^{204}Pb(γ,γ') 2003En07

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	C. J. Chiara and F. G. Kondev	NDS 111,141 (2010)	1-Oct-2009

2003En07: 0.2292-g Pb target enriched to 66.5% ^{204}Pb, sandwiched between boron disks used for Eγ calibration; E=6.75−MeV bremsstrahlung produced by electron beam on Ta disk; two Euroball Cluster Ge detectors to measure γ's, one with BGO suppressors behind Ge crystals; measured Eγ, $\gamma(\theta)$. Quasiparticle-phonon model analysis; pygmy dipole resonance studied.
Additional information 1.

^{204}Pb Levels

2003En07 provide reduced transition strengths for all identified levels, assuming E1 transitions in most cases; values are given here only for those levels with firmly established J^π. Based on their assumption, they find E1 strength concentration around 5 and 6 MeV, as in ^{206}Pb and ^{208}Pb, with increasing fragmentation farther from the closed shell.

E(level)†	J^π‡	$T_{1/2}$#	$\Gamma^2_{\gamma0}/\Gamma_\gamma$ [eV]@	Comments
0	0^+			
899.2	2^+			
2311.6 *6*	1		0.02 *1*	
3377.4 *7*	1		0.03 *2*	
3656.3 *3*	1		0.12 *1*	
3893.2 *6*	2^+	17 fs *3*	0.03 *1*	B(E2)↑: 0.018 *3*, deduced from the measured cross section.
4379.0 *2*	2^+	4.0 fs *4*	0.11 *1*	B(E2)↑: 0.044 *5*, deduced from the measured cross section.
4596.1 *8*	1		0.09 *2*	
4922.0 *3*	1		0.18 *4*	
4933.1 *3*	1		0.09 *4*	
4980.3 *2*	1		0.8 *3*	
5011.9 *3*	1		0.54 *6*	
5283.1 *5*	$(1,2^+)$		0.16 *12*	
5365.8 *6*	$(1,2^+)$		0.08 *6*	
5398.7 *5*	1		0.16 *4*	
5610.2 *9*	$(1,2^+)$		0.15 *4*	
5674.9 *12*	$(1,2^+)$		0.22 *4*	
5776.6 *4*	1		0.91 *13*	
5795.5 *6*	1		0.33 *7*	
5811.3 *5*	1		0.17 *14*	
5828.3 *3*	1		0.80 *10*	
5838.4 *4*	1		0.37 *6*	
5877.8 *6*	$(1,2^+)$		0.28 *6*	
5890.6 *5*	$(1,2^+)$		0.35 *6*	
5943.8 *12*	$(1,2^+)$		0.82 *30*	
5967.6 *5*	1		0.58 *8*	
5981.2 *3*	1		1.11 *14*	
5998.3 *8*	$(1,2^+)$		0.18 *12*	
6008.7 *7*	1		0.32 *6*	
6020.1 *6*	1		0.46 *23*	
6054.0 *15*	1		0.24 *7*	
6066.8 *8*	1		0.31 *8*	
6074.2 *11*	1		0.28 *8*	
6084.4 *8*	$(1,2^+)$		0.30 *8*	
6105.0 *20*	$(1,2^+)$		0.20 *14*	
6148.3 *5*	1		0.49 *12*	
6161.2 *6*	$(1,2^+)$		0.43 *12*	
6194.4 *8*	1		0.27 *16*	
6210.0 *6*	$(1,2^+)$		0.28 *17*	
6229.1 *20*	$(1,2^+)$		0.32 *9*	

Continued on next page (footnotes at end of table)

^{204}Pb(γ,γ') 2003En07 (continued)

^{204}Pb Levels (continued)

E(level)[†]	J$^\pi$[‡]	$\Gamma^2_{\gamma0}/\Gamma_\gamma$ [eV][@]	E(level)[†]	J$^\pi$[‡]	$\Gamma^2_{\gamma0}/\Gamma_\gamma$ [eV][@]
6254.3 *6*	1	0.46 *10*	6419.6? *11*	(1,2$^+$)	0.22 *13*
6277.0 *9*	1	0.35 *11*	6456.9 *9*	(1,2$^+$)	0.41 *17*
6322.9 *5*	1	0.96 *23*	6469.3? *7*	(1,2$^+$)	0.38 *20*
6410.9? *6*	1	0.48 *21*			

[†] As quoted in 2003En07.
[‡] From $\gamma(\theta)$ in 2003En07.
[#] Calculated from B(E2)↑.
[@] Relative energy-integrated cross sections from 2003En07, where $\Gamma_{\gamma0}$=partial width to g.s. and Γ_γ=total level width.

$\gamma(^{204}Pb)$

E$_i$(level)	J$_i^\pi$	E$_\gamma$[†]	I$_\gamma$	E$_f$	J$_f^\pi$	Mult.[‡]	Comments
2311.6	1	2311.6 *6*	100	0	0$^+$	D	
3377.4	1	3377.4 *7*	100	0	0$^+$	D	
3656.3	1	3656.3 *3*	100	0	0$^+$	D	
3893.2	2$^+$	3893.2 *6*	100	0	0$^+$	E2	
4379.0	2$^+$	4379.0 *2*	100	0	0$^+$	E2	
4596.1	1	4596.1 *8*	100	0	0$^+$	D	
4922.0	1	4922.0 *3*	100	0	0$^+$	D	
4933.1	1	4933.1 *3*	100	0	0$^+$	D	
4980.3	1	4980.3 *2*	100	0	0$^+$	D	
5011.9	1	5011.9 *3*	100	0	0$^+$	D	
5283.1	(1,2$^+$)	5283.1 *5*	100	0	0$^+$		
5365.8	(1,2$^+$)	5365.8 *6*	100	0	0$^+$		
5398.7	1	5398.7 *5*	100	0	0$^+$	D	
5610.2	(1,2$^+$)	5610.2 *9*	100	0	0$^+$		
5674.9	(1,2$^+$)	5674.9 *12*	100	0	0$^+$		
5776.6	1	5776.6 *4*	100	0	0$^+$	D	
5795.5	1	5795.5 *6*	100	0	0$^+$	D	Additional information 2.
5811.3	1	4912.1	60 *20*	899.2	2$^+$		I$_\gamma$: Upper limit, assuming no other decay branches.
		5811.3 *5*	40 *20*	0	0$^+$	D	I$_\gamma$: 2003En07 give the branching fraction to the g.s. as 0.36 *+23−16*. Additional information 3.
5828.3	1	5828.3 *3*	100	0	0$^+$	D	
5838.4	1	5838.4 *4*	100	0	0$^+$	D	
5877.8	(1,2$^+$)	5877.8 *6*	100	0	0$^+$		
5890.6	(1,2$^+$)	5890.6 *5*	100	0	0$^+$		Additional information 4.
5943.8	(1,2$^+$)	5044.6	23 *23*	899.2	2$^+$		I$_\gamma$: Upper limit, assuming no other decay branches.
		5943.8 *12*	77 *23*	0	0$^+$		I$_\gamma$: 2003En07 give the branching fraction to the g.s. as 0.74 *+26−20*. Additional information 5.
5967.6	1	5967.6 *5*	100	0	0$^+$	D	
5981.2	1	5981.2 *3*	100	0	0$^+$	D	
5998.3	(1,2$^+$)	5998.3 *8*	100	0	0$^+$		
6008.7	1	6008.7 *7*	100	0	0$^+$	D	
6020.1	1	6020.1 *6*	100	0	0$^+$	D	
6054.0	1	6054.0 *15*	100	0	0$^+$	D	
6066.8	1	6066.8 *8*	100	0	0$^+$	D	
6074.2	1	6074.2 *11*	100	0	0$^+$	D	
6084.4	(1,2$^+$)	6084.4 *8*	100	0	0$^+$		Additional information 6.

Continued on next page (footnotes at end of table)

^{204}Pb(γ,γ') 2003En07 (continued)

$\gamma(^{204}Pb)$ (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ	E_f	J_f^π	Mult.[‡]	Comments
6105.0	(1,2$^+$)	5205.8	64 *18*	899.2	2$^+$		I_γ: Upper limit, assuming no other decay branches.
		6105.0 *20*	36 *18*	0	0$^+$		I_γ: 2003En07 give the branching fraction to the g.s. as 0.32 *+21−14*.
							Additional information 7.
6148.3	1	6148.3 *5*	100	0	0$^+$	D	
6161.2	(1,2$^+$)	6161.2 *6*	100	0	0$^+$		
6194.4	1	6194.4 *8*	100	0	0$^+$	D	
6210.0	(1,2$^+$)	6210.0 *6*	100	0	0$^+$		
6229.1	(1,2$^+$)	6229.1 *20*	100	0	0$^+$		
6254.3	1	6254.3 *6*	100	0	0$^+$	D	
6277.0	1	6277.0 *9*	100	0	0$^+$	D	
6322.9	1	6322.9 *5*	100	0	0$^+$	D	
6410.9?	1	6410.9[@] *6*	100[#]	0	0$^+$	D	
6419.6?	(1,2$^+$)	6419.6[@] *11*	100[#]	0	0$^+$		
6456.9	(1,2$^+$)	6456.9 *9*	100	0	0$^+$		
6469.3?	(1,2$^+$)	6469.3[@] *7*	100[#]	0	0$^+$		

[†] Observed in 2003En07, but Eγ values not quoted. Evaluators assume the Eγ values based on the level energies given in 2003En07 and the observed decays to the g.s.; however, this does not account for any differences in fitted energies arising from levels with more than one decay branch, nor for the≈0.1−keV shift in most cases due to recoil.

[‡] From $\gamma(\theta)$ in 2003En07.

[#] Peak probably contaminated by a transition in ^{206}Pb.

[@] Placement of transition in the level scheme is uncertain.

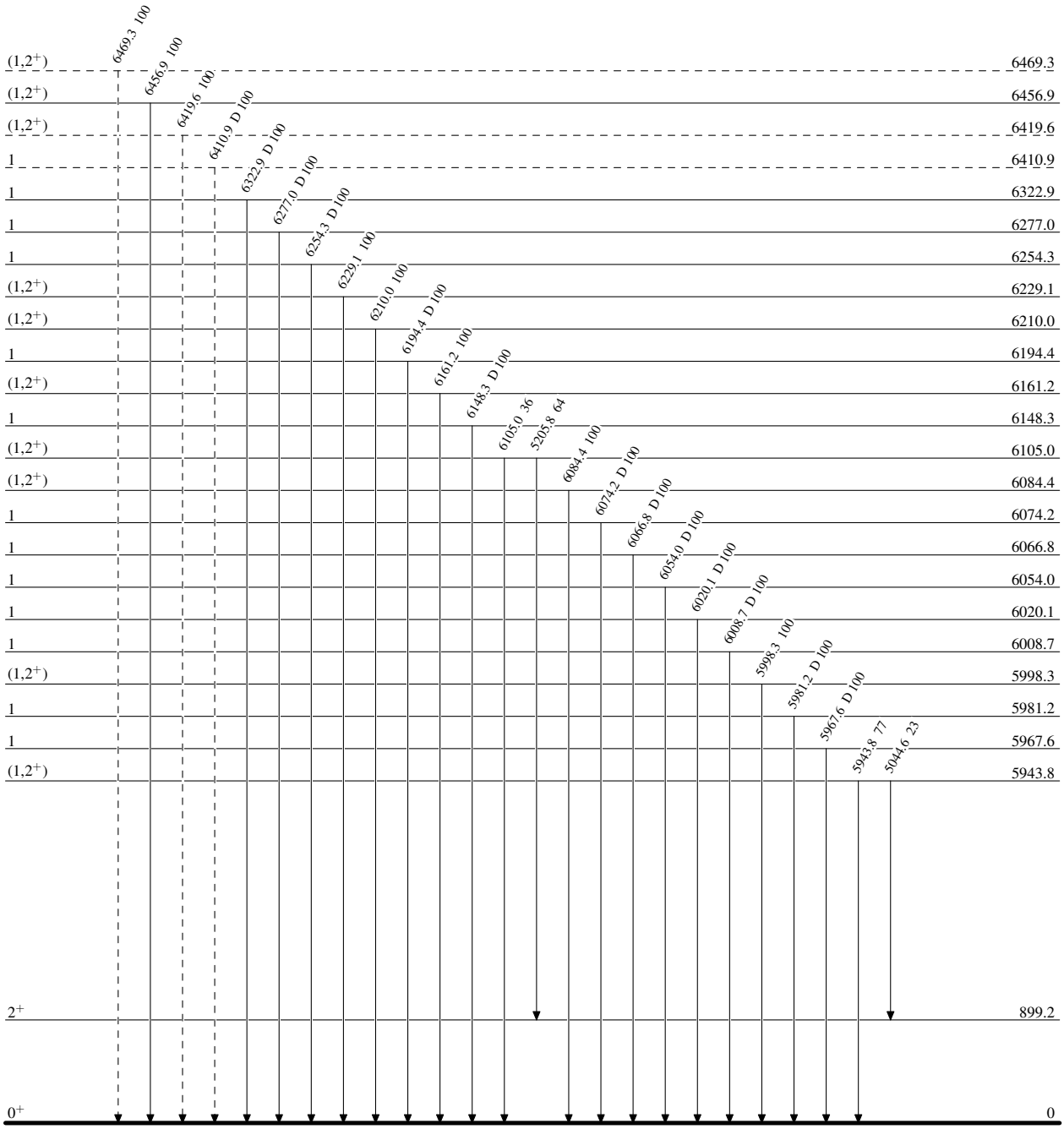
^{204}Pb(γ,γ') 2003En07

Legend

Level Scheme

Intensities: % photon branching from each level

γ Decay (Uncertain)

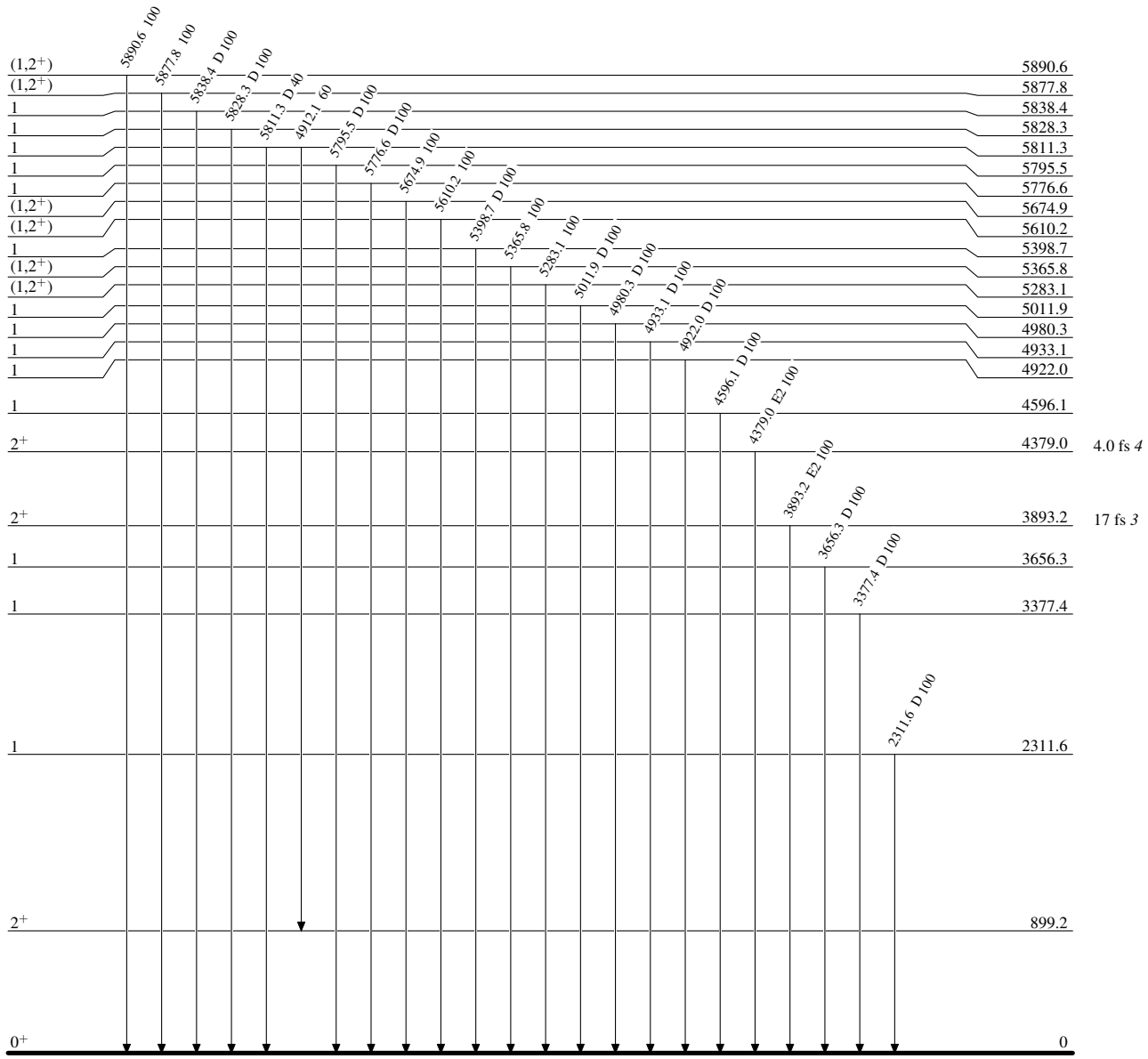


$^{204}_{82}Pb_{122}$

^{204}Pb(γ,γ′) 2003En07

Level Scheme (continued)

Intensities: % photon branching from each level



$^{204}_{82}Pb_{122}$