## $^{210}$Po(t,$\alpha$) 1972Ba81

History

| Type | Author | Citation | Literature Cutoff Date |
|---|---|---|---|
| Full Evaluation | J. Chen [#] and F. G. Kondev | NDS 126, 373 (2015) | 30-Sep-2013 |

Target $^{210}$Po $J^{\pi}$(g.s.)=0$^+$.

1972Ba81: E=20.0 MeV triton beam was produced from the Los Alamos three-stage Van de Graaff facility. Target was 95% enriched 60 $\mu$g/cm$^2$ thick $^{210}$Po evaporated onto a 50 $\mu$g/cm$^2$ carbon foil. $\alpha$ particles were momentum analyzed in an Elbek-type spectrograph and detected in nuclear emulsions, FWHM=20 keV. Measured $\sigma$(E$_\alpha$,$\theta$). Deduced levels, $J^{\pi}$, L, spectroscopic factors from DWBA analysis.

Other: 1981Wa03 deduce the rms radius and asymptotic amplitude of the 1h$_{9/2}$ proton wave function.

### $^{209}$Bi Levels

| E(level)[†] | L[‡] | C$^2$S | Comments |
|---|---|---|---|
| 0.0 | | 2.62[@] | C$^2$S: if configuration=$\pi(1h_{9/2})^{+1}$. |
| 890 *15* | | 0.12[@] | C$^2$S: if configuration=$\pi(2f_{7/2})^{+1}$. |
| 1600 *15* | | 0.5[@] | C$^2$S: if configuration=$\pi(1i_{13/2})^{+1}$. |
| 2430 *15* | (0) | 1.8[#] | L: The authors of 1972Ba81 noted that the relative maximum of the transition to this level at 40° is consistent with L=0.<br>C$^2$S: if $J^{\pi}$=1/2$^+$.<br>configuration=$\pi(3s_{1/2})^{-1}+\pi(2f_{7/2})^{+1}\otimes 3^-$ (1972Ba81). |
| 2480 *15* | | 1.8[#] | C$^2$S: if $J^{\pi}$=3/2$^+$.<br>configuration=$\pi(2d_{3/2})^{-1}+\pi(1h_{9/2})^{+1}\otimes 3^-$ (1972Ba81). |
| 2750 *15* | | ≤0.2 | C$^2$S: if configuration=$\pi(1h_{9/2})^{+1}\otimes 3^-$.<br>configuration=$\pi(1h_{9/2})^{+1}\otimes 3^-$ (1972Ba81). |
| 2820 *15* | | ≤0.05 | C$^2$S: if $J^{\pi}$=5/2$^-$. |
| 2950 *15* | | 2.2 | C$^2$S: if $J^{\pi}$=3/2$^+$.<br>configuration=$\pi(2d_{3/2})^{-1}+\pi(1h_{9/2})^{+1}\otimes 3^-$ (1972Ba81). |
| 3690 *15* | | 10.0 | C$^2$S: if $J^{\pi}$=11/2$^-$.<br>configuration=$\pi(1h_{11/2})^{-1}+\pi(1h_{9/2})^{+1}\otimes 3^-$ (1972Ba81). |
| 3970 *15* | | | |
| 4000 *15* | | 1.8 | C$^2$S: if $J^{\pi}$=5/2$^+$.<br>configuration=$\pi(2d_{5/2})^{-1}+\pi(2d_{3/2})^{-1}\otimes 4^+$ (1972Ba81). |
| 4020 *15* | | 2.4 | C$^2$S: if $J^{\pi}$=5/2$^+$.<br>configuration=$\pi(2d_{5/2})^{-1}+\pi(2d_{3/2})^{-1}\otimes 4^+$ (1972Ba81). |
| 4100 *15* | | | |
| 4140 *15* | | | |
| 4230 *15* | | | |
| 4880 *15* | | | |

[†] The authors of 1972Ba81 assumed configurations are based on known single-particle states in the case of the first three levels, and on a comparison of energies with the hole states in $^{207}$Pb and a comparison of experimental and theoretical spectroscopic factors for the assumed core-coupled configurations for the higher excited states.

[‡] The authors of 1972Ba81 give tentative L values for the strong states, partly on the basis of structure arguments, but point out that the angular distributions are all consistent with L=2, configuration=$\pi(2d_{3/2})^{-1}$.

[#] Calculated using local zero-range DWBA with normalization factor N=34 and neutron parameters radius=1.25 fm, diffuseness=0.65 fm, and spin-orbit-coupling strength=32 (1972Ba81). C$^2$S=(2j+1)($\sigma(\theta)_{exp}/\sigma(\theta)_{DWBA}$)/N, where j is the angular momentum of transferred particle.

[@] From (2J+1)$\sigma$($^{210}$Po(t,$\alpha$))/$\sigma$($^{208}$Pb(t,$\alpha$)), a comparison of $^{210}$Po(t,$\alpha$) cross sections with $^{208}$Pb(t,$\alpha$) single-proton hole cross sections measured at the same bombarding energy (1972Ba81).