 21/2⁻ → 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_{SDI} = 0.165 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.

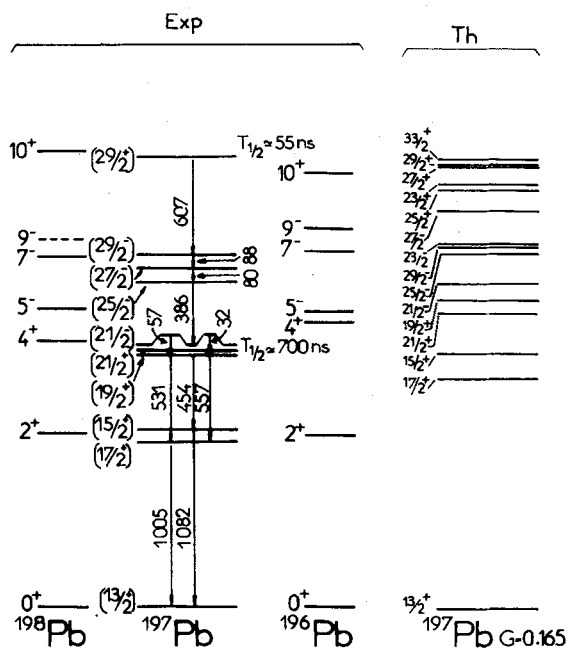


TABLE I

	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 50 to 75
Half-life measurements	$\text{W}({}^{16}\text{O}, 5n)$	Variable energy cyclotron Orsay, France	97
γ_1 - γ_2 coincidences			
$\gamma_1, \gamma_2 \geq 100$ keV	$\text{Re}({}^{14}\text{N}, 4n)$	Cyclotron-Louvain-la-Neuve-Belgium	73
$\gamma_1 \leq 100$ keV	${}^{186}\text{W}({}^{16}\text{O}, 5n)$	Tandem M. P. Orsay-France	86.5
$\gamma_2 \geq 100$ keV			

(*) I.I.S.N. Bruxelles, Belgique.