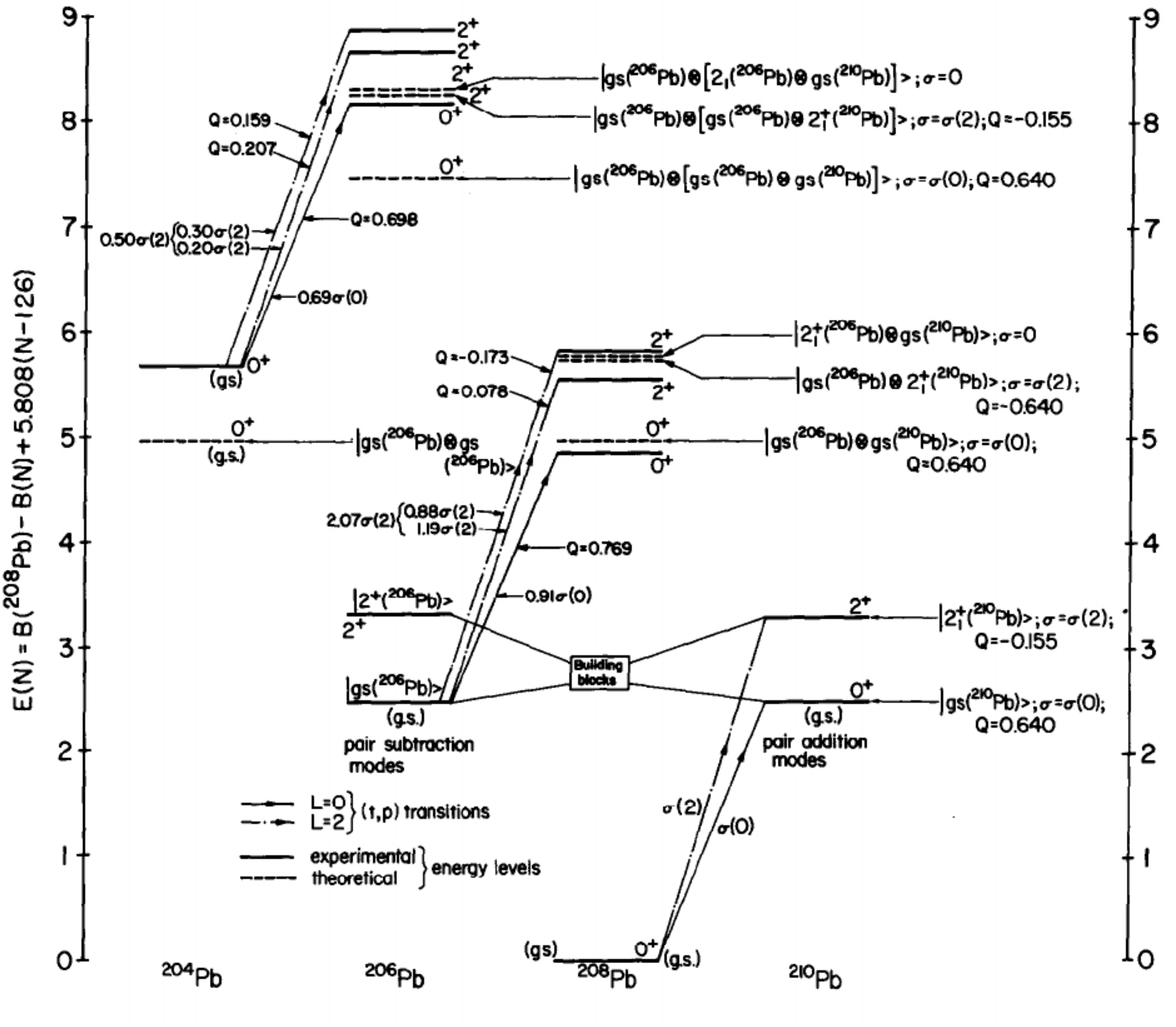

Theoretical predictions of the pairing vibrational model for the $J^\pi = 0^+$ and 2^+ excited states of ^{208}Pb and ^{206}Pb expected to display the same Q-value, angular distribution and intensities in the ^{206,204}Pb (t, p) reactions as the ground state and first excited 2^+ state of ^{210}Pb in the ^{208}Pb (t, p) ^{210}Pb reaction.

These levels are depicted as dotted lines and their structure in terms of the pair addition and pair subtraction phonons (building blocks) are explicitly given.

The corresponding cross section and Q-values expected for each transition are also quoted for each state. The experimental energies (solid lines) and (t, p) cross sections are also given. In this case, the levels are joined by a continuous line ($L = 0$ transitions) or by a dotted line ($L = 2$ transitions) and the corresponding intentities in terms of the cross sections $\sigma(0) = \sigma(^{208}\text{Pb (t, p)}\ ^{210}\text{Pb (gs)})$ and $\sigma(2) = \sigma(^{208}\text{Pb (t, p)}\ ^{210}\text{Pb } (2^+))$ are given. Also quoted are the observed Q-values.

The experimental energy of the different ground states is given relative to the ^{208}Pb ground state and corrected by a linear function of the number of neutrons outside (or missing from) the $N = 126$ closed shell such that $E(^{206}\text{Pb (gs)}) = E(^{210}\text{Pb (gs)})$. The corresponding expression [6] is $E_{\text{exp}}(N, Z = 82) = B(^{208}\text{Pb}) - B(N, Z = 82) + 5.808\,(N-126)$, where $B(N, Z)$ is the binding energy of the nucleus $A = N + Z$. Note that $\hbar\omega(0) = E_{\text{theor}}(^{206}\text{Pb (gs)}) = E_{\text{theor}}(^{210}\text{Pb (gs)}) = E_{\text{exp}}(^{206}\text{Pb (gs)}) = E_{\text{exp}}(^{210}\text{Pb (gs)}) = 2.493$ MeV, that $E_{\text{theor}}(^{206}\text{Pb } (2^+)) = E_{\text{exp}}(^{206}\text{Pb } (2^+)) = 3.294$ MeV and $E_{\text{theor}}(^{210}\text{Pb } (2^+)) = E_{\text{exp}}(^{210}\text{Pb } (2^+)) = 3.288$ MeV. The theoretical energy of any other state, for example of the 2^+ state $|\text{gs}(^{206}\text{Pb}) \otimes 2\,(^{210}\text{Pb}); 2^+\rangle$ of ^{206}Pb is equal to $2.493 + 3.294 + 2.493 = 8.280$ MeV (as measured from ^{208}Pb (gs)).