

GAMMA DECAY STUDIES OF $^{194}\text{Pb}(9.2\text{m})$, $^{195\text{m}}\text{Pb}(15.0\text{m} + <1\text{m})$ AND $^{196}\text{Pb}(36.4\text{m})$

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Initially we studied the $^{197}\text{Au}(^6\text{Li},\text{xn})^{203-\text{xnPb}}$ reaction in conjunction with Exp. #69, "Investigation of the Decay Modes of High-Spin Compound Nuclei in ^6Li Induced Fusion Reactions," by measuring the Pb activation yields using Ge(Li) γ -ray spectroscopy. The excitation functions for the production of $^{194-199}\text{Pb}$ isotopes were measured in the energy range of 55-95 MeV. Those results were in good agreement with the yields measured in-beam by H. Karwowski (IUCF Thesis, 1980). In our study we observed the $^{197\text{g}}\text{Pb}$ ground state as part of the $^{197\text{m}}\text{Pb}(42\text{m})$ isomeric decay. Subsequently in further measurements we determined the half-life of $^{197\text{g}}\text{Pb}$ to be 6.2m and detailed the decay schemes of the isomeric pair. Results of that study were recently published.¹⁾

A new experiment was proposed (Exp. #137) which was motivated in part as a search for an analogous low-spin isomer of ^{195}Pb . The experiment involved a detailed γ -ray singles and γ - γ coincidence study of ^{194}Pb , ^{195}Pb and ^{196}Pb produced in the $^{197}\text{Au}(^6\text{Li},\text{xn})^{203-\text{xnPb}}$ reactions at 95 MeV. Singles γ -ray spectra were accumulated from multiple

bombardments of $\sim 50\text{mg}/\text{cm}^2$ ^{197}Au targets for short periods of time during the first 15 minutes to search for short-lived activities ($T_{1/2} \sim 1-5$ min). Longer bombardment times were used to study the long-lived products. The γ - γ coincidence study required accumulating results from 30 bombardments of the Au targets. Eleven new γ -rays were found in the decays of ^{194}Pb and ^{195}Pb . In addition, the half-lives of the isotopes were measured to a nominal 15% uncertainty. Previous²⁾ decay schemes were confirmed and some decay ambiguities were resolved. The $^{195\text{g}}\text{Pb}$ ground state decay was studied in detail but only a limit could be set on its half-life. The isomeric decay of $^{195\text{m}}\text{Pb}(15.0\text{m})$ was deduced to be 17% which is to be compared with 35% for $^{197\text{m}}\text{Pb}(42\text{m})$. In Figure 1 are shown the results of the $^{195\text{m}}\text{Pb}$ isomer study.

A manuscript of this study is currently being prepared for submission to Nuclear Physics.

- 1) K. Hicks and T. Ward, Nucl. Phys. A349, 29 (1980).
- 2) "Table of Isotopes," ed. by C.M. Lederer and V.S. Shirley, 7th ed., 1978, John Wiley and Sons, N.Y.

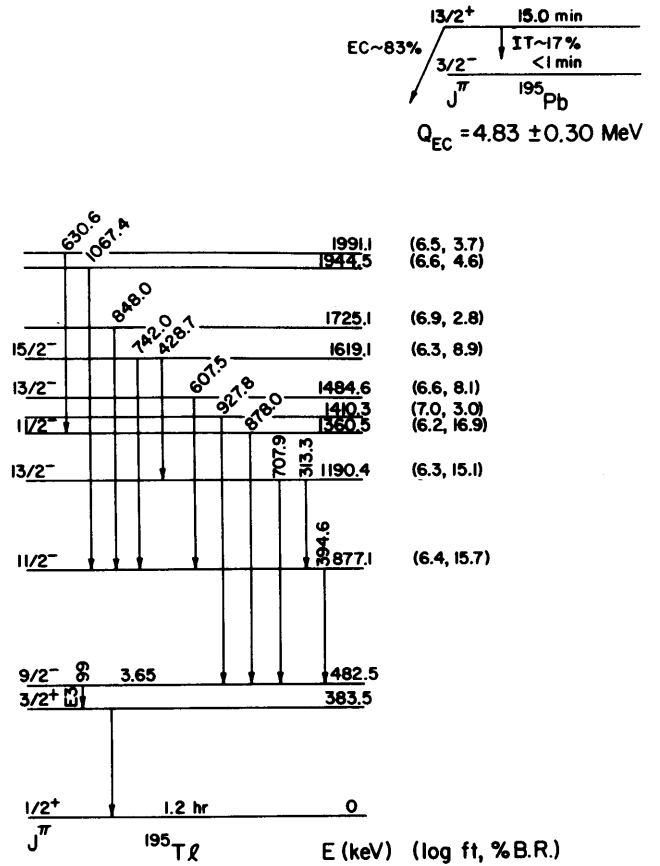
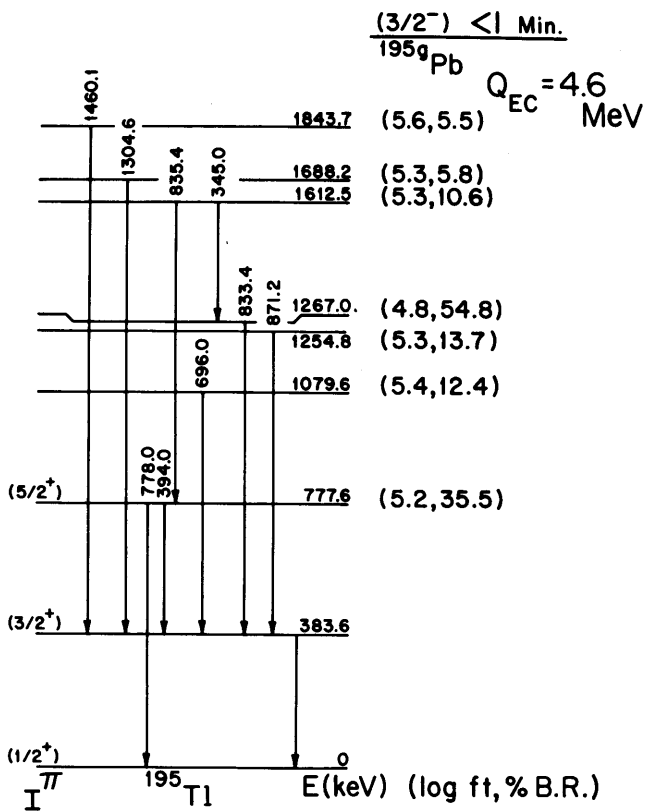


Figure 1. Decay schemes of the $^{195m+g}\text{Pb}$ isomer deduced in the present study.