

Adopted Levels, Gammas

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	M. J. Martin	NDS 108,1583 (2007)	1-Jun-2007

$Q(\beta^-) = -2878.4 \pm 2.1$ ;  $S(n) = 7367.87 \pm 5$ ;  $S(p) = 8004 \pm 6$ ;  $Q(\alpha) = 517.2 \pm 1.3$     [2012Wa38](#)  
Note: Current evaluation has used the following Q record  $-2878.4 \pm 2.1$   $7367.87 \pm 5$   $8004 \pm 6$   $516.9 \pm 1.3$     [2003Au03](#).  
Neutron and ground-state  $\gamma$  widths are given in the resonance reactions, (n, $\gamma$ ), (n,X), and ( $\gamma$ ,n).  
For measurements of the neutron-skin thickness see [2004Kr02](#) and references contained therein. The rms(n)-rms(p) values, in fm, range from 0.12  $\pm$  0.007 to 0.20  $\pm$  0.004.

**Adopted Levels, Gammas (continued)**

<sup>208</sup>Pb Levels

The neutron-particle, neutron-hole configurations are from (d,p) and from (p,p') (via IAR). The proton-particle, proton-hole configurations are from (d,<sup>3</sup>He). Other configurations, especially for the high-spin states are from (e,e'). In addition to the configurations given in those source datasets, [2006He21](#) (in their reference 24) analyze (p,p') via IAR, (d,p), and (d,<sup>3</sup>He) data to deduce configuration amplitudes for several levels below 4500. Amplitudes for non-dominant configurations are included in their calculations but are not given here. Only the dominant neutron particle-hole and/or proton particle-hole configurations are given. The B(EL) values for levels above the 2614.5 level are from (e,e').

Cross Reference (XREF) Flags

<b>A</b>	<sup>207</sup> Pb(d,pγ), <sup>209</sup> Bi(t,αγ)	<b>L</b>	<sup>208</sup> Pb(p,p'γ), <sup>207</sup> Pb(d,pγ)	<b>W</b>	Muonic atom
<b>B</b>	<sup>208</sup> Pb(α,α'),(α,α'γ),(α,α'n)	<b>M</b>	<sup>207</sup> Pb(n,γ)	<b>X</b>	<sup>212</sup> Po α decay (17.1 ns)
<b>C</b>	<sup>208</sup> Pb(d,d'),(pol d,d')	<b>N</b>	<sup>207</sup> Pb(n,X),(n,n)	<b>Y</b>	<sup>212</sup> Po α decay (45.1 s)
<b>D</b>	<sup>208</sup> Pb(p,p'),(pol p,p')	<b>O</b>	<sup>207</sup> Pb(n,γ) E=resonance	<b>Z</b>	<sup>212</sup> Po α decay (0.299 μs)
<b>E</b>	<sup>208</sup> Pb(γ,γ'),(pol γ,γ')	<b>P</b>	<sup>208</sup> Pb(γ,n),(γ,pol n)	Others:	
<b>F</b>	<sup>207</sup> Pb(d,p),(pol d,p)	<b>Q</b>	<sup>208</sup> Pb(x,x'),(x,x'γ)	<b>AA</b>	<sup>208</sup> Pb(d,t),(p,d)
<b>G</b>	<sup>208</sup> Pb(e,e'),(e,e'n)	<b>R</b>	Coulomb excitation	<b>AB</b>	<sup>208</sup> Pb(e,F)
<b>H</b>	<sup>208</sup> Pb(n,n'γ)	<b>S</b>	<sup>208</sup> Bi ε decay	<b>AC</b>	<sup>210</sup> Pb(p,t)
<b>I</b>	<sup>209</sup> Bi(d, <sup>3</sup> He)	<b>T</b>	<sup>208</sup> Pb(γ,p),(e,e'p) IAR	<b>AD</b>	<sup>209</sup> Bi(t,α)
<b>J</b>	<sup>208</sup> Pb(x,x'γ)	<b>U</b>	<sup>204</sup> Hg( <sup>16</sup> O, <sup>12</sup> C)	<b>AE</b>	<sup>208</sup> Pb( <sup>17</sup> O, <sup>17</sup> O'γ),( <sup>17</sup> O, <sup>17</sup> O'nγ)
<b>K</b>	<sup>208</sup> Tl β <sup>-</sup> decay	<b>V</b>	<sup>206</sup> Pb(t,p),(pol t,p)	<b>AF</b>	<sup>209</sup> Bi(μ <sup>-</sup> ,νnγ)

E(level) <sup>†</sup>	Jπ <sup>‡</sup>	T <sub>1/2</sub> <sup>#</sup>	XREF			Comments
0	0 <sup>+</sup>	stable	ABCDEFGHIJKLM	QRS	VWXYZ	XREF: Others: <b>AA, AB, AC, AD, AE, AF</b>
2614.522 10	3 <sup>-</sup>	16.7 ps 3	ABCD FGHIJKLM	QRS	VW Y	XREF: Others: <b>AA, AB, AC, AD, AE, AF</b> μ=+1.9 2 ( <a href="#">1973ScYX</a> , <a href="#">1969Bo12</a> , <a href="#">2005St24</a> ) Q=-0.34 15 ( <a href="#">1984Ve07</a> , <a href="#">1983Sp02</a> , <a href="#">2005St24</a> ) J <sup>π</sup> : from L=3 in (α,α'), (d,d'), (p,p'), (e,e'). T <sub>1/2</sub> : from B(E3)=0.611 9, a weighted average of 0.611 12 ( <a href="#">1983Sp02</a> ) in Coulomb excitation, and 0.612 13 ( <a href="#">1980Go12</a> ) in (e,e'). The value of 32 ps 11 reported by <a href="#">1962We14</a> in β <sup>-</sup> decay appears to Be in error. Other: 15.4 ps 12 from B(E2) in (α,α'). Isomer shift=6.25 28 from muonic atom ( <a href="#">1977Sh07</a> ). XREF: Others: <b>AC, AD</b> μ=+0.11 4 ( <a href="#">1969Bo01</a> , <a href="#">2005St24</a> ); B(E5)↑=0.0447 30 configuration=ν2g <sub>9/2</sub> ν3p <sub>1/2</sub> <sup>-1</sup> + ν2g <sub>9/2</sub> ν2f <sub>5/2</sub> <sup>-1</sup> + ν2g <sub>9/2</sub> ν3p <sub>3/2</sub> <sup>-1</sup> + π1h <sub>9/2</sub> π3s <sub>1/2</sub> <sup>-1</sup> . J <sup>π</sup> : L=5 in (α,α'), (d,d'), (p,p'), (e,e'). T <sub>1/2</sub> : from β <sup>-</sup> decay.
3197.711 10	5 <sup>-</sup>	294 ps 15	ABCD FGHIJKL	Q	V Y	XREF: Others: <b>AF</b> configuration=ν2g <sub>9/2</sub> ν3p <sub>1/2</sub> <sup>-1</sup> . J <sup>π</sup> : M1+E2 γ's to 3 <sup>-</sup> and 5 <sup>-</sup> .
3475.078 11	4 <sup>-</sup>	4 ps 3	A CD F HIJKL	Q		

**Adopted Levels, Gammas (continued)**

<sup>208</sup>Pb Levels (continued)

E(level) <sup>†</sup>	J <sup>π</sup> <sup>‡</sup>	T <sub>1/2</sub> <sup>#</sup>	XREF		Comments
3708.451 12	5 <sup>-</sup>		ABCD	FGHIJKL V	T <sub>1/2</sub> : from β <sup>-</sup> decay. XREF: Others: AD, AF B(E5)↑=0.0241 18 configuration=ν2g <sub>9/2</sub> ν2f <sub>5/2</sub> <sup>-1</sup> + ν2g <sub>9/2</sub> ν3p <sub>1/2</sub> <sup>-1</sup> + ν1i <sub>11/2</sub> ν3p <sub>1/2</sub> <sup>-1</sup> + π1h <sub>9/2</sub> π3s <sub>1/2</sub> <sup>-1</sup> + π1h <sub>9/2</sub> π2d <sub>3/2</sub> <sup>-1</sup> . J <sup>π</sup> : L=5 in (α,α'), (d,d'), (p,p'). T <sub>1/2</sub> : <100 ps from β <sup>-</sup> decay and >0.69 ps from (n,n'γ). XREF: Others: AF configuration=ν2g <sub>9/2</sub> ν2f <sub>5/2</sub> <sup>-1</sup> . J <sup>π</sup> : M1 γ to 5 <sup>-</sup> . Not seen in (α,α'), (d,d'), (p,t) or (t,p) thus J <sup>π</sup> =4 <sup>-</sup> or 6 <sup>-</sup> . γ from 7 <sup>-</sup> 5542 level.
3919.966 13	6 <sup>-</sup>	>690 fs	A D	H JKL	XREF: Others: AF configuration=ν2g <sub>9/2</sub> ν2f <sub>5/2</sub> <sup>-1</sup> . J <sup>π</sup> : M1 γ to 5 <sup>-</sup> . Not seen in (α,α'), (d,d'), (p,t) or (t,p) thus J <sup>π</sup> =4 <sup>-</sup> or 6 <sup>-</sup> . γ from 7 <sup>-</sup> 5542 level.
3946.578 14	4 <sup>-</sup>	>430 fs	A D	HIJKL	XREF: Others: AF configuration=π1h <sub>9/2</sub> π3s <sub>1/2</sub> <sup>-1</sup> + π1h <sub>9/2</sub> π2d <sub>3/2</sub> <sup>-1</sup> + ν2g <sub>9/2</sub> ν2f <sub>5/2</sub> <sup>-1</sup> . J <sup>π</sup> : L(d, <sup>3</sup> He)=0+2 gives J <sup>π</sup> =4 <sup>-</sup> or 5 <sup>-</sup> . Not seen in (α,α') or (d,d'), thus J <sup>π</sup> =5 <sup>-</sup> is ruled out. A confirming argument is the strength in (d, <sup>3</sup> He) which rules out J=5, given J=5 for the 3708 and 3961 levels.
3961.162 13	5 <sup>-</sup>		ABCD	GHIJKL V	XREF: Others: AC, AD, AF B(E5)↑≈0.0008 configuration=π1h <sub>9/2</sub> π3s <sub>1/2</sub> <sup>-1</sup> + ν2g <sub>9/2</sub> ν2f <sub>5/2</sub> <sup>-1</sup> . J <sup>π</sup> : J=5 from γγ(θ) and ce data in β <sup>-</sup> decay. π=- from L=0+2 in (d, <sup>3</sup> He). T <sub>1/2</sub> : ≤18 ps from β <sup>-</sup> decay and >0.47 ps from (n,n'γ).
3995.438 13	4 <sup>-</sup>	>690 fs	A D F	HI KLM Q	XREF: Others: AF configuration=π1h <sub>9/2</sub> π3s <sub>1/2</sub> <sup>-1</sup> + ν2g <sub>9/2</sub> ν2f <sub>5/2</sub> <sup>-1</sup> . J <sup>π</sup> : L(d, <sup>3</sup> He)=0. Not seen in (α,α') or (d,d') thus J <sup>π</sup> is not 5 <sup>-</sup> . A confirming argument is the dipole component of the 1380γ to 3 <sup>-</sup> .
4037.443 14	7 <sup>-</sup>	>690 fs	ABCD	GH J L V	XREF: Others: AC B(E7)↑≈0.0010 configuration=ν2g <sub>9/2</sub> ν2f <sub>5/2</sub> <sup>-1</sup> . J <sup>π</sup> : L(p,p')=7.
4051.134 13	3 <sup>-</sup>	326 fs +28-21	AB D F	HI LM	XREF: Others: AF J <sup>π</sup> : dipole γ to 3 <sup>-</sup> , γ to 4 <sup>-</sup> , and γ from 2 <sup>-</sup> allow 2 <sup>-</sup> ,3 <sup>-</sup> ,4 <sup>-</sup> . Excitation in (α,α') rules out 2 <sup>-</sup> and 4 <sup>-</sup> . Note that L=0 is given in (d, <sup>3</sup> He), which gives 4 <sup>-</sup> or 5 <sup>-</sup> . The level is weakly excited and no σ(θ) is shown. Also, L=(6) is reported in (d,p), suggesting J <sup>π</sup> =5 <sup>-</sup> or 6 <sup>-</sup> . The evaluator notes that σ(θ) in (d,p) is too forward peaked to be fit with L=2 and/or 4, required for J <sup>π</sup> =3 <sup>-</sup> . If the reaction L values are correct, there must be a doublet at this energy, possibly with J <sup>π</sup> =5 <sup>-</sup> for the second member. There is no evidence of a doublet in the high-precision γ data. Note finally that L=(3) in (p,p').
4085.52 4	2 <sup>+</sup>	0.80 fs 4	ABCDE	GHI LM QR V	XREF: Others: AC, AE, AF Q=-0.7 3 (1984Ve07,2005St24) configuration=π1h <sub>9/2</sub> π1h <sub>11/2</sub> <sup>-1</sup> .

## Adopted Levels, Gammas (continued)

208Pb Levels (continued)

E(level) <sup>†</sup>	J <sup>π</sup> <sup>‡</sup>	T <sub>1/2</sub> <sup>#</sup>	XREF	Comments
4125.347 12	5 <sup>-</sup>	>490 fs	AB D FGHIJKL	J <sup>π</sup> : L=2 in (α,α'). T <sub>1/2</sub> : weighted average of 0.78 fs 4 from B(E2)=0.318 16 in (e,e') and 0.87 fs 7 from Γ in (γ,γ'). Both values were deduced using Γ <sub>γ0</sub> /Γ=0.9954 15. XREF: Others: AD, AF configuration=ν2g <sub>9/2</sub> ν2f <sub>5/2</sub> <sup>-1</sup> + ν1i <sub>11/2</sub> ν3p <sub>1/2</sub> <sup>-1</sup> + π1h <sub>9/2</sub> π3s <sub>1/2</sub> <sup>-1</sup> + π1h <sub>9/2</sub> π2d <sub>3/2</sub> <sup>-1</sup> . J <sup>π</sup> : L(d,p)=4+6. The assignment is confirmed in <sup>208</sup> Pb(p,p') IAR. See reference 24 of 2006He21.
4144? 5	+		I	E(level): seen only in (d, <sup>3</sup> He) and weakly excited so level is questionable. configuration=π1h <sub>9/2</sub> π1h <sub>11/2</sub> <sup>-1</sup> . J <sup>π</sup> : L(d, <sup>3</sup> He)=5.
4180.414 14	5 <sup>-</sup>	319 fs 35	AB D FGHI KL	V XREF: Others: AC, AF configuration=ν2g <sub>9/2</sub> ν3p <sub>3/2</sub> <sup>-1</sup> + ν1i <sub>11/2</sub> ν3p <sub>1/2</sub> <sup>-1</sup> + π1h <sub>9/2</sub> π3s <sub>1/2</sub> <sup>-1</sup> + π1h <sub>9/2</sub> π2d <sub>3/2</sub> <sup>-1</sup> . J <sup>π</sup> : from σ and form factor in (e,e').
4206.277 14	6 <sup>-</sup>	>690 fs	A D F HIJ L	XREF: Others: AF configuration=ν1i <sub>11/2</sub> ν3p <sub>1/2</sub> <sup>-1</sup> + ν2g <sub>9/2</sub> ν2f <sub>5/2</sub> <sup>-1</sup> π1h <sub>9/2</sub> π2d <sub>3/2</sub> <sup>-1</sup> . J <sup>π</sup> : L(d,p)=6. Not observed in (α,α'). Dipole component in γ to 5 <sup>-</sup> .
4229.590 17	2 <sup>-</sup>	333 fs 28	A D F H LM	configuration=ν3d <sub>5/2</sub> ν3p <sub>1/2</sub> <sup>-1</sup> . J <sup>π</sup> : J=2 from γ(θ) in (n,n'γ). L(d,p)=2.
4254.795 17	3 <sup>-</sup>	97 fs 7	AB D FGHI LM	V XREF: Others: AC configuration=ν3d <sub>5/2</sub> ν3p <sub>1/2</sub> <sup>-1</sup> . J <sup>π</sup> : L(d,p)=2 for 3d <sub>3/2</sub> gives 2 <sup>-</sup> or 3 <sup>-</sup> . Excitation in (α,α') rules out 2 <sup>-</sup> . Note that L=0 in (d, <sup>3</sup> He) gives 4 <sup>-</sup> or 5 <sup>-</sup> ; however, the state is weakly excited and no σ(θ) is shown.
4261.871 13	4 <sup>-</sup>	>520 fs	A D F HI KL	XREF: Others: AF configuration=ν2g <sub>9/2</sub> ν3p <sub>3/2</sub> <sup>-1</sup> + π1h <sub>9/2</sub> π2d <sub>3/2</sub> <sup>-1</sup> . J <sup>π</sup> : L(d,p)=4 for configuration=ν2g <sub>9/2</sub> allows J <sup>π</sup> =4 <sup>-</sup> or 5 <sup>-</sup> . The 1647γ to 3 <sup>-</sup> has a dipole component.
4296.560 13	5 <sup>-</sup>	201 fs +49-35	AB D F HI KL	V For the neutron configuration see reference 24 of 2006He21. XREF: Others: AC, AF configuration=ν1i <sub>11/2</sub> ν3p <sub>1/2</sub> <sup>-1</sup> + ν2g <sub>9/2</sub> ν3p <sub>3/2</sub> <sup>-1</sup> + π1h <sub>9/2</sub> π2d <sub>3/2</sub> <sup>-1</sup> . J <sup>π</sup> : L(p,p')=5. A confirming argument is L(d, <sup>3</sup> He)=0+2, allowing 4 <sup>-</sup> or 5 <sup>-</sup> . Excitation in (α,α') rules out 4 <sup>-</sup> .
4323.946 14	4 <sup>+</sup>	11.7 ps +15-18	ABCD GHIJ L	Q V XREF: Others: AC, AF configuration=π1h <sub>9/2</sub> π1h <sub>11/2</sub> <sup>-1</sup> . J <sup>π</sup> : L=4 in (α,α') and (d,d').
4358.670 13	4 <sup>-</sup>	194 fs 21	A CD F HI KL	T <sub>1/2</sub> : from B(E4)=0.155 11 in (e,e') and Γ <sub>γ0</sub> /Γ=0.00260 +27-35. XREF: Others: AF configuration=ν2g <sub>9/2</sub> ν3p <sub>3/2</sub> <sup>-1</sup> + π1h <sub>9/2</sub> π2d <sub>3/2</sub> <sup>-1</sup> . J <sup>π</sup> : L(d, <sup>3</sup> He)=0+2 allows 4 <sup>-</sup> or 5 <sup>-</sup> . The 1744γ to 3 <sup>-</sup> has a dipole component. For the neutron configuration see reference 24 of 2006He21.

**Adopted Levels, Gammas (continued)**

<sup>208</sup>Pb Levels (continued)

E(level) <sup>†</sup>	J <sup>π</sup> <sup>‡</sup>	T <sub>1/2</sub> <sup>#</sup>	XREF	Comments
4383.285 17	6 <sup>-</sup>	>690 fs	A D FGHI KL	XREF: Others: AF configuration= $\pi 1h_{9/2}\pi 2d_{3/2}^{-1} + \nu 1i_{11/2}\nu 3p_{1/2}^{-1} + \nu 2g_{9/2}\nu 3p_{3/2}^{-1} + \nu 2g_{9/2}\nu 2f_{5/2}^{-1}$ . J <sup>π</sup> : from $\sigma$ and form factor in (e,e').
4423.647 15	6 <sup>+</sup>	>110 fs	ABCD FGHIJ L Q V	XREF: Others: AC, AF B(E6) $\uparrow$ =0.067 7 configuration= $\pi 1h_{9/2}\pi 1h_{11/2}^{-1}$ . J <sup>π</sup> : L=6 in ( $\alpha,\alpha'$ ) and (p,p').
4447? 5	-		I	E(level): seen only in (d, <sup>3</sup> He) and weakly excited so level is questionable. configuration= $\pi 1h_{9/2}\pi 2d_{3/2}^{-1}$ . J <sup>π</sup> : L(d, <sup>3</sup> He)=2.
4480.746 16	6 <sup>-</sup>	97 fs 7	ABCD FGHIJKL	XREF: Others: AF configuration= $\pi 1h_{9/2}\pi 2d_{3/2}^{-1} + \nu 2g_{9/2}\nu 3p_{3/2}^{-1} + \nu 1i_{11/2}\nu 3p_{1/2}^{-1}$ . J <sup>π</sup> : from $\sigma$ and form factor in (e,e').
4610.748 16	8 <sup>+</sup>	3.2 ns 5	AB D FGHIJ L V	BE8UP=0.0054 9 configuration= $\nu 1j_{15/2}\nu 3p_{1/2}^{-1} + \pi 1h_{9/2}\pi 1h_{11/2}^{-1}$ . J <sup>π</sup> : L( $\alpha,\alpha'$ )=8. L=8 also in (p,p') and (e,e').
4680.266 22	7 <sup>-g</sup>	>690 fs	AB D H J	T <sub>1/2</sub> : from $\alpha\gamma(t)$ in (t, $\alpha\gamma$ ). configuration= $\nu 1i_{11/2}\nu 2f_{5/2}^{-1}$ . J <sup>π</sup> : the 474 $\gamma$ and 760 $\gamma$ to 6 <sup>-</sup> levels have dipole components and the magnitude of $\delta$ for both transitions argues against mult=E1+M2. Excitation in ( $\alpha,\alpha'$ ) rules out 6 <sup>-</sup> . L=(9) is reported in (p,p'), but the evaluator notes that L=5 or 7 seem to give as good a fit. Absence of gammas to levels with J<6 suggests 7 <sup>-</sup> rather than 5 <sup>-</sup> .
4698.323 17	3 <sup>-g</sup>	139 fs +42-28	AB D FGHI L V	XREF: Others: AC configuration= $\nu 3d_{5/2}\nu 3p_{1/2}^{-1} + \pi 1h_{9/2}\pi 2d_{3/2}^{-1} + \nu 1i_{11/2}\nu 2f_{5/2}^{-1}$ . J <sup>π</sup> : L( $\alpha,\alpha'$ )=3. J <sup>π</sup> =3 <sup>-</sup> from $\sigma$ and form factor in (e,e'). L(p,p')=3.
4708.727 21	5 <sup>-g</sup>	0.24 ps +20-9	AB D HI	configuration= $\pi 1h_{9/2}\pi 2d_{3/2}^{-1} + \nu 1i_{11/2}\nu 2f_{5/2}^{-1}$ . J <sup>π</sup> : L(d, <sup>3</sup> He)=2. The 1511 $\gamma$ and 1000 $\gamma$ to J <sup>π</sup> =5 <sup>-</sup> levels have dipole components. Excitation in ( $\alpha,\alpha'$ ) rules out 4 <sup>-</sup> or 6 <sup>-</sup> .
4711.817 21	4 <sup>-g</sup>	>340 fs	A D F H M	configuration= $\nu 1i_{11/2}\nu 2f_{5/2}^{-1}$ . J <sup>π</sup> : dipole components in $\gamma'$ s to 3 <sup>-</sup> and 4 <sup>-</sup> levels. Not seen in ( $\alpha,\alpha'$ ) so J <sup>π</sup> probably not 3 <sup>-</sup> .
4761.956 23	6 <sup>-g</sup>	0.26 ps +18-9	A D FGH	configuration= $\nu 1i_{11/2}\nu 2f_{5/2}^{-1}$ . J <sup>π</sup> : L(p,p')=(7). Not seen in ( $\alpha,\alpha'$ ) so J <sup>π</sup> probably 6 <sup>-</sup> or 8 <sup>-</sup> . $\gamma'$ s to 5 <sup>-</sup> .
4830	(8,9,10)		G	J <sup>π</sup> : L(e,e')=(8 to 10).
4841.60 5	1 <sup>-</sup>	0.068 fs +21-15	AB DEFGH L	XREF: Others: AC J <sup>π</sup> : L( $\alpha,\alpha'$ )=1. Confirming arguments are J <sup>π</sup> =1 <sup>-</sup> from $\sigma$ and form factor in (e,e') and J <sup>π</sup> =1 <sup>-</sup> from $\gamma(\theta)$ and $\gamma(\text{pol})$ in ( $\gamma,\gamma'$ ).

**Adopted Levels, Gammas (continued)**

<sup>208</sup>Pb Levels (continued)

E(level) <sup>†</sup>	J <sup>π</sup> <sup>‡</sup>	T <sub>1/2</sub> <sup>#</sup>	XREF	Comments
				T <sub>1/2</sub> : from (γ,γ'). Other: <9 fs from (n,n'γ). configuration=ν4s <sub>1/2</sub> ν3p <sub>1/2</sub> <sup>-1</sup> + ν3d <sub>3/2</sub> ν3p <sub>1/2</sub> <sup>-1</sup> . configuration=ν1j <sub>15/2</sub> ν3p <sub>1/2</sub> <sup>-1</sup> + π1h <sub>9/2</sub> π1h <sub>11/2</sub> <sup>-1</sup> . J <sup>π</sup> : L(d,p)=7 for j <sub>15/2</sub> gives 7 <sup>+</sup> or 8 <sup>+</sup> . Excitation in (α,α') rules out 7 <sup>+</sup> . configuration=ν1j <sub>15/2</sub> ν3p <sub>1/2</sub> <sup>-1</sup> . J <sup>π</sup> : L(d,p)=7 for j <sub>15/2</sub> allows 7 <sup>+</sup> or 8 <sup>+</sup> . The 387γ to 6 <sup>-</sup> has a dipole dipole component.
4860.78 6	8 <sup>+</sup>	>22 fs	AB D F HI J	
4867.91 4	7 <sup>+</sup>	>97 fs	A D F H	
4868.35 5	0 <sup>+</sup>	>312 fs	AB H L	V XREF: Others: AC J <sup>π</sup> : E0 transition to the g.s.
4878 2			D F	
4895.23 5	10 <sup>+</sup>	0.50 μs 5	AB D G IJ	configuration=π1h <sub>9/2</sub> π1h <sub>11/2</sub> <sup>-1</sup> . J <sup>π</sup> : from σ and form factor in (e,e').
4909.5 3			D F	T <sub>1/2</sub> : from αγ(t) in (t,αγ). J <sup>π</sup> : 1997VaZT give L=(7) and propose configuration=ν1j <sub>15/2</sub> ν3p <sub>1/2</sub> <sup>-1</sup> , which gives J <sup>π</sup> =7 <sup>+</sup> or 8 <sup>+</sup> ; however, the error bars for σ(θ) for this level are very large (evaluator).
4911.343 20	4	215 fs +63-42	H	J <sup>π</sup> : D+Q transitions to 3 <sup>-</sup> and 5 <sup>-</sup> .
4918.8 4	8 <sup>-8</sup>		D	configuration=ν1i <sub>11/2</sub> ν2f <sub>5/2</sub> <sup>-1</sup> .
4928.1 15	2 <sup>+</sup>		D	V XREF: Others: AC J <sup>π</sup> : L(p,p')=2.
4937.19 4	3 <sup>-</sup>	17.3 fs +35-28	AB D F HI LM	configuration=ν3d <sub>5/2</sub> ν3p <sub>1/2</sub> <sup>-1</sup> + ν2g <sub>7/2</sub> ν3p <sub>1/2</sub> <sup>-1</sup> and π1h <sub>9/2</sub> π2d <sub>5/2</sub> <sup>-1</sup> . J <sup>π</sup> : L(α,α')=3. Confirming arguments are L(p,p')=3 and L(d,p)=2+4.
4953.302 17	3 <sup>-</sup>	33.3 fs 14	AB D F H	J <sup>π</sup> : L(p,p')=3.
4962.428 21	4 <sup>(-),5(+)</sup>	>440 fs	D H	J <sup>π</sup> : D+Q γ to 5 <sup>-</sup> . γ to 4 <sup>+</sup> . Not seen in (α,α') so level probably has unnatural parity.
4973.918 19	3 <sup>-</sup>	166 fs 21	AB D FGH L	V configuration=ν3d <sub>5/2</sub> ν3p <sub>1/2</sub> <sup>-1</sup> . J <sup>π</sup> : L(α,α')=3. Confirming arguments are L(p,p')=3, and J <sup>π</sup> =3 <sup>-</sup> from σ and form factor in (e,e').
4992.5 6	(2) <sup>-</sup>		F	configuration=ν3d <sub>5/2</sub> ν3p <sub>1/2</sub> <sup>-1</sup> . J <sup>π</sup> : L(d,p)=2 for d <sub>5/2</sub> allows 2 <sup>-</sup> or 3 <sup>-</sup> . Not excited in (α,α') so J <sup>π</sup> probably not 3 <sup>-</sup> .
4994.7 6	≥7		D	J <sup>π</sup> : L(p,p')≥8.
5010.43 14	9 <sup>+</sup>		A D G J	configuration=ν2g <sub>9/2</sub> ν1i <sub>13/2</sub> <sup>-1</sup> . J <sup>π</sup> : from σ and form factor in (e,e').
5037.536 18	3 <sup>-</sup>	90 fs 7	AB D F H L	V configuration=ν3d <sub>5/2</sub> ν3p <sub>1/2</sub> <sup>-1</sup> . J <sup>π</sup> : L(d,p)=2 for d <sub>5/2</sub> allows 2 <sup>-</sup> or 3 <sup>-</sup> . Excitation in (α,α') rules out 2 <sup>-</sup> .
5056.1 3			D F	
5069.31 10	10 <sup>+</sup>		AB D G IJ	configuration=π1h <sub>9/2</sub> π1h <sub>11/2</sub> <sup>-1</sup> . J <sup>π</sup> : from σ and form factor in (e,e').
5074.81 6	h	69 fs +13-10	d H	J <sup>π</sup> : γ's to 5 <sup>-</sup> and 6 <sup>-</sup> .
5075.78 18	h		A d F H	J <sup>π</sup> : γ to 5 <sup>-</sup> .

**Adopted Levels, Gammas (continued)**

<sup>208</sup>Pb Levels (continued)

E(level) <sup>†</sup>	J <sup>π</sup> <sup>‡</sup>	T <sub>1/2</sub> <sup>#</sup>	XREF	Comments
5079.912 20	6 <sup>-8</sup>	111 fs +28-21	D F H	configuration= $\nu 1i_{11/2} \nu 3p_{3/2}^{-1}$ . J <sup>π</sup> : $\gamma$ 's to 5 <sup>-</sup> and 6 <sup>-</sup> .
5085.470 24	7 <sup>-8j</sup>	>229 fs	AB D Hi L	configuration= $\nu 1i_{11/2} \nu 3p_{3/2}^{-1}$ . J <sup>π</sup> : D+Q $\gamma$ to 6 <sup>-</sup> .
5087.9 15	3 <sup>-j</sup>		D i	J <sup>π</sup> : L(p,p')=3.
5092.99 3	8 <sup>+</sup>	>690 fs	AB D F HI	configuration= $\pi 1h_{9/2} \pi 1h_{11/2}^{-1} + \nu 1j_{15/2} \nu 1j^{-1}$ with a 3p <sub>1/2</sub> , 2f <sub>5/2</sub> , or 3p <sub>3/2</sub> neutron hole state. J <sup>π</sup> : $\gamma$ 's to 8 <sup>+</sup> . Excitation in ( $\alpha, \alpha'$ ) gives natural parity. L(d, <sup>3</sup> He)=5. Strength in (t, $\alpha\gamma$ ) rules out 6 <sup>+</sup> or 10 <sup>+</sup> .
5103.3 15			D	
5127.356 16	2 <sup>-</sup> , 3 <sup>-</sup>	64 fs 3	A D F HI L	configuration= $\nu 3d_{5/2} \nu 3p_{1/2}^{-1} + \pi 1h_{9/2} \pi 2d_{5/2}^{-1}$ . J <sup>π</sup> : L(d,p)=2 for d <sub>5/2</sub> allows 2 <sup>-</sup> or 3 <sup>-</sup> . L(d, <sup>3</sup> He)=2. $\gamma$ 's to 4 <sup>-</sup> and 0 <sup>+</sup> . Non-observation in ( $\alpha, \alpha'$ ) is a weak argument against 3 <sup>-</sup> . J <sup>π</sup> =2 <sup>-</sup> is given in <sup>207</sup> Pb(pol p,p') IAR.
5162.05 5	9 <sup>+</sup>		A D F IJ	configuration= $\pi 1h_{9/2} \pi 1h_{11/2}^{-1}$ . J <sup>π</sup> : $\gamma$ 's to 8 <sup>+</sup> and 10 <sup>+</sup> . L(d, <sup>3</sup> He)=5. From strength in (t, $\alpha\gamma$ ), given the strength observed for the (d, <sup>3</sup> He) L=5 states with J <sup>π</sup> =8 <sup>+</sup> and 10 <sup>+</sup> .
5193.428 25	5 <sup>+</sup> i	>319 fs	A HI	J <sup>π</sup> : $\gamma$ 's to 4 <sup>+</sup> and 6 <sup>+</sup> .
5195.054 23	3 <sup>-</sup> , 4 <sup>-</sup>	187 fs +42-35	D F H	configuration= $\pi 1h_{9/2} \pi 1h_{11/2}^{-1}$ . configuration= $\nu 2g_{7/2} \nu 3p_{1/2}^{-1}$ . J <sup>π</sup> : L(d,p)=4 for g <sub>7/2</sub> allows 3 <sup>-</sup> or 4 <sup>-</sup> .
5195.37 10	7 <sup>+</sup> i	>690 fs	A HIJ	J <sup>π</sup> : $\gamma$ 's to 6 <sup>+</sup> , 6 <sup>-</sup> , 8 <sup>+</sup> . configuration= $\pi 1h_{9/2} \pi 1h_{11/2}^{-1} + \nu 1j_{15/2} \nu 1j^{-1}$ with a 3p <sub>1/2</sub> , 2f <sub>5/2</sub> , or 3p <sub>3/2</sub> neutron hole state.
5213.007 21	6 <sup>+</sup> i	76 fs +21-14	A D HIJ	configuration= $\pi 1h_{9/2} \pi 1h_{11/2}^{-1}$ . J <sup>π</sup> : $\gamma$ 's to 5 <sup>-</sup> and 6 <sup>+</sup> .
5213.98 3	(5 <sup>-</sup> )	14 fs 3	FGH	J <sup>π</sup> : from $\sigma$ and form factor in (e,e').
5216.214 18	4 <sup>+</sup> i	32 fs 3	AB D HIJ	configuration= $\nu 2d_{5/2} \nu 1j^{-1}$ . configuration= $\pi 1h_{9/2} \pi 1h_{11/2}^{-1}$ . J <sup>π</sup> : $\gamma$ to 3 <sup>-</sup> has a dipole component.
5234 5	+		I	configuration= $\pi 1h_{9/2} \pi 1h_{11/2}^{-1}$ . J <sup>π</sup> : L(d, <sup>3</sup> He)=5.
5235.37 11	(11 <sup>+</sup> ) <sup>@</sup>		D J	J <sup>π</sup> : $\gamma$ from 12 <sup>+</sup> . $\gamma$ to 10 <sup>+</sup> . No transition to levels with J<10.
5239.3 4	4 <sup>-8</sup>		A D F H	1993Sc08 propose configuration= $\nu 2g_{9/2} \nu 1i_{13/2}^{-1}$ . configuration= $\pi 2f_{7/2} \pi 2d_{3/2}^{-1} + \nu 1i_{11/2} \nu 3p_{3/2}^{-1}$ .
5241.1 3	0 <sup>+</sup>	>690 fs	A H L	J <sup>π</sup> : $\gamma$ to 3 <sup>-</sup> . XREF: Others: AC configuration: 1996Ye01 propose that this state is the lowest-spin member of the expected quartet of two-phonon octupole states at an energy about twice that of the

**Adopted Levels, Gammas (continued)**

<sup>208</sup>Pb Levels (continued)

E(level) <sup>†</sup>	J <sup>π</sup> <sup>‡</sup>	T <sub>1/2</sub> <sup>#</sup>	XREF	Comments
5245.246 21	3 <sup>-</sup>	17 fs +7-6	AB D FGH L	3 <sup>-</sup> 2614 state. J <sup>π</sup> : from E0 to 0 <sup>+</sup> . configuration= $\nu 3d_{5/2} \nu 3p_{1/2}^{-1}$ . J <sup>π</sup> : from $\sigma$ and form factor in (e,e'). T <sub>1/2</sub> : other: 5.3 fs +19-15 from B(E3)=0.13 3 in (e,e') and $\Gamma_{\gamma 0}/\Gamma=0.0088$ 18. J <sup>π</sup> : $\gamma$ to 4 <sup>-</sup> . configuration= $\pi 1h_{9/2} \pi 1h_{11/2}^{-1}$ . J <sup>π</sup> : from $\sigma$ and form factor in (e,e').
5254.12 15			A F H J	
5260	9 <sup>+</sup>		G	
5261.2 8			F	
5266.6 9			F	
5270	(11 <sup>+</sup> )		G	J <sup>π</sup> : from $\sigma$ and form factor in (e,e').
5276.418 24	4 <sup>-</sup> <sup>g</sup>	44 fs +6-5	D F HI	configuration= $\pi 1h_{9/2} \pi 2d_{5/2}^{-1} + \nu 1i_{11/2} \nu 3p_{3/2}^{-1}$ . J <sup>π</sup> : $\gamma$ 's to 3 <sup>-</sup> and 6 <sup>-</sup> allow 4 <sup>-</sup> or 5 <sup>-</sup> .
5280.47 4	0 <sup>-</sup>	>319 fs	A D F H L	configuration= $\nu 4s_{1/2} \nu 3p_{1/2}^{-1}$ with a small admixture of configuration= $\nu 3d_{5/2} \nu 2f_{5/2}^{-1}$ . J <sup>π</sup> : L(d,p)=0 gives 0 <sup>-</sup> or 1 <sup>-</sup> . S for the 5280 and 5292 L(d,p)=0 levels rules out J <sup>π</sup> (5280)=1 <sup>-</sup> given J <sup>π</sup> (5292)=1 <sup>-</sup> . J <sup>π</sup> : dipole $\gamma$ to 3 <sup>-</sup> allows J=2,3, or 4. $\gamma$ to 0 <sup>+</sup> and T <sub>1/2</sub> rule out J=4 and J <sup>π</sup> =3 <sup>+</sup> . For J <sup>π</sup> =2 <sup>-</sup> , the g.s. transition would have B(M2)(W.u.)=0.48 7 and for J <sup>π</sup> =3 <sup>-</sup> would have B(E3)(W.u.)=9.3 14.
5286.484 17	2,3 <sup>-</sup>	76 fs 7	D F H	
5291 6	11 <sup>+</sup>		G	configuration= $\nu 2g_{9/2} \nu 1i_{13/2}^{-1}$ . J <sup>π</sup> : from $\sigma$ and form factor in (e,e').
5291.90 12	1 <sup>-</sup>	0.049 fs +28-18	AB DEF H L	configuration= $\nu 4s_{1/2} \nu 3p_{1/2}^{-1}$ . J <sup>π</sup> : from $\gamma(\theta)$ and $\gamma(\text{pol})$ in ( $\gamma, \gamma'$ ). T <sub>1/2</sub> : from ( $\gamma, \gamma'$ ). Other: <2.1 fs from (n,n' $\gamma$ ).
5307.6 15			F	
5317.041 18	(3) <sup>+</sup> <sup>k</sup>	>690 fs	A d F HI	XREF: F(1513). J <sup>π</sup> : $\gamma$ 's to 3 <sup>-</sup> and 4 <sup>+</sup> . L(d, <sup>3</sup> He)=5. On the basis of these decay modes, and the strength in (t, $\alpha\gamma$ ), 1997Sc21 propose J <sup>π</sup> =(3 <sup>+</sup> ). configuration= $\pi 1h_{9/2} \pi 1h_{11/2}^{-1}$ . J <sup>π</sup> : $\gamma$ to 5 <sup>-</sup> .
5317.2 6	<sup>k</sup>		A d F	
5326.6 2	<sup>+</sup> <sup>k</sup>		D F	configuration= $\pi 1h_{9/2} \pi 1h_{11/2}^{-1} + \nu 1j_{15/2} \nu 1j^{-1}$ with a 3p <sub>1/2</sub> , 2f <sub>5/2</sub> , or 3p <sub>3/2</sub> neutron hole state.
5339.46 6	8 <sup>+</sup>	32 fs +37-18	A D F HI	configuration= $\pi 1h_{9/2} \pi 1h_{11/2}^{-1} + \nu 1j_{15/2} \nu 1j^{-1}$ , with a 3p <sub>1/2</sub> , 2f <sub>5/2</sub> , or 3p <sub>3/2</sub> neutron hole state.
5347.270 18	3 <sup>-</sup>	28.4 fs 14	ABCD FGH	J <sup>π</sup> : $\gamma$ 's to 8 <sup>+</sup> and 7 <sup>-</sup> . L(d, <sup>3</sup> He)=5. Strength in (t, $\alpha\gamma$ ). configuration= $\nu 3d_{5/2} \nu 3p_{1/2}^{-1} + \nu 2g_{7/2} \nu 3p_{1/2}^{-1}$ . J <sup>π</sup> : from $\sigma$ and form factor in (e,e'). Confirming arguments are L( $\alpha, \alpha'$ )=3 and L(d,p)=2+4.
5352 6	+		I	J <sup>π</sup> : L(d, <sup>3</sup> He)=5.

**Adopted Levels, Gammas (continued)**

<sup>208</sup>Pb Levels (continued)

E(level) <sup>†</sup>	J <sup>π</sup> <sup>‡</sup>	T <sub>1/2</sub> <sup>#</sup>	XREF	Comments
5364 3			D	configuration= $\pi 1h_{9/2}\pi 1h_{11/2}^{-1}$ .
5373.8 8	(6) <sup>+</sup>		B D Fg	J <sup>π</sup> : excitation function resonates at $\nu 1j_{15/2}$ IAR in (p,p'), so $\pi=+$ , inconsistent with L(p,p')=5. The evaluator notes that from the $\sigma(\theta)$ of 1975Wa18 L=5 gives the best fit; however, the fit for L=6 is also reasonable.
5380.6 & 8	-		A g I	J <sup>π</sup> : $\gamma$ to 3 <sup>-</sup> . L(d, <sup>3</sup> He)=2.
5382.82 & 3	3 <sup>+</sup> , 4 <sup>+</sup> , 5 <sup>+</sup>	37 fs +7-6	A gHI	configuration= $\pi 1h_{9/2}\pi 2d_{5/2}^{-1}$ . J <sup>π</sup> : $\gamma$ to 4 <sup>-</sup> . L(d, <sup>3</sup> He)=5. The 1387 $\gamma$ to 4 <sup>-</sup> cannot be M2 (RUL).
5384.59 3	3 <sup>-</sup>	76 fs 14	AB D FgH LM	configuration= $\pi 1h_{9/2}\pi 1h_{11/2}^{-1}$ . configuration= $\nu 3d_{5/2}\nu 3p_{1/2}^{-1}$ . J <sup>π</sup> : L(d,p)=2 for d5/2 gives 2 <sup>-</sup> or 3 <sup>-</sup> . Excitation in ( $\alpha,\alpha'$ ) rules out 2 <sup>-</sup> .
5401 2			D	
5418.6 5	(6) <sup>+</sup>		D	J <sup>π</sup> : excitation function resonates at $\nu 1j_{15/2}$ IAR in (p,p'), so $\pi=+$ , given the available neutron hole states. L(p,p')=(6,7).
5473 6	+		I	configuration= $\pi 1h_{9/2}\pi 1h_{11/2}^{-1}$ . J <sup>π</sup> : L(d, <sup>3</sup> He)=5.
5481.87 <sup>q</sup> 3	5 <sup>-</sup>	90 fs 14	AB D FGH L Q	J <sup>π</sup> : L( $\alpha,\alpha'$ )=5. L(p,p')=5.
5490 <sup>a</sup> 2	<sup>a</sup>		B	
5490.34 <sup>a</sup> 5	(4 <sup>-</sup> , 6 <sup>-</sup> ) <sup>a</sup>		A f Hi	J <sup>π</sup> : $\gamma'$ s to 5 <sup>-</sup> and 6 <sup>-</sup> .
5491.53 <sup>a</sup> 3	(4 <sup>-</sup> , 6 <sup>-</sup> ) <sup>a</sup>	125 fs +35-21	A D f Hi L	J <sup>π</sup> : $\gamma'$ s to 5 <sup>-</sup> and 6 <sup>-</sup> .
5502 3			D g	
5511.78 14	1 <sup>-</sup>	0.0194 fs +12-18	AB DEFgH L	configuration= $\nu 3d_{3/2}\nu 3p_{1/2}^{-1}$ . J <sup>π</sup> : from $\gamma(\theta)$ and $\gamma(\text{pol})$ in ( $\gamma,\gamma'$ ). T <sub>1/2</sub> : from ( $\gamma,\gamma'$ ). Other: <3.5 fs from (n,n' $\gamma$ ).
5516.714 23	3 <sup>-</sup>	40.9 fs 21	AB D FGH	configuration= $\nu 2g_{7/2}\nu 3p_{1/2}^{-1}$ . J <sup>π</sup> : L( $\alpha,\alpha'$ )=3.
5524 3	+		D I	configuration= $\pi 1h_{9/2}\pi 1h_{11/2}^{-1}$ . J <sup>π</sup> : L(d, <sup>3</sup> He)=5.
5531 3			D F	
5536.58 19	10 <sup>+</sup>		A D G	configuration= $\pi 1h_{9/2}\pi 1h_{11/2}^{-1} + \nu 1j_{15/2}\nu 2f_{5/2}^{-1}$ . J <sup>π</sup> : from $\sigma$ and form factor in (e,e').
5543.01 14	7 <sup>-</sup>		Ab d G I	configuration= $\pi 1h_{9/2}\pi 2d_{5/2}^{-1}$ . J <sup>π</sup> : from $\sigma$ and form factor in (e,e').
5545.46 4	(5 <sup>-</sup> )	37 fs +8-6	Ab d H	J <sup>π</sup> : $\gamma'$ s to 5 <sup>-</sup> and 4 <sup>-</sup> . 1997Sc21 propose J <sup>π</sup> =5 <sup>-</sup> on the basis of the observed $\gamma$ decay and the strength of the level in their (t, $\alpha\gamma$ ) work.
5548.113 23	2 <sup>-</sup>	83 fs 7	A D F H L	configuration= $\nu 3d_{3/2}\nu 3p_{1/2}^{-1} + \nu 3d_{5/2}\nu 3p_{1/2}^{-1}$ . J <sup>π</sup> : L(d,p)=2 with both d3/2 and d5/2 components.
5554 2			D	
5557.2 10			F	
5561.31 5	2 <sup>+</sup>	38 fs 4	B D H	J <sup>π</sup> : L( $\alpha,\alpha'$ )=2. L(p,p')=2.

# Adopted Levels, Gammas (continued)

## <sup>208</sup>Pb Levels (continued)

E(level) <sup>†</sup>	J <sup>π</sup> <sup>‡</sup>	T <sub>1/2</sub> <sup>#</sup>	XREF	Comments
5563.73 4	3 <sup>-</sup>	44 fs +9-7	A F H L	configuration= $\nu 3d_{5/2} \nu 3p_{1/2}^{-1} + \nu 2g_{7/2} \nu 3p_{1/2}^{-1}$ . J <sup>π</sup> : from L(d,p)=2+4.
5565.2 5	(4 <sup>+</sup> )		A G J	J <sup>π</sup> : from $\sigma$ and form factor in (e,e').
5572.0 8			F	
5576.6 15	<i>l</i>		D i	
5579.0 9	<i>l</i>		F i	
5587.7 5	<i>l</i>		D F i	
5599.48 6	0 <sup>-</sup>	>159 fs	A D F H L	configuration= $\nu 3d_{5/2} \nu 2f_{5/2}^{-1}$ with a small admixture of configuration= $\nu 4s_{1/2} \nu 3p_{1/2}^{-1}$ . J <sup>π</sup> : L(d,p)=0. Strength in (d,p) rules out 1 <sup>-</sup> given J <sup>π</sup> =1 <sup>-</sup> for the 4842, 5292, and 5512 L=0 levels.
5615.4 4	7 <sup>+</sup>		D FG	J <sup>π</sup> : excitation function resonates at $\nu 1j_{15/2}$ IAR in (p,p').
5627 5	+		I	configuration= $\nu 1j_{15/2} \nu 3p_{3/2}^{-1}$ with J <sup>π</sup> =7 <sup>+</sup> from $\sigma(\theta)$ in (p,p') IAR. configuration= $\pi 1h_{9/2} \pi 1h_{11/2}^{-1}$ . J <sup>π</sup> : L(d, <sup>3</sup> He)=5.
5639.55 9	1 <sup>-</sup>	0.13 ps +12-5	Ab D F H L	J <sup>π</sup> : $\gamma$ 's to 0 <sup>+</sup> and 3 <sup>-</sup> . RUL for the transition to g.s. rules out 2 <sup>-</sup> . (p,p') via IAR rules out J <sup>π</sup> =2 <sup>+</sup> (2007He01).
5641.98 20	1,2 <sup>+</sup>	<5.5 fs	b D H	configuration= $\nu 3d_{3/2} \nu 3p_{1/2}^{-1}$ . J <sup>π</sup> : $\gamma$ to 0 <sup>+</sup> . RUL rules out 2 <sup>-</sup> or J>2.
5643 4	2 to 7 <sup>-</sup>		b I	configuration= $\pi 1h_{9/2} \pi 2d_{5/2}^{-1}$ . J <sup>π</sup> : L(d, <sup>3</sup> He)=2.
5649.01 6	3 <sup>-</sup> ,4 <sup>-</sup>	37 fs +13-10	A D FgH	J <sup>π</sup> : D+Q $\gamma$ to 3 <sup>-</sup> . $\gamma$ to 5 <sup>-</sup> is not M2 or E3 (RUL)E3. Resonates at the $\nu 2g_{9/2}$ IAR in (p,p'). configuration= $\nu 2g_{9/2} \nu 2f_{7/2}^{-1}$ from $\sigma(\theta)$ in (p,p') IAR (2007HeZW).
5649.5 4	6 to 9 <sup>+</sup>		D	J <sup>π</sup> : excitation function resonates at $\nu 1j_{15/2}$ IAR in (p,p'). configuration= $\nu 1j_{15/2} \nu 3p_{3/2}^{-1}$ from $\sigma(\theta)$ in (p,p') IAR.
5658.51 4	5 <sup>-m</sup>	31 fs +7-6	B D FgHi	J <sup>π</sup> : L( $\alpha,\alpha'$ )=5. L(p,p')=5.
5665.7 11	<i>m</i>		B D i	
5675.366 23	2 <sup>-</sup> ,3,4 <sup>n</sup>	13 fs +6-5	A D F Hi	J <sup>π</sup> : D+Q $\gamma$ to 3 <sup>-</sup> allows J=2, 3, or 4. RUL for $\gamma$ 's to 4 <sup>-</sup> rule out 2 <sup>+</sup> L(p,p')=(3).
5686.5 7	6 <sup>-gn</sup>		A D F Hi	J <sup>π</sup> : $\gamma$ 's to 5 <sup>-</sup> and 6 <sup>-</sup> . configuration= $\nu 2g_{9/2} \nu 2f_{7/2}^{-1}$ . configuration= $\pi 1h_{9/2} \pi 1h_{11/2}^{-1}$ . J <sup>π</sup> : from $\sigma$ and form factor in (e,e'). Confirming assignments are L( $\alpha,\alpha'$ )=4 and L(p,p')=4.
5690.117 23	4 <sup>+</sup>	46 fs 4	ABCD GHI	configuration= $\pi 1h_{9/2} \pi 2d_{5/2}^{-1} + \nu 2g_{9/2} \nu 2f_{7/2}^{-1}$ . J <sup>π</sup> : $\gamma$ to 6 <sup>-</sup> . L(d, <sup>3</sup> He)=2.
5694.22 12	7 <sup>-g</sup>	58 fs +84-30	A D HI	configuration= $\pi 1h_{9/2} \pi 1h_{11/2}^{-1}$ . J <sup>π</sup> : from $\gamma(\theta)$ and $\gamma(\text{pol})$ in ( $\gamma,\gamma'$ ).
5715.53 9	2 <sup>+</sup>	3.7 fs 11	A DE GHI	T <sub>1/2</sub> : unweighted average of 4.8 fs 9 from (n,n' $\gamma$ ) and 2.6 fs +5-3 from ( $\gamma,\gamma'$ ).
5721.51 4	7 <sup>-</sup>	28 fs +9-7	B D F H	J <sup>π</sup> : L( $\alpha,\alpha'$ )=7.

Adopted Levels, Gammas (continued)

$^{208}\text{Pb}$  Levels (continued)

E(level) <sup>†</sup>	J <sup>π</sup> <sup>‡</sup>	T <sub>1/2</sub> <sup>#</sup>	XREF	Comments
5727 6	+		I	configuration= $\pi 1h_{9/2}\pi 1h_{11/2}^{-1}$ . J <sup>π</sup> : L(d, <sup>3</sup> He)=5.
5737.9 3			D L	
5741.1 4	6 to 9 <sup>+</sup>		D F	J <sup>π</sup> : excitation function resonates at $\nu 1j_{15/2}$ IAR in (p,p'). configuration= $\nu 1j_{15/2}\nu 3p_{3/2}^{-1}$ from $\sigma(\theta)$ in (p,p') IAR.
5749.67 14	(11 <sup>+</sup> ) <sup>@</sup>		J	
5763.7 8	6 <sup>+</sup>		D I	configuration= $\pi 1h_{9/2}\pi 1h_{11/2}^{-1} + \nu 1j_{15/2}\nu 3p_{3/2}^{-1}$ . J <sup>π</sup> : L(p,p')=6. L(d, <sup>3</sup> He)=5.
5777.96 3	2 <sup>-</sup> ,3 <sup>-</sup>	15.9 fs 14	A D FGHI L	configuration= $\nu 2g_{7/2}\nu 3p_{1/2}^{-1} + \nu 3d_{5/2}\nu 3p_{1/2}^{-1}$ or $\nu 3d_{3/2}\nu 3p_{1/2}^{-1} + \nu 3d_{5/2}\nu 3p_{1/2}^{-1} + \pi 1h_{9/2}\pi 2d_{5/2}^{-1}$ . J <sup>π</sup> : L(d,p)=2+4, or L=2 with both d3/2 and d5/2. J <sup>π</sup> : $\gamma$ to 6 <sup>-</sup> .
5783.22 7		41 fs +22-14	A H	
5789.34 4	2 <sup>+</sup> ,3 <sup>+</sup> ,4 <sup>+</sup>	40 fs +4-3	HI	configuration= $\pi 1h_{9/2}\pi 1h_{11/2}^{-1}$ . J <sup>π</sup> : L(d, <sup>3</sup> He)=5. $\gamma$ to 3 <sup>-</sup> rules out 1 <sup>+</sup> and J <sup>π</sup> >4 <sup>+</sup> . J <sup>π</sup> : $\gamma$ to 4 <sup>-</sup> .
5799.41 9		>690 fs	A D H	J <sup>π</sup> : from $\gamma(\theta)$ in (n,n' $\gamma$ ).
5805.0 3	1	5.1 fs +11-10	A D H L	configuration= $\nu 2g_{7/2}\nu 3p_{1/2}^{-1}$ . J <sup>π</sup> : L( $\alpha,\alpha'$ )=3. L(p,p')=3.
5813.27 4	3 <sup>-</sup>	22 fs +4-3	ABCD FGH L	configuration= $\pi 1h_{9/2}\pi 1h_{11/2}^{-1}$ . J <sup>π</sup> : L(d, <sup>3</sup> He)=5. $\gamma$ to 0 <sup>+</sup> . J <sup>π</sup> : $\gamma$ to 8 <sup>+</sup> .
5819.49 20	1 <sup>+</sup> ,2 <sup>+</sup>	222 fs +42-35	F HI	E(level): excited in ( $\alpha,\alpha'$ ) so this level must be different from the 5835.8 level which has unnatural parity.
5825.3 5			A D F	
5835 2			B	configuration= $\nu 2g_{9/2}\nu 2f_{7/2}^{-1}$ . J <sup>π</sup> : excitation function resonates at $\nu 2g_{9/2}$ IAR in (p,p'). J <sup>π</sup> =8 <sup>-</sup> from $\sigma(\theta)$ in (p,p') IAR.
5835.8 6	8 <sup>-</sup>		D F	
5844.49 20	1 <sup>+</sup>	≤0.31 fs	A CDE GHI M	configuration= $\pi 1h_{9/2}\pi 1h_{11/2}^{-1}$ . J <sup>π</sup> : from $\gamma(\theta)$ and $\gamma(\text{pol})$ in ( $\gamma,\gamma'$ ). T <sub>1/2</sub> : from ( $\gamma,\gamma'$ ). $\Gamma$ data in ( $\gamma,\gamma'$ ) gives T <sub>1/2</sub> =0.283 $\Gamma_{\gamma 0}/\Gamma$ fs +27-23. B(M1)=1.01 +43-13 in (e,e') gives T <sub>1/2</sub> =0.59 $\Gamma_{\gamma 0}/\Gamma$ fs +9-17. T <sub>1/2</sub> <2.1 fs is reported in (n,n' $\gamma$ ). The uncertainties in the (e,e') work do not include a systematic component.
5860 6	11 <sup>+</sup>		G	configuration= $\nu 1i_{11/2}\nu 1i_{13/2}^{-1}$ . J <sup>π</sup> : from $\sigma$ and form factor in (e,e').
5867 4	+		I	configuration= $\pi 1h_{9/2}\pi 1h_{11/2}^{-1}$ . J <sup>π</sup> : L(d, <sup>3</sup> He)=5.
5873.573 23	3 <sup>-</sup>	13.2 fs +21-14	AB D F H J L	configuration= $\nu 2g_{7/2}\nu 3p_{1/2}^{-1}$ . J <sup>π</sup> : L( $\alpha,\alpha'$ )=3.
5885.55 4	3 <sup>-</sup>	13.9 fs 14	AB D F HI L	configuration= $\nu 3d_{5/2}\nu 3p_{1/2}^{-1} + \nu 2g_{7/2}\nu 3p_{1/2}^{-1} + \pi 1h_{9/2}\pi 2d_{5/2}^{-1}$ .

**Adopted Levels, Gammas (continued)**

<sup>208</sup>Pb Levels (continued)

E(level) <sup>†</sup>	J <sup>π</sup> <sup>‡</sup>	T <sub>1/2</sub> <sup>#</sup>	XREF	Comments
5901 3	(8) <sup>+</sup>		D I	J <sup>π</sup> : L(d,p)=2+4. configuration= $\pi 1h_{9/2}\pi 1h_{11/2}^{-1}$ .
5918.28 4	3 <sup>-</sup> ,4,5 <sup>-</sup>	173 fs +56-42	D H	J <sup>π</sup> : L(p,p')=(8); L(d, <sup>3</sup> He)=5.
5923.67 3	2 <sup>-</sup>	104 fs +90-42	A D F H L	J <sup>π</sup> : $\gamma$ 's to 3 <sup>-</sup> and 5 <sup>-</sup> are not M2 or E3 (RUL). configuration= $\nu 3d_{3/2}\nu 3p_{1/2}^{-1}$ .
5928.0 3	10 <sup>+</sup>		A G I	J <sup>π</sup> : L(d,p)=2 for d3/2 gives 1 <sup>-</sup> or 2 <sup>-</sup> . Strength in (d,p) rules out 1 <sup>-</sup> given J <sup>π</sup> =1 <sup>-</sup> for the 5947 level.
5944 5	+		I	J <sup>π</sup> : from $\sigma$ and form factor in (e,e'). configuration= $\pi 1h_{9/2}\pi 1h_{11/2}^{-1}$ .
5946.77 20	1 <sup>-</sup>	≤0.48 fs	A DEF H L	J <sup>π</sup> : L(d, <sup>3</sup> He)=5. configuration= $\pi 1h_{9/2}\pi 1h_{11/2}^{-1}$ .
5954 6	9 <sup>+</sup>		G	configuration= $\nu 3d_{3/2}\nu 3p_{1/2}^{-1}$ .
5957.3 6			D	J <sup>π</sup> : from $\gamma(\theta)$ and $\gamma(\text{pol})$ in ( $\gamma,\gamma'$ ). T <sub>1/2</sub> : from ( $\gamma,\gamma'$ ). Other: <1.4 fs from (n,n' $\gamma$ ).
5965.8 4			A	configuration= $\nu 1i_{11/2}\nu 1i_{13/2}^{-1} + \pi 2f_{7/2}\pi 1h_{11/2}^{-1}$ .
5967.8 8	≈9		D	J <sup>π</sup> : from $\sigma$ and form factor in (e,e').
5968.55 6	4 <sup>-</sup>	7.6 fs +42-35	A D F H L	J <sup>π</sup> : $\gamma$ to 4 <sup>+</sup> . J <sup>π</sup> : L(p,p')≈9.
5973.0 4	2 <sup>+</sup>		AB	configuration= $\nu 2g_{7/2}\nu 3p_{1/2}^{-1}$ .
5981 2			D	J <sup>π</sup> : L(d,p)=4 for 2g <sub>7/2</sub> gives 3 <sup>-</sup> or 4 <sup>-</sup> . Mult(1762 $\gamma$ ) to 6 <sup>-</sup> cannot be M3 (RUL).
5989.1 12			D F	J <sup>π</sup> : $\gamma$ 's to 4 <sup>+</sup> and 0 <sup>+</sup> .
5992.67 25	6 <sup>+</sup>		ABCD FG	
5996 5	-		I	J <sup>π</sup> : from $\sigma$ and form factor in (e,e'). Confirming arguments are L( $\alpha,\alpha'$ )=6 and L(p,p')=6.
6009.75 4	3 <sup>-</sup>	11 fs +5-4	ABCD FGH L	configuration= $\pi 1h_{9/2}\pi 2d_{5/2}^{-1}$ .
6011.64 6		57 fs +13-11	H	J <sup>π</sup> : L(d, <sup>3</sup> He)=2.
6020.4 20			D	configuration= $\nu 2g_{7/2}\nu 3p_{1/2}^{-1}$ .
6025.8 6			A D F	J <sup>π</sup> : L( $\alpha,\alpha'$ )=3. L(p,p')=3.
6033 2			D	J <sup>π</sup> : $\gamma$ to 3 <sup>-</sup> .
6037.5 12	(5 <sup>+</sup> ,6 <sup>+</sup> )		D F	J <sup>π</sup> : $\gamma$ to 4 <sup>-</sup> .
6053.7 6	4 <sup>+</sup>		B D G	configuration= $\nu 2h_{11/2}\nu 3p_{1/2}^{-1}$ ?
6068.2 12	(5 <sup>+</sup> ,6 <sup>+</sup> )		D F	J <sup>π</sup> : probable configuration for L(d,p)=(5). J <sup>π</sup> : L(p,p')=4. Excited in ( $\alpha,\alpha'$ ).
6071 5	-		I	configuration= $\nu 2h_{11/2}\nu 3p_{1/2}^{-1}$ ?
				J <sup>π</sup> : probable configuration for L(d,p)=(5). configuration= $\pi 1h_{9/2}\pi 2d_{5/2}^{-1}$ .

## Adopted Levels, Gammas (continued)

<sup>208</sup>Pb Levels (continued)

E(level) <sup>†</sup>	J <sup>π</sup> <sup>‡</sup>	T <sub>1/2</sub> <sup>#</sup>	XREF	Comments
6076.4 13	0 <sup>-</sup> , 1 <sup>-</sup>		D F	J <sup>π</sup> : L(d, <sup>3</sup> He)=2. configuration= $\nu 4s_{1/2}\nu 3p_{1/2}^{-1}$ . J <sup>π</sup> : L(d,p)=0.
6086.56 4	1 <sup>-</sup>	37 fs +25-15	AB D F H L	configuration= $\nu 3d_{3/2}\nu 3p_{1/2}^{-1}$ . J <sup>π</sup> : L(d,p)=2 for d3/2. $\gamma'$ 's to 0 <sup>+</sup> and 3 <sup>-</sup> . Excited in ( $\alpha,\alpha'$ ) so 2 <sup>-</sup> is ruled out.
6099.8 4			A D	J <sup>π</sup> : $\gamma$ to 5 <sup>-</sup> and to the 5239 level that deexcites to 3 <sup>-</sup> .
6100.69 14	12 <sup>+</sup>		D G J	configuration= $\nu 1i_{11/2}\nu 1i_{13/2}^{-1}$ . J <sup>π</sup> : from $\sigma$ and form factor in (e,e').
6101.1 10	(5 <sup>+</sup> )	>690 fs	D F H	configuration= $\nu 2h_{11/2}\nu 3p_{1/2}^{-1}$ ? J <sup>π</sup> : probable configuration for L(d,p)=(5) allows 5 <sup>+</sup> or 6 <sup>+</sup> . $\gamma$ to 4 <sup>-</sup> is not M2 (RUL).
6103.5 5			A	J <sup>π</sup> : $\gamma$ to 5 <sup>-</sup> and to the 5566 level that deexcites to 4 <sup>-</sup> .
6147.8 8			A H	J <sup>π</sup> : $\gamma$ to 4 <sup>-</sup> .
6179 5	2 <sup>+</sup>		D I	configuration= $\pi 1h_{9/2}\pi 1h_{11/2}^{-1}$ . J <sup>π</sup> : L(p,p')=2.
6191.0 15	3 <sup>-</sup>		D F	J <sup>π</sup> : L(p,p')=3. Note that L=(5) is reported in (d,p); however, the assignment is tentative.
6193.1 4	2 <sup>+</sup>	0.62 fs 5	B DE G	XREF: B(6195.6). J <sup>π</sup> : from $\gamma(\theta)$ and $\gamma(\text{pol})$ in ( $\gamma,\gamma'$ ). A confirming argument is from $\sigma$ and form factor in (e,e'). T <sub>1/2</sub> : from B(E2)=0.0505 37 in (e,e'). Other: 0.75 fs +20-13 from ( $\gamma,\gamma'$ ), both deduced for $\Gamma_0/\Gamma=1$ .
6216.8 15			D	
6223.9 15			D	
6234.9 6			D g	
6242.4 9	<i>o</i>		AB D FgHi	J <sup>π</sup> : $\gamma$ to 3 <sup>-</sup> .
6250.6 15	<i>o</i>		D G i	
6255.68 6	2 <sup>+</sup>	≤0.91 fs	A DEF H	J <sup>π</sup> : from $\gamma(\theta)$ and $\gamma(\text{pol})$ in ( $\gamma,\gamma'$ ). T <sub>1/2</sub> : from ( $\gamma,\gamma'$ ).
6263.7 1	1 <sup>-</sup>	≤0.21 fs	AB DEFG L	configuration= $\nu 4s_{1/2}\nu 3p_{1/2}^{-1} + \nu 3d_{3/2}\nu 3p_{1/2}^{-1}$ . J <sup>π</sup> : from $\gamma(\theta)$ and $\gamma(\text{pol})$ in ( $\gamma,\gamma'$ ). Confirming arguments are L( $\alpha,\alpha'$ )=1 and L(d,p)=0+2. T <sub>1/2</sub> : from ( $\gamma,\gamma'$ ).
6274.55 22	3 <sup>-</sup>	12 fs +16-10	AB D F H	configuration= $\nu 3d_{5/2}\nu 3p_{1/2}^{-1} + \nu 2g_{7/2}\nu 3p_{1/2}^{-1}$ . J <sup>π</sup> : L(d,p)=2+4. A confirming argument is L(p,p')=3.
6283 6	10 <sup>-</sup>		G	J <sup>π</sup> : from $\sigma$ and form factor in (e,e').
6313.9 1	1 <sup>-</sup>	≤0.17 fs	AB DEF L	configuration= $\nu 4s_{1/2}\nu 3p_{1/2}^{-1}$ . J <sup>π</sup> : from $\gamma(\theta)$ and $\gamma(\text{pol})$ in ( $\gamma,\gamma'$ ). T <sub>1/2</sub> : from ( $\gamma,\gamma'$ ).
6317.6 15			D	
6327.2 15			D	
6332.9 15	<i>b</i>		D g	

Adopted Levels, Gammas (continued)

<sup>208</sup>Pb Levels (continued)

E(level) <sup>†</sup>	J <sup>π</sup> <sup>‡</sup>	T <sub>1/2</sub> <sup>#</sup>	XREF		Comments
6340 5	1 <sup>-</sup> ,2,3 <sup>-b</sup>		A	D Fg M	J <sup>π</sup> : γ to 3 <sup>-</sup> . Fed from 0 <sup>-</sup> ,1 <sup>-</sup> capturing state.
6348.3 15	<sup>b</sup>			D g	
6354.4 4			A	D F	J <sup>π</sup> : γ to 3 <sup>-</sup> .
6361.6 1	1 <sup>-</sup>	≤0.30 fs	AB	DEF L	configuration=ν3d <sub>3/2</sub> ν3p <sub>1/2</sub> <sup>-1</sup> . J <sup>π</sup> : from γ(θ) and γ(pol) in (γ,γ'). A confirming argument is L(α,α')=1. T <sub>1/2</sub> : from (γ,γ').
6371.8 15	2 <sup>+</sup> ,3 <sup>-</sup>			D G	J <sup>π</sup> : from σ and form factor in (e,e'). 2 <sup>+</sup> is preferred by the authors, but 3 <sup>-</sup> cannot be ruled out.
6378.8 6				D	
6389.6 5	- <sup>p</sup>			D Fg 1	configuration=ν3d <sub>3/2</sub> ν3p <sub>1/2</sub> <sup>-1</sup> or ν2g <sub>7/2</sub> ν3p <sub>1/2</sub> <sup>-1</sup> . J <sup>π</sup> : L(d,p)=2 or 4.
6397.1 15	<sup>p</sup>			D g 1	
6420.2 14	(5 <sup>+</sup> ,6 <sup>+</sup> )			D F	XREF: D(6418.8)F(6421.6). configuration=ν2h <sub>11/2</sub> ν3p <sub>1/2</sub> <sup>-1</sup> ? E(level): the energy agreement between (d,p) and (p,p') is poor, but 1997VaZT assign these as the same level. J <sup>π</sup> : probable configuration for L(d,p)=(5) allows 5 <sup>+</sup> or 6 <sup>+</sup> .
6427.6 15				D G	
6428 10	2 <sup>-</sup>			G	B(M2)↑≈2.4 E(level),J <sup>π</sup> : from σ and form factor in (e,e'). The evaluator assumes that this level is distinct from that at 6427.6 since (α,α') is not expected to excite an unnatural parity level.
6435.57 23	12 <sup>-</sup>			D G J	configuration=ν1j <sub>15/2</sub> ν1i <sub>13/2</sub> <sup>-1</sup> . J <sup>π</sup> : from σ and form factor in (e,e').
6444.4 2	3 <sup>-</sup>			D F L	configuration=ν3d <sub>5/2</sub> ν3p <sub>1/2</sub> <sup>-1</sup> + ν2g <sub>7/2</sub> ν3p <sub>1/2</sub> <sup>-1</sup> . J <sup>π</sup> : L(d,p)=2+4. A confirming argument is L(p,p')=3.
6448.40 14	(13 <sup>-</sup> ) <sup>@</sup>			D J	
6452.0 5			B	D	
6462.7 4	-			D F I	configuration=π1h <sub>9/2</sub> π2d <sub>5/2</sub> <sup>-1</sup> . J <sup>π</sup> : L(d, <sup>3</sup> He)=2.
6472.6 15				D	
6482.0 15	2 <sup>-</sup>			D G	J <sup>π</sup> : from σ and form factor in (e,e'). B(M2)≈8 from (e,e').
6486.5 2	1 <sup>-</sup>	0.78 fs +37-23	AB	DEF L	configuration=ν4s <sub>1/2</sub> ν3p <sub>1/2</sub> <sup>-1</sup> + ν3d <sub>3/2</sub> ν3p <sub>1/2</sub> <sup>-1</sup> . J <sup>π</sup> : from γ(θ) and γ(pol) in (γ,γ'). A confirming argument is L(d,p)=0+2. T <sub>1/2</sub> : from (γ,γ').
6505.6 22	1	≤1.0 fs		DE	J <sup>π</sup> : from γ(θ) in (γ,γ'). T <sub>1/2</sub> : from (γ,γ').
6512.8 6	1	≤4.2 fs		DE g	J <sup>π</sup> : from γ(θ) in (γ,γ'). T <sub>1/2</sub> : from (γ,γ').

Adopted Levels, Gammas (continued)

<sup>208</sup>Pb Levels (continued)

E(level) <sup>†</sup>	J <sup>π</sup> <sup>‡</sup>	T <sub>1/2</sub> <sup>#</sup>	XREF	Comments
6529.0 <sup>c</sup> 15	-		a D g I	configuration= $\pi 1h_{9/2}\pi 2d_{5/2}^{-1}$ . J <sup>π</sup> : L(d, <sup>3</sup> He)=2.
6531.7 <sup>c</sup> 15			a D	
6541.6 6			B D	
6545.2 11			A	
6551.93 16	1 <sup>-</sup> ,2,3 <sup>-</sup>		A L	J <sup>π</sup> : $\gamma$ 's to 0 <sup>+</sup> and 3 <sup>-</sup> .
6561.0 15			D	
6573.2 15			D F	
6579.0			D	
6588 10	2 <sup>-</sup>		G	E(level): this level may correspond to one of the adjacent levels seen in (p,p') or (d,p). J <sup>π</sup> : from $\sigma$ and form factor in (e,e'). B(M2)≈3 from (e,e').
6589.0 15			D F	
6609.2 15			D	
6617.0 3	3 <sup>-</sup>		AB D FG I L	configuration= $\nu 2g_{7/2}\nu 3p_{1/2}^{-1} + \pi 1h_{9/2}\pi 2d_{5/2}^{-1}$ . J <sup>π</sup> : from $\sigma$ and form factor in (e,e').
6631.5 6			B D	
6655.3 15			D F	
6657.8 5	4 <sup>+</sup>		AB D G L	J <sup>π</sup> : L(p,p')=4.
6682.46 14	(5 <sup>-</sup> )		A D F L	configuration= $\nu 2h_{11/2}\nu 3p_{1/2}^{-1}$ ? J <sup>π</sup> : probable configuration for L(d,p)=(5). $\gamma$ to 3 <sup>-</sup> rules out 6 <sup>-</sup> . XREF: L(6692.0). J <sup>π</sup> : L(p,p')=5.
6687.8 7	5 <sup>-</sup>		B D L	
6699.60 23	(3 <sup>-</sup> ) <sup>d</sup>		AB D Fg	J <sup>π</sup> : $\gamma$ 's to 2 <sup>-</sup> and 5 <sup>-</sup> . Excited in ( $\alpha,\alpha'$ ) so level probably has natural parity. From $\sigma$ and form factor in (e,e') one has J <sup>π</sup> =1 <sup>-</sup> , (2 <sup>-</sup> ,3 <sup>-</sup> ) for a level at 6701 9.
6708.9 15	<sup>d</sup>		D g	
6719.8 5	1 <sup>-</sup>	0.052 fs +6-12	AB DEF L	XREF: L(6718.4). E(level),J <sup>π</sup> : J <sup>π</sup> =1 <sup>-</sup> from $\gamma(\theta)$ and $\gamma(\text{pol})$ for E $\gamma$ =6719.7 5. L=(1) in (p,p') for E=6719.7 7. E(d,p)=6720.8 15. Although the energy agreement is not good, E(p,p' $\gamma$ )=6718.5 3 with J determined as 1 from $\gamma(\theta)$ , and E $\gamma$ =6716.3 4 in (d,p $\gamma$ ) and E( $\alpha,\alpha'$ )=6717 2 probably correspond to the same 1 <sup>-</sup> level. T <sub>1/2</sub> : from ( $\gamma,\gamma'$ ).
6728 2			D	
6734.4 11			D FG	
6739.6 7			D L	
6743.42 16	14 <sup>-</sup>		D G J	XREF: L(6740.1). configuration= $\nu 1j_{15/2}\nu 1i_{13/2}^{-1}$ . J <sup>π</sup> : from $\sigma$ and form factor in (e,e').
6756.4 7			D g	
6766.6 10			A D Fg	
6773.4 15	1,2,3 <sup>-</sup>		A D Fg	XREF: D(6777.0)F(6774.7). J <sup>π</sup> : $\gamma$ to 0 <sup>+</sup> .

**Adopted Levels, Gammas (continued)**

<u><math>^{208}\text{Pb}</math> Levels (continued)</u>					
E(level) <sup>†</sup>	$J^\pi$ <sup>‡</sup>	$T_{1/2}$ <sup>#</sup>	XREF		Comments
6789.1 6	(2 <sup>-</sup> ,3 <sup>+</sup> )		A	D FG	$J^\pi$ : $J^\pi=3^+$ or, less likely, 2 <sup>-</sup> , from $\sigma$ and form factor in (e,e').
6794.1 15				D	
6800.8 20				D F	$J^\pi$ : $\gamma$ to 5 <sup>-</sup> .
6820.0 4	(2 <sup>-</sup> ,3 <sup>-</sup> )		A	D F	$J^\pi$ : $\gamma$ 's to 1 <sup>-</sup> and 4 <sup>-</sup> .
6825.6 7				D F	
6831.5 15	(8 <sup>-</sup> )			D G	configuration= $\nu 1j_{15/2} \nu 1i_{13/2}^{-1}$ .
6845.7 6	(8 <sup>+</sup> )			D	$J^\pi$ : from $\sigma$ and form factor in (e,e') for E=6833.
6861.4 <sup>e</sup> 6	9 <sup>-e</sup>			D G	$J^\pi$ : L(p,p')=(8).
6868.0 <sup>e</sup> 6	10 <sup>-e</sup>			D G	configuration= $\pi 1i_{13/2} \pi 1h_{11/2}^{-1}$ .
6877.7 5				D F	$J^\pi$ : from $\sigma$ and form factor in (e,e').
6879 6	7 <sup>-</sup>			G	$J^\pi$ : from $\sigma$ and form factor in (e,e').
6884 6	10 <sup>-</sup>			G	configuration= $\pi 1i_{13/2} \pi 1h_{11/2}^{-1}$ .
6897.3 4			A	D	$J^\pi$ : from $\sigma$ and form factor in (e,e').
6913 4	2 <sup>+</sup>	≤0.85 fs		E	E(level): from (d,p $\gamma$ ). Other:6897.2 6 from (p,p').
6917.5 6				D	$J^\pi$ : J=2 from $\gamma(\theta)$ . B(M2)(W.u.)>82 rules out $J^\pi=2^-$ .
6920.7 8			A		$T_{1/2}$ : from ( $\gamma,\gamma'$ ).
6929.6 5	2 <sup>-</sup>		A	D FG	
6939.9 15	3 <sup>-</sup>			D	B(M2)↑≈20
6947 2				D	configuration= $\nu 3d_{3/2} \nu 3p_{1/2}^{-1} + \nu 3d_{5/2} \nu 3p_{1/2}^{-1}$ .
6969.3 5	2 <sup>-</sup>		A	D FG	E(level): from (d,p $\gamma$ ). Others:6929.1 6 from (p,p') and 6927.5 6 from (d,p).
6980 40	1,2 <sup>+</sup>	≈1.8 fs		E	$J^\pi$ : from $\sigma$ and form factor in (e,e' $\gamma$ ). A confirming argument is L(d,p)=2 with both $d_{3/2}$ and $d_{5/2}$ configurations.
6988.7 15				D g	$J^\pi$ : L(p,p')=3.
6995.1 15				D g	
7000	(9 <sup>+</sup> )			G	configuration= $\nu 3d_{3/2} \nu 3p_{1/2}^{-1} + \nu 3d_{5/2} \nu 3p_{1/2}^{-1}$ .
7001.0 4			A	D F	E(level): from (d,p $\gamma$ ). Others:6969.5 6 from (p,p') and 1968.9 6 from (d,p).
7020.2 6	1 <sup>-</sup>			FG	$J^\pi$ : L(d,p)=2 with both $d_{3/2}$ and $d_{5/2}$ configurations. Note that L(p,p')=(1).
7020.2 4	(3 <sup>-</sup> )		A	D	$J^\pi$ : seen in ( $\gamma,\gamma'$ ).
7034 2				D	$T_{1/2}$ : from ( $\gamma,\gamma'$ ).
					configuration= $\nu 4s_{1/2} \nu 3p_{1/2}^{-1} + \nu 3d_{3/2} \nu 3p_{1/2}^{-1}$ .
					$J^\pi$ : L(d,p)=0+2.
					$J^\pi$ : L(p,p')=(3). $\gamma$ 's to 4 <sup>+</sup> and 4 <sup>-</sup> .

## Adopted Levels, Gammas (continued)

<sup>208</sup>Pb Levels (continued)

E(level) <sup>†</sup>	J <sup>π</sup> <sup>‡</sup>	T <sub>1/2</sub> <sup>#</sup>	XREF		Comments
7057.9 15			D		
7061 5	12 <sup>-</sup>		D G		configuration= $\pi 1i_{13/2}\pi 1h_{11/2}^{-1}$ . J <sup>π</sup> : from $\sigma$ and form factor in (e,e'). A confirming argument is from 1990Fu07 in (p,p') based on comparison of $\sigma(\theta)$ with DWBA calculations for the indicated pure particle-hole configuration, and agreement of excitation energy with the calculated value. The J <sup>π</sup> and configuration agree with the earlier (p,p') work of 1980Ba46.
7063.53 20	1 <sup>-</sup>	0.025 fs +1-3	AB DEFG	L	XREF: L(7062.1). configuration= $\nu 4s_{1/2}\nu 3p_{1/2}^{-1}$ . J <sup>π</sup> : from $\gamma(\theta)$ and $\gamma(\text{pol})$ in ( $\gamma,\gamma'$ ). T <sub>1/2</sub> : from ( $\gamma,\gamma'$ ).
7083.2 3	1 <sup>-</sup>	0.050 fs 4	A DEF	L	configuration= $\nu 3d_{3/2}\nu 3p_{1/2}^{-1}$ . J <sup>π</sup> : from $\gamma(\theta)$ and $\gamma(\text{pol})$ in ( $\gamma,\gamma'$ ). T <sub>1/2</sub> : from ( $\gamma,\gamma'$ ).
7086 6	12 <sup>-</sup>		G		configuration= $\pi 1i_{13/2}\pi 1h_{11/2}^{-1}$ . J <sup>π</sup> : from $\sigma$ and form factor in (e,e').
7095.6 3			D		
7108 10	(1 <sup>-</sup> ,3 <sup>-</sup> )		G		J <sup>π</sup> : from $\sigma$ and form factor in (e,e'). J <sup>π</sup> =1 <sup>-</sup> is most probable, but 3 <sup>-</sup> cannot Be ruled out.
7117.0 3	(3 <sup>-</sup> )		D F		J <sup>π</sup> : L(p,p')=(3).
7137.3 4	3 <sup>-</sup> ,4 <sup>-</sup>		A D F		configuration= $\nu 2g_{7/2}\nu 3p_{1/2}^{-1}$ . J <sup>π</sup> : L(d,p)=4 for g <sub>7/2</sub> allows 3 <sup>-</sup> or 4 <sup>-</sup> .
7143 10	(3 <sup>+</sup> ,2 <sup>-</sup> )		G		J <sup>π</sup> : from $\sigma$ and form factor in (e,e'). J <sup>π</sup> =3 <sup>+</sup> is the authors' preferred value, but 2 <sup>-</sup> cannot Be ruled out.
7146.1 15	(5 <sup>-</sup> ,6 <sup>-</sup> )		D F		configuration= $\nu 2h_{11/2}\nu 3p_{1/2}^{-1}$ ? J <sup>π</sup> : probable configuration for L(d,p)=(5).
7157 2			D		
7167 2			D F		
7177.0 3	1	≤0.57 fs	DE		J <sup>π</sup> : from $\gamma(\theta)$ in ( $\gamma,\gamma'$ ). T <sub>1/2</sub> : from ( $\gamma,\gamma'$ ).
7191.6 15			D		
7196.6 10			Ab D Fg		J <sup>π</sup> : $\gamma$ to 3 <sup>-</sup> .
7206.9 5	1	≤0.51 fs	Ab E g		J <sup>π</sup> : from $\gamma(\theta)$ in ( $\gamma,\gamma'$ ). T <sub>1/2</sub> : from ( $\gamma,\gamma'$ ).
7218.6 14			A D F		
7232.2 15			D F		
7240 2	1 <sup>-</sup>	≤0.24 fs	A D F		E(level): the data are inconsistent. The values are 7238.7 6 (d,p $\gamma$ ), 7239.6 15 (d,p), 7241.4 1 (p,p' $\gamma$ ), 7237.9 15 (p,p') and 7243 3 ( $\gamma,\gamma'$ ). The evaluator assumes that all these reactions are exciting the same level. configuration= $\nu 4s_{1/2}\nu 3p_{1/2}^{-1}$ + $\nu 3d_{3/2}\nu 3p_{1/2}^{-1}$ . J <sup>π</sup> : L(d,p)=0+2. T <sub>1/2</sub> : from ( $\gamma,\gamma'$ ).
7255.3 15			D FG		

Adopted Levels, Gammas (continued)

<sup>208</sup>Pb Levels (continued)

E(level) <sup>†</sup>	J <sup>π</sup> <sup>‡</sup>	T <sub>1/2</sub> <sup>#</sup>	XREF			Comments
7264.4 10			A	g		J <sup>π</sup> : γ to 5 <sup>-</sup> .
7265.9 15	2 <sup>+</sup>			D	g	J <sup>π</sup> : L(p,p')=2.
7278.68 20	1 <sup>+</sup>	0.585 fs 15		DEF	g	J <sup>π</sup> : from γ(θ) and γ(pol) in (γ,γ'). T <sub>1/2</sub> : from (γ,γ').
7280			B			E(level): this level is excited in (α,α') and thus is probably distinct from the 7278.68 level which has unnatural parity.
7291.4 23				D	F	
7301.2 17				D	F	
7311 2					F	
7313 4	(2 <sup>-</sup> ,3 <sup>+</sup> )				G	J <sup>π</sup> : from σ and form factor in (e,e'). 3 <sup>+</sup> is the authors' preferred value; however, 2 <sup>-</sup> cannot Be ruled out.
7315.4 20	2 <sup>+</sup>		A	D		J <sup>π</sup> : L(p,p')=2.
7332.4 8	1 <sup>-</sup>	0.016 fs +2-4	A	DEF	L	XREF: D(7326.5)F(7329.2). J <sup>π</sup> : from γ(θ) and γ(pol) in (γ,γ'). T <sub>1/2</sub> : from (γ,γ').
7334.8 15	3 <sup>-</sup>			D		J <sup>π</sup> : L(p,p')=3.
7335.4 15	(5 <sup>-</sup> ,6 <sup>-</sup> )				F	E(level): L is tentative, so this may Be the same as the 7334.8 level. configuration=ν2h <sub>11/2</sub> ν3p <sub>1/2</sub> <sup>-1</sup> ? J <sup>π</sup> : probable configuration for L(d,p)=(5).
7346 3				D	G	
7360 <sup>f</sup> 50	2 <sup>+</sup>			D		XREF: Others: <b>AE</b> J <sup>π</sup> : L(p,p')=2. Γ=400 keV 50. %EWSR=6.5 10.
7360.1 15	(5 <sup>-</sup> ,6 <sup>-</sup> )			D	F	configuration=ν2h <sub>11/2</sub> ν3p <sub>1/2</sub> <sup>-1</sup> ? J <sup>π</sup> : probable configuration for L(d,p)=(5).
7370.92 5	2 <sup>+</sup>					NOP
7371.6 17				D	F	
7378.01 5	2 <sup>+</sup>					NOP
7380.17 5						N
7382 9	(4 <sup>+</sup> )			D		J <sup>π</sup> : L(p,p')=(4).
7383.96 6	2 <sup>+</sup>					OP
7384.55 5	1 <sup>+</sup>					N P
7389.0 10	3 <sup>-</sup>		A	D	G	J <sup>π</sup> : J <sup>π</sup> =3 <sup>-</sup> or 1 <sup>-</sup> from σ and form factor in (e,e'). 3 <sup>-</sup> is the authors' preferred value, but 1 <sup>-</sup> cannot Be ruled out. γ to 4 <sup>-</sup> rules out the 1 <sup>-</sup> alternative.
7397.12 6	(2 <sup>+</sup> )					NO
7398.21 3	1					OP
7399.4 11	4 <sup>+</sup>			BCD	F	J <sup>π</sup> : L=4 in (α,α') and (d,d').
7400.68 6	2 <sup>+</sup>					O
7405.41 6	1 <sup>+</sup>					NOP
7408.5 <sup>f</sup> 11				D	F	
7408.94 5	1 <sup>-</sup>					NOP

**Adopted Levels, Gammas (continued)**

<sup>208</sup> Pb Levels (continued)				
E(level) <sup>†</sup>	J <sup>π</sup> <sup>‡</sup>	T <sub>1/2</sub> <sup>#</sup>	XREF	Comments
7415 3	1 <sup>-</sup>	≤0.17 fs	E G	J <sup>π</sup> : J=1 from $\gamma(\theta)$ in $(\gamma, \gamma')$ . J <sup>π</sup> =1 <sup>-</sup> or possibly 3 <sup>-</sup> from $\sigma$ and form factor in (e,e'). T <sub>1/2</sub> : from $(\gamma, \gamma')$ .
7416.04 7	2 <sup>+</sup>		OP	
7420.9 11			D F	
7428.9 11			D F	E(level): possibly the same level as that seen at 7430.38 in resonance work.
7430.38 7	2 <sup>+</sup>		O	
7435.34 9			O	
7435.90 5	2 <sup>+</sup>		NO	
7440.53 5	1 <sup>+</sup>		NO	
7449.4 12	(5 <sup>-</sup> , 6 <sup>-</sup> )		D F	configuration= $\nu 2h_{11/2} \nu 3p_{1/2}^{-1}$ ? J <sup>π</sup> : probable configuration for L(d,p)=(5).
7449.55 5	0 <sup>+</sup>		N	
7450.45 5	2 <sup>+</sup>		NO	
7455.19 5	2 <sup>+</sup>		NO	
7459 2	2 <sup>-</sup>		D FG	J <sup>π</sup> : from $\sigma$ and form factor in (e,e'). B(M2)≈11 from (e,e').
7465.79 5	1 <sup>+</sup>		NOP	
7465.79 6	2 <sup>+</sup>		NO	
7468.6 6	1 <sup>-</sup>		D F	E(level): possibly the same level as that seen at 7469.18 in resonance work. configuration= $\nu 4s_{1/2} \nu 3p_{1/2}^{-1} + \nu 3d_{3/2} \nu 3p_{1/2}^{-1}$ . J <sup>π</sup> : L(d,p)=0+2.
7469.18 6	1 <sup>-</sup>		NOP	
7470.94 6	0 <sup>+</sup>		N	
7479.38 6	(2 <sup>+</sup> )		NO	
7482 10	(1 <sup>-</sup> , 3 <sup>-</sup> )		G	J <sup>π</sup> : from $\sigma$ and form factor in (e,e'). The authors' preferred assignment is 3 <sup>-</sup> , but 1 <sup>-</sup> cannot be ruled out.
7482.49 6	1 <sup>+</sup>		NOP	
7491	2 <sup>+</sup>		D	E(level): possibly the same level as that seen at 7494.92 in resonance work. J <sup>π</sup> : L(p,p')=2.
7494.92 8	2 <sup>+</sup>		NOP	
7495.17 8	1 <sup>+</sup>		NO	
7497.47 6	1 <sup>+</sup>		NOP	
7499.41 7	1 <sup>(+)</sup>		NO	
7502.47 7	0 <sup>+</sup>		N	
7503.70 7	(2 <sup>+</sup> )		NO	
7505.0 3	1 <sup>-</sup>		D F	configuration= $\nu 4s_{1/2} \nu 3p_{1/2}^{-1} + \nu 3d_{3/2} \nu 3p_{1/2}^{-1}$ . J <sup>π</sup> : L(d,p)=0+2.
7506.89 7	2 <sup>+</sup>		NO	
7508.12 15	(2 <sup>+</sup> )		O	
7509 4	2 <sup>-</sup>		G	J <sup>π</sup> : from $\sigma$ and form factor in (e,e'). B(M2)≈10 from (e,e').

Adopted Levels, Gammas (continued)

<sup>208</sup>Pb Levels (continued)

E(level) <sup>†</sup>	J <sup>π</sup> <sup>‡</sup>	T <sub>1/2</sub> <sup>#</sup>	L	XREF	Comments
7512.58 7	1 <sup>+</sup>			NO	
7515.38 7	(1 <sup>+</sup> )			NO	
7516.29 7	(1 <sup>+</sup> )			N	
7517	3 <sup>-</sup>				J <sup>π</sup> : L(p,p')=3.
7517 2	0 <sup>-</sup> ,1 <sup>-</sup>				J <sup>π</sup> : L(d,p)=0.
7520.90 7	2 <sup>+</sup>			NO	
7522.89 7	1 <sup>+</sup>			NO	
7523.84 7	(0 <sup>+</sup> ,1 <sup>+</sup> )			N P	
7526.01 10	2 <sup>+</sup>			NO	
7528.79 17				J	
7535.57 7	1 <sup>+</sup>			NO	
7537.60 18	(2 <sup>+</sup> )			O	
7538.18 7	2 <sup>+</sup>			NO	
7546.02 10	1 <sup>+</sup>			NO	
7546.24 11	0 <sup>+</sup>			N	
7547.98 10	1 <sup>+</sup>			NO	
7548.18 7	2 <sup>+</sup>			NO	
7548.49 11	1 <sup>-</sup>			NOP	
7548.6 6	1 <sup>-</sup>	≤0.35 fs		DEFG	configuration=ν4s <sub>1/2</sub> ν3p <sub>1/2</sub> <sup>-1</sup> + ν3d <sub>3/2</sub> ν3p <sub>1/2</sub> <sup>-1</sup> . E(level): possibly the same level as that seen at 7548.49 in resonance work. J <sup>π</sup> : L(d,p)=0+2. Confirming arguments are J=1 from γ(θ) in (γ,γ'), and J <sup>π</sup> =1 <sup>-</sup> or possibly 2 <sup>-</sup> or 3 <sup>+</sup> from σ and form factor in (e,e'). T <sub>1/2</sub> : from (γ,γ').
7549.09 11	(0 <sup>+</sup> )			N	
7553.29 10	(0 <sup>+</sup> )		(1)	N	E(level): possible multiplet.
7563.94 11	(2 <sup>+</sup> )			NO	
7566.43 10	(0 <sup>+</sup> )			N	
7567.89 11	( <sup>+</sup> )			N	
7568.00 8				N	
7573 <sup>f</sup> 7				D	
7574.49 10	0 <sup>+</sup>			N	
7576.31 10	2 <sup>-</sup>			N	
7577.41 11	1 <sup>+</sup>			NO	
7578.62 11	(2 <sup>-</sup> )			N	
7580.71 11				N	
7585.27 10	1 <sup>+</sup>			NO	
7586.85 23	(1)			O	
7587.04 10	2 <sup>+</sup>			NO	
7590.79 10	(2 <sup>+</sup> )			NO	
7594 <sup>f</sup> 7				D	
7595.26 11	0 <sup>-</sup>			N	

Adopted Levels, Gammas (continued)

<sup>208</sup>Pb Levels (continued)

E(level) <sup>†</sup>	J <sup>π</sup> <sup>‡</sup>	T <sub>1/2</sub> <sup>#</sup>	XREF	Comments
7596.53 10	1 <sup>+</sup>		NO	
7598.07 11			N	
7600.01 11	(1 <sup>+</sup> )		NO	
7607.38 11	2 <sup>+</sup>		NO	
7610.21 11	(1 <sup>+</sup> )		N	
7610.64 11	(2 <sup>+</sup> )		NO	
7616.16 10	2 <sup>+</sup>		NOP	
7616.55 11	1 <sup>+</sup>		NO	
7621.09 10	3 <sup>-</sup>		N	
7623.07 26	1 <sup>-</sup>		NOP	
7627.20 11			N	
7628.77 16	(1 <sup>+</sup> )		NO	
7631 4	1 <sup>-</sup>	≤0.57 fs	E G	J <sup>π</sup> : J=1 from γ(θ) in (γ,γ'). J <sup>π</sup> =1 <sup>-</sup> or possibly 2 <sup>-</sup> or 3 <sup>-</sup> from σ and form factor in (e,e'). T <sub>1/2</sub> : from (γ,γ').
7632.03 10	1 <sup>+</sup>		NO	
7636.02 21	(2 <sup>+</sup> )		NO	
7636.4 3	2 <sup>+</sup>		O	
7640.01 11	(2 <sup>+</sup> )		NO	
7642.98 21	(0 <sup>+</sup> )		N	
7644.5 2			N	
7650.2			P	
7651.18 11	1 <sup>+</sup>		NO	
7651.52 10	(2 <sup>+</sup> )		N	
7653.93 11	(1 <sup>+</sup> )		NO	
7655.3 3	(2 <sup>+</sup> )		O	
7656 8	(10 <sup>+</sup> )		D G	J <sup>π</sup> : L(p,p')=(10).
7656.66 11	0 <sup>+</sup>		N	
7662.91 11	1 <sup>(+)</sup>		NO	
7664.41 10	1 <sup>+</sup>		NOP	
7666.32 11	(1 <sup>+</sup> )		NO	
7667.81 11	(0 <sup>+</sup> )		N	
7670.83 11			N	
7672.51 11	(1 <sup>+</sup> )		NO	
7676.35 11	(2 <sup>-</sup> )		N	
7676.59 10	(1 <sup>-</sup> )		N	
7680.18 11			N	
7680.44 11	1 <sup>+</sup>		NO	
7683.31 11	1 <sup>-</sup>		NOP	
7683.7 2	(0 <sup>+</sup> )		N	
7685.4 5	1,2 <sup>+</sup>		DE	J <sup>π</sup> : excited in (γ,γ').
7685.89 11	2 <sup>-</sup>		N	
7689.63 11	2 <sup>+</sup>		NO	

**Adopted Levels, Gammas (continued)**

<u><math>^{208}\text{Pb}</math> Levels (continued)</u>					
E(level) <sup>†</sup>	J <sup>π</sup> <sup>‡</sup>	T <sub>1/2</sub> <sup>#</sup>	XREF	Comments	
7696.02 11	3 <sup>-</sup>		N		
7696.5 3	1 <sup>-</sup>		N		
7698.68 10	(2) <sup>+</sup>		NO		
7700 <sup>f</sup> 10			G		
7701.87 10	1 <sup>+</sup>		NO		
7702.80 10	(2) <sup>+</sup>		N		
7706.62 11			N		
7712.68 10	(2 <sup>+</sup> )		N		
7715.95 11			N		
7721.52 11	2 <sup>-</sup>		N		
7722.6 24	1	≤0.62 fs	DE	J <sup>π</sup> : from $\gamma(\theta)$ in $(\gamma, \gamma')$ . T <sub>1/2</sub> : from $(\gamma, \gamma')$ .	
7725.92 11	2 <sup>+</sup>		N		
7734.87 11	2 <sup>+</sup>		N		
7736.17 11	1 <sup>+</sup>		NO		
7738.94 11	(0 <sup>+</sup> )		N		
7740 <sup>f</sup> 10			N		
7743.03 11	(0 <sup>+</sup> )		N		
7743.09 12			N		
7744.65 11	2 <sup>+</sup>		NO		
7745.33 11	(1 <sup>+</sup> )		NO		
7748.55 11	2 <sup>+</sup>		NO		
7749.60 11	(0 <sup>+</sup> )		N		
7751.92 21	(1 <sup>+</sup> )		NO		
7757.55 13			N		
7761.1 2	2 <sup>+</sup>		g	NO	
7762.1 2	(0) <sup>+</sup>		N		
7767.5 2	2 <sup>+</sup>		g	NO	
7768.3 2	2 <sup>+</sup>		g	NO	
7771.6 2	0 <sup>+</sup>		N		
7777.09 14			N		
7777.9 2	(2) <sup>+</sup>		NO		
7780.8 1	3 <sup>-</sup>		N		
7785.78 14	(2 <sup>+</sup> )		NO		
7786.4 2	2 <sup>+</sup>		NO		
7790.0 2	1 <sup>+</sup>		NO		
7790.8 2			N		
7791.56 14			N		
7792.9 2	1 <sup>+</sup>		NO		
7794.2 2	2 <sup>-</sup>		N		
7795.9 2	(2) <sup>+</sup>		N		

**Adopted Levels, Gammas (continued)**

<sup>208</sup> Pb Levels (continued)					
E(level) <sup>†</sup>	J <sup>π</sup> <sup>‡</sup>	T <sub>1/2</sub> <sup>#</sup>	XREF	Comments	
7798.23 14			N		
7802.1 2	0 <sup>+</sup>		N		
7803.40 14			N		
7807 6	(1 <sup>-</sup> ,2 <sup>+</sup> ,3 <sup>-</sup> )		G	J <sup>π</sup> : from $\sigma$ and form factor in (e,e'). The authors' preferred assignment is 3 <sup>-</sup> ; however, 1 <sup>-</sup> and 2 <sup>+</sup> cannot Be ruled out.	
7808.13 14			N		
7808.76 14			N		
7811.13 14			N		
7812.0 2	2 <sup>+</sup>		NO		
7812.9 2	1 <sup>-</sup>		N		
7817.75 15	2 <sup>+</sup>		NO		
7818.21 15			N		
7823.15 15			N		
7825 8	(10 <sup>-</sup> )		D	configuration= $\nu 1i_{11/2}\nu 2h_{9/2}^{-1}$ . J <sup>π</sup> : from a comparison of $\sigma(\theta)$ with DWBA calculations for the indicated pure particle-hole configuration, and agreement of the excitation energy with the calculated value (1990Fu07).	
7828.3 2	3 <sup>-</sup>		N		
7829.5 2	1 <sup>-</sup>		N		
7830.04 15			N		
7830.61 15			N		
7831.9 2	(1) <sup>+</sup>		N		
7832.5 2			N		
7837.1 2	(2) <sup>-</sup>		N		
7838.1 2	3 <sup>-</sup>		N		
7839.9 2			N		
7840.9 2			N		
7844.5 2			N		
7845 <sup>f</sup> 10	2 <sup>+</sup>		D G	XREF: Others: AE XREF: D(7840). J <sup>π</sup> : L(p,p')=2. $\Gamma$ =400 keV 50 from (p,p'). %EWSR=4.2 6 from (p,p').	
7846.8 2			N		
7852			P		
7858			P		
7869			P		
7872 6	(1 <sup>-</sup> ,2)		G	J <sup>π</sup> : from $\sigma$ and form factor in (e,e'). The authors preferred assignment is 2 <sup>+</sup> ; however, 1 <sup>-</sup> and 2 <sup>-</sup> cannot Be ruled out.	
7901.9 6	2 <sup>+</sup>		O		
7904.3 6	2 <sup>+</sup>		O		
7907.2 6	1 <sup>-</sup>		OP		
7913 3	1 <sup>(-)</sup>	≤0.48 fs	DE	XREF: D(7920). J <sup>π</sup> : J=1 from $\gamma(\theta)$ in ( $\gamma,\gamma'$ ). L(p,p')=(1).	

Adopted Levels, Gammas (continued)

<sup>208</sup>Pb Levels (continued)

E(level) <sup>†</sup>	J <sup>π</sup> <sup>‡</sup>	XREF		Comments
7913.8 6	2 <sup>+</sup>		OP	T <sub>1/2</sub> : from (γ,γ').
7918			P	
7924 3	2 <sup>-</sup>	G		J <sup>π</sup> : from σ and form factor in (e,e').
7961 3	(1 <sup>-</sup> ,3 <sup>-</sup> )	G		B(M2)≈20 in (e,e').
				J <sup>π</sup> : from σ and form factor in (e,e'). The authors preferred assignment is 3 <sup>-</sup> ; however, 1 <sup>-</sup> cannot be ruled out.
7965			P	
7967.5 2	3 <sup>-</sup>		N	
7968.5 2	0 <sup>+</sup>		N	
7970.0 2	(2) <sup>+</sup>		N	
7971.2 2	1 <sup>-</sup>		N P	
7974.04 19	(15 <sup>-</sup> ) <sup>@</sup>	J		
7974.2 2	1 <sup>+</sup>		N	
7977.7 2	2 <sup>-</sup>		N	
7978.8 2	(0 <sup>+</sup> ,1 <sup>+</sup> ,2 <sup>+</sup> )		N	
7980.9 2	1 <sup>-</sup>		NOP	
7981.7 2	(1,2) <sup>+</sup>		N	
7982.6 2	(1,2) <sup>+</sup>		N	
7987.3 2	2 <sup>-</sup>		N	
8001			P	
8008 3	2 <sup>-</sup>	D G		J <sup>π</sup> : from σ and form factor in (e,e').
				B(M2)≈11 in (e,e').
8008.2 7	2 <sup>+</sup>		OP	
8018	1 <sup>-</sup>		P	
8026.95 17	(14 <sup>-</sup> ) <sup>@</sup>	J		
8051.1 7	2 <sup>+</sup>		O	
8065			P	
8071.9 7	2 <sup>+</sup>		N	
8092			P	
8102	1 <sup>-</sup>		P	
8109.1 8	2 <sup>+</sup>		O	
8110 50	4 <sup>+</sup>	BCD		XREF: B(8100)C(8100).
				J <sup>π</sup> : L=4 in (α,α'), (d,d') and (p,p').
				Γ=400 keV 50 in (p,p'). %EWSR=3.0 15 in (p,p'), 2.5 in (α,α').
8144.5 8	2 <sup>+</sup>		OP	
8166 8	3 <sup>-</sup>	D		J <sup>π</sup> : L(p,p')=3.
8167.0 8	2 <sup>+</sup>		O	
8185			P	
8202			P	
8206			P	

**Adopted Levels, Gammas (continued)**

<sup>208</sup>Pb Levels (continued)

E(level) <sup>†</sup>	J <sup>π</sup> <sup>‡</sup>	XREF		Comments
8212	1 <sup>-</sup>		P	
8219.9 9	1		OP	
8220 <sup>f</sup>	(1 <sup>-</sup> )	D		J <sup>π</sup> : L(p,p')=(1).
8252			P	
8264			P	
8264.38 23		J		J <sup>π</sup> : γ to (14 <sup>-</sup> ).
8274	1 <sup>-</sup>		P	
8293			P	
8310			P	
8319	1 <sup>-</sup>		P	
8338			P	
8343			P	
8350 50	3 <sup>-</sup>	D		J <sup>π</sup> : L(p,p')=3. Γ=400 keV 50. %EWSR=4.0 12.
8350.79 19	(15 <sup>-</sup> ) <sup>@</sup>	J		
8358			P	
8365	1 <sup>-</sup>		P	
8369 8	12 <sup>+</sup>	D		configuration=ν1j <sub>15/2</sub> ν2h <sub>9/2</sub> <sup>-1</sup> . J <sup>π</sup> : from a comparison of σ(θ) with DWBA calculations for the indicated pure particle-hole configuration, and agreement of the excitation energy with the calculated value (1990Fu07).
8400 <sup>f</sup>		G		
8470	3 <sup>-</sup>	D		J <sup>π</sup> : L(p,p')=3.
8493 20			V	E(level): possibly corresponds to the 8470 level.
8520 20			V	
8562.94 24	(16 <sup>-</sup> ) <sup>@</sup>	J		
8620	2 <sup>+</sup>	D		J <sup>π</sup> : L(p,p')=2.
8723.50 23		J		J <sup>π</sup> : γ to 14 <sup>-</sup> .
8750	2 <sup>+</sup>	D		J <sup>π</sup> : L(p,p')=2.
8812.70 23	(14 <sup>-</sup> ,15,16 <sup>-</sup> )	J		J <sup>π</sup> : γ's to (14 <sup>-</sup> ) and (16 <sup>-</sup> ).
8860 50	2 <sup>+</sup>	D g		J <sup>π</sup> : L(p,p')=2. Γ=400 keV 50 in (p,p'). %EWSR=5.0 8 in (p,p').
8950	2 <sup>+</sup>	D g		J <sup>π</sup> : L(p,p')=2.
9061.2 3	(17 <sup>+</sup> ) <sup>@</sup>	J		
9103.1 3		J		J <sup>π</sup> : γ to (17 <sup>+</sup> ).
9180	3 <sup>-</sup>	D		J <sup>π</sup> : L(p,p')=3.
9340 50	2 <sup>+</sup>	D		J <sup>π</sup> : L(p,p')=2. Γ=400 keV 50. %EWSR=5.0 8.
9380	3 <sup>-</sup>	DE		XREF: E(9400).
9394.4 4		J		J <sup>π</sup> : L(p,p')=3.
9520	2 <sup>+</sup>	D G		J <sup>π</sup> : γ to 9103 which has a γ to (17 <sup>+</sup> ). XREF: G(9600).

Adopted Levels, Gammas (continued)

<sup>208</sup>Pb Levels (continued)

E(level) <sup>†</sup>	J <sup>π</sup> <sup>‡</sup>	XREF	Comments
10070 30	(1,2)	E G	J <sup>π</sup> : L(p,p')=2. XREF: E(10040). J <sup>π</sup> : from $\gamma(\theta)$ in ( $\gamma,\gamma'$ ) dipole excitation is dominant, but an L=2 contribution as large as 25% cannot Be excluded.
10136.8 5		J	J <sup>π</sup> : high spin, above the (17 <sup>+</sup> ) 9061 level.
10196.1 11		J	J <sup>π</sup> : high spin, above the (17 <sup>+</sup> ) 9061 level.
10342.0 11		J	J <sup>π</sup> : high spin, above the (17 <sup>+</sup> ) 9061 level.
10357.4 11		J	J <sup>π</sup> : high spin, above the (17 <sup>+</sup> ) 9061 level.
10372.2 11		J	J <sup>π</sup> : high spin, above the (17 <sup>+</sup> ) 9061 level.
10552.4 15		J	J <sup>π</sup> : high spin, above the (17 <sup>+</sup> ) 9061 level.
10600 40	(1,2)	CDE G	J <sup>π</sup> : L=2 in (d,d') and (p,p'); however, $\gamma(\theta)$ in ( $\gamma,\gamma'$ ) shows a dominant dipole contribution, but an L=2 contribution as large as 20% cannot Be ruled out.
10.9×10 <sup>3</sup> 3	2 <sup>+</sup>	BCD	XREF: Others: AE configuration: isoscalar giant quadrupole resonance. J <sup>π</sup> : L=2 in ( $\alpha,\alpha'$ ), (d,d'), and (p,p'). E(level): from ( $\alpha,\alpha'$ ). Others: 10500 200 (d,d'), 10600 200 (p,p'), $\Gamma=3.0$ 3 MeV, %EWSR=100 13 (2004Yo02). See ( $\alpha,\alpha'$ ) for other values and a discussion of possible higher L components. $\Gamma=2.0$ MeV 2 in (p,p').
11270	(1,2)	E	J <sup>π</sup> : $\gamma(\theta)$ gives a dominant dipole contribution, but an L=2 contribution as large as 25% cannot Be ruled out.
11361.0 15		J	J <sup>π</sup> : high spin, above the (17 <sup>+</sup> ) 9061 level.
11450	(1,2)	E	J <sup>π</sup> : $\gamma(\theta)$ gives a dominant dipole contribution, but an L=2 contribution as large as 15% cannot Be ruled out. $\Gamma<70$ keV.
11.60×10 <sup>3</sup> 10		E	$\Gamma=2.1$ MeV if E1. %EWSR=11.
11958.1 17		J	J <sup>π</sup> : high spin, above the (17 <sup>+</sup> ) 9061 level.
12250	4 <sup>+</sup>	B D	XREF: B(12500)D(12000). J <sup>π</sup> : L=4 in ( $\alpha,\alpha'$ ) and (p,p').
12949.6 17		J	$\Gamma=2.4$ MeV 2 in (p,p'), 3.6 MeV in ( $\alpha,\alpha'$ ). %EWSR=10 3 in (p,p') and 14 in ( $\alpha,\alpha'$ ).
13.5×10 <sup>3</sup> 1	1 <sup>-</sup>	B DE G P	J <sup>π</sup> : high spin, above the (17 <sup>+</sup> ) 9061 level. E(level): weighted average of 13300 300 (2004Yo02 in ( $\alpha,\alpha'$ )), 13500 100 in ( $\gamma,\gamma'$ ), and 13600 200 (e,e'). Others: 13000 100 (2004Uc01 in ( $\alpha,\alpha'$ )), 13600 (p,p'), and 13420 ( $\gamma,n$ ). configuration: low-energy component of the isoscalar giant dipole resonance (see ( $\alpha,\alpha'$ )). J <sup>π</sup> : from $\sigma$ and form factor in (e,e'). Confirming arguments are L=1 in ( $\alpha,\alpha'$ ) and (p,p'), and J=1 from $\gamma(\theta)$ in ( $\gamma,\gamma'$ ).
13675.0 20		J	$\Gamma=7.7$ 5 MeV (2004Yo02 in ( $\alpha,\alpha'$ )), 4.05 MeV (1970Ve03 in ( $\gamma,n$ )) and 3.7 MeV in ( $\gamma,\gamma'$ ).
13.96×10 <sup>3</sup> 20	0 <sup>+</sup>	BCD G	J <sup>π</sup> : high spin, above the (17 <sup>+</sup> ) 9061 level. E(level): from 2004Yo02 in ( $\alpha,\alpha'$ ). See ( $\alpha,\alpha'$ ) for other values ranging from 13000 to 13900. E=13500 300 in (d,d'), 13900 in (p,p'), and 14000 in (e,e'). configuration: isoscalar giant monopole resonance. L=0 is dominant; however, other components are required. See ( $\alpha,\alpha'$ ) for a discussion. From observation of a g.s. $\gamma$ branch in ( $\alpha,\alpha'\gamma$ ), 1989Po01 determine that not more than 12% 4 of the observed singles resonance $\sigma$ can Be due to isovector dipole

**Adopted Levels, Gammas (continued)**

<sup>208</sup>Pb Levels (continued)

E(level) <sup>†</sup>	J <sup>π</sup> <sup>‡</sup>	S	XREF	Comments
				excitation. Strong feeding of the 13/2 <sup>+</sup> level in <sup>207</sup> Pb from their (α,α'n) work, <a href="#">1984Ey01</a> conclude that there must be an L=6 component. This is corroborated by the ( <sup>17</sup> O, <sup>17</sup> O'n) work of <a href="#">1989Br03</a> .
16000	6 <sup>+</sup>		<b>B</b>	J <sup>π</sup> : L=0 in (α,α'), (d,d'), and (p,p'). See comment on configuration. Γ=2.88 MeV 20 ( <a href="#">2004Yo02</a> in (α,α')). See (α,α') for other values. %EWSR=99 15 ( <a href="#">2004Yo02</a> in (α,α')). See (α,α') for other values.
19.6×10 <sup>3</sup> 5	3 <sup>-</sup>		<b>B D</b>	J <sup>π</sup> : L(α,α')=6. Γ=2.9 MeV, %EWSR=15. E(level): from <a href="#">2004Yo02</a> in (α,α'). E=20500 1000 in ( <sup>3</sup> He, <sup>3</sup> He'). See (α,α') for other values. configuration: high-energy giant octupole resonance ( <a href="#">2004Yo02</a> , <a href="#">1997Da11</a> ). Γ=7.4 MeV 6 ( <a href="#">2004Yo02</a> in (α,α')). Others: 78 15 in ( <sup>3</sup> He, <sup>3</sup> He'). See also (α,α') for more values.
22.1×10 <sup>3</sup> 3	1 <sup>-</sup>		<b>B</b>	%EWSR=70 14 ( <a href="#">2004Yo02</a> in (α,α')). See (α,α') for other values. J <sup>π</sup> : L(α,α')=1. configuration: high-energy component of the isoscalar giant dipole resonance ( <a href="#">2004Yo02</a> and other references in (α,α')). E≈21500 reported by <a href="#">1983SeZX</a> in inelastic pion scattering (see (x,x')). They report that the forward angle strength is consistent with an isoscalar dipole resonance, but not with a quadrupole or octupole resonance.
23.94×10 <sup>3</sup> 20		120 40	<b>N T</b>	E(level): from <a href="#">2004Hu04</a> in (α,α'). See (α,α') for other values. Γ=3.8 MeV 8 ( <a href="#">2004Hu04</a> in (α,α')). See (α,α') for other values. EWSR=158 43 ( <a href="#">2004Hu04</a> in (α,α')). See (α,α') for other values. From α-proton and α-neutron coincidence work, <a href="#">2004Hu04</a> determine branching for direct proton decay to the 2s1/2 + 2d3/2 states and 1h11/2 + 2d5/2 final states in <sup>207</sup> Tl of 2.3% 11 and 1.2% 7, respectively. The value for direct neutron decay to final states in <sup>207</sup> Pb with excitation energies from 0 to 6 MeV is 23% 5.
24.48×10 <sup>3</sup> 20		120 40	<b>N T</b>	Γ=190 keV 40, (2J+1)Γ <sub>n0</sub> /Γ=0.6 2. Data are from <a href="#">1980Be52</a> in (n,X) who suggest that the resonance is the IAR of a possible 1 <sup>-</sup> level in <sup>208</sup> Tl predicted at ≈1500 by <a href="#">1970Do03</a> . See also (γ,p),(e,e'p) where E=24400 and the same interpretation is given.
26.9×10 <sup>3</sup> 2	2 <sup>+</sup>		<b>B</b>	Γ=190 keV 40, (2J+1)Γ <sub>n0</sub> /Γ=0.6 2. Data are from <a href="#">1980Be52</a> in (n,X) who suggest that the resonance is the IAR of a possible 1 <sup>-</sup> level in <sup>208</sup> Tl predicted at ≈2000 by <a href="#">1970Do03</a> . See also (γ,p),(e,e'p) where E=25000 and the same interpretation is given.
27200			<b>T</b>	J <sup>π</sup> : L(α,α')=2. Γ=6.0 13 MeV ( <a href="#">2004Hu04</a> , <a href="#">2003Hu13</a> in (α,α')). configuration: suggested as an overtone of the isoscalar giant quadrupole resonance ( <a href="#">2004Hu04</a> , <a href="#">2003Hu13</a> ). Interpreted by <a href="#">1975Sh12</a> , <a href="#">1975Sh13</a> as the IAR of a possible 2 <sup>+</sup> level in <sup>208</sup> Tl predicted at ≈2800 by <a href="#">1970Do03</a> .

# Adopted Levels, Gammas (continued)

## <sup>208</sup>Pb Levels (continued)

- <sup>†</sup> From a least-squares fit to the adopted E<sub>γ</sub> values. For levels with no observed deexciting gammas, the energies are weighted averages of values from all reactions. For levels above the neutron separation energy, the energies from the resonance data in (n,γ) E=resonance, (n,X), and (γ,n), have been calculated using S(n)=7367.87 5. In addition to the levels shown, a level at 9300 has been reported in <sup>204</sup>Hg(<sup>16</sup>O,<sup>12</sup>C). Levels in (t,p) are reported up to 8520; however, the resolution and the quoted uncertainties are such that it is not possible to make a unique correspondence with the Adopted Levels above 5000, except for the 0<sup>+</sup> level at 5241, and for the two highest levels at 8493 20 and 8520 20 which are not reported in other reactions. The same holds for the (p,t) reaction, which reports levels up to 6726, and the (t,α) reaction for levels above 4200.
- <sup>‡</sup> Assignments for levels above S(n), except where the argument is explicitly given, are from <sup>207</sup>Pb(n,X) based on transmission measurements, from <sup>207</sup>Pb(n,γ) E=resonance based on Γ<sub>γ0</sub>/Γ, or from <sup>208</sup>Pb(γ,n) based on neutron polarization measurements. See the source datasets for details. For some levels, where a single deexciting transition is known, this fact is stated in a J<sup>π</sup> comment even though the resulting J<sup>π</sup> range is too large to be useful in the J<sup>π</sup> field.
- # From (n,n'γ), except where noted otherwise.
- @ Based on γ decay pattern, available shell-model states, and shell-model calculations involving two-particle two-hole excitations using semi-empirical effective interactions (2004Br19, 2001Wr02, 1993Sc08).
- & In the <sup>207</sup>Pb(d,pγ), <sup>209</sup>Bi(t,αγ) dataset, based on data from (t,αγ), two levels are proposed at around 5380, one at 5380.6 8 deexciting via a 2766.1 8 transition, and one at 5383.7 11 deexciting via a 1387.8 10 transition. In (n,n'γ) a single level is proposed deexciting via 1387.37 3 and 2768.31 5 transitions, giving E(level)=5382.81 3 and 5382.83 5, respectively. There are two levels at about this energy in (d,<sup>3</sup>He), so the evaluator adopts the two-level proposal from the (t,αγ) work. The discrepancy in the energy of the 2766γ should be noted, and it is of course possible that the (n,n'γ) 2768γ is a different transition and that the 5380.6 level is not populated in (n,n'γ).
- <sup>a</sup> There is a single level at 5491 proposed in (d,pγ), (n,n'γ), and (p,p'γ); however, the branchings are not consistent. I<sub>γ</sub>(1571γ)/I<sub>γ</sub>(2293γ) in (d,pγ) and (n,n'γ) agree, but I<sub>γ</sub>(1107γ)/I<sub>γ</sub>(2293γ) and I<sub>γ</sub>(1781γ)/I<sub>γ</sub>(2293γ) are both a factor of 4-5 higher in (d,pγ) than in (n,n'γ), and only the 2293γ is reported in (p,p'γ). The branchings from all three reactions can be reconciled if two levels are proposed. The evaluator has thus proposed a doublet with transitions divided as shown in adopted gammas. For the 5491.53 level one has I<sub>γ</sub>(1571γ)/I<sub>γ</sub>(2293γ)=0.38 4 in (n,n'γ) and 0.48 +19-14 in (d,pγ). For the 5490.34 level one has I<sub>γ</sub>(1107γ):I<sub>γ</sub>(1529γ):I<sub>γ</sub>(1781γ)=100 12:85 9:94 9 in (n,n'γ), and 100 16:91 16:84 18 in (d,pγ). The 1193, 1283, and 1365γ's are multiplets in (n,n'γ) and the intensity of each of these transitions can be divided such that the branchings for each placement are consistent with the (d,pγ) results. Both levels deexcite to levels with J<sup>π</sup>=5<sup>-</sup> and 6<sup>-</sup>, suggesting J<sup>π</sup>=4<sup>-</sup>, 5, 6, or 7<sup>-</sup>. In addition to the γ reactions, the (d,p) reaction reports E=5491.9 6 with a γ<sub>7/2</sub> transfer, giving J<sup>π</sup>=4<sup>-</sup> for one or both levels, the 3<sup>-</sup> alternative being ruled out by the γ decay modes. In (d,<sup>3</sup>He) a level at 5487 2 is reported, with L=2. The authors state that the strength requires J<sup>π</sup>=6<sup>-</sup> given J<sup>π</sup>=7<sup>-</sup> for their 5541 2 level. A 5490 2 level is reported in (α,α') so there must also be a natural parity level in the region of E=5490.
- <sup>b</sup> J<sup>π</sup>=3<sup>-</sup> from σ and form factor in (e,e') for E=6343 10.
- <sup>c</sup> In (d,pγ) there is a level with E=6534 5 deexciting via a single transition with E<sub>γ</sub>=3920 5 to a 3<sup>-</sup> level.
- <sup>d</sup> J<sup>π</sup>=1<sup>-</sup> or, less likely, 2<sup>-</sup> or 3<sup>-</sup> for a peak at 6701 9 in (e,e').
- <sup>e</sup> Levels with E=6861.4 6 and 6868.0 6 are reported in (p,p') with no spectroscopic information, and levels with E=6859, J<sup>π</sup>=9<sup>-</sup> and 6865, J<sup>π</sup>=10<sup>-</sup> are reported in (e,e'). The evaluator assigns two levels; however, it is possible that the two reactions are exciting different levels.
- <sup>f</sup> This level may correspond to one or more of the close-lying levels determined in the higher-resolution resonance work.
- <sup>g</sup> From 2006He21 in (p,p') from a study of excitations via IAR in <sup>209</sup>Bi. The assignments are based on a comparison of the experimental σ(θ) values and cross-sections with calculations based on the schematic shell model. The cross-sections are averaged values for the members of the ν1i<sub>11/2</sub>ν2f<sub>5/2</sub><sup>-1</sup> multiplet and for members of the ν1i<sub>11/2</sub>ν3p<sub>3/2</sub><sup>-1</sup> multiplet. The same arguments hold for the 5686, 5695 and 5835 levels which have configuration=ν2g<sub>9/2</sub>ν2f<sub>7/2</sub><sup>-1</sup>. Additional arguments are given.
- <sup>h</sup> From a comparison of the branchings in (n,n'γ) and (d,pγ), the evaluator proposes two levels at 5074. The 5074.803 is seen in (n,n'γ) and the 5075.78 in (n,n'γ) and (d,pγ). The (d,p) level at 5074.8 4 presumably corresponds to the (d,pγ) level. The (p,p') level at 5074.7 5 could correspond to either or both members of the

**Adopted Levels, Gammas (continued)**

<sup>208</sup>Pb Levels (continued)

doublet. [2006He21](#) determine  $J^\pi=5^-$  with configuration= $\nu 1i_{11/2}\nu 3p_{3/2}^{-1}$  for the (p,p') level. See the comment on, for example, the 5080 level, for the  $J^\pi$  assignment.

<sup>i</sup> L(d,<sup>3</sup>He)=5 for E=5191 5 gives configuration= $\pi 1h_{9/2}\pi 1h_{11/2}^{-1}$  for the 5193.4 and 5195.37 levels. L(d,<sup>3</sup>He)=5 for E=5210 5 gives configuration= $\pi 1h_{9/2}\pi 1h_{11/2}^{-1}$  for the 5213.007 and 5216.214 levels. A comparison of the spectroscopic factor for these (d,<sup>3</sup>He) peaks with those for the resolved (t, $\alpha\gamma$ ) peaks shows that in each case both levels are being populated in (d,<sup>3</sup>He). From the observed  $\gamma$  decay modes and the spectroscopic factors in (t, $\alpha\gamma$ ), [1997Sc21](#) assign the  $J^\pi$  values as shown. The evaluator adopts these assignments.

<sup>j</sup> L(d,<sup>3</sup>He)=5 for E=5084 2 gives configuration= $\pi 1h_{9/2}\pi 1h_{11/2}^{-1}$  for the 5085.47 and/or 5087.9 levels.

<sup>k</sup> L(p,p')=3, with E=5321 4, suggesting  $J^\pi=3^-$  for the 5317.041, 5317.2, or 5326.7 levels. L(d,<sup>3</sup>He)=5 for 5314 3 gives  $\pi=+$  for one or both members of the 5317 doublet. In the (d,p $\gamma$ ),(t, $\alpha\gamma$ ) work, the 5317.041 level is seen only in (t, $\alpha\gamma$ ) and the 5317.2 level only in (d,p $\gamma$ ). The evaluator assumes that the (t, $\alpha\gamma$ ) and (d,<sup>3</sup>He) works are populating the same level, thus  $\pi=+$  for the 5317.041 level. The 5326.7 level resonates strongly at the  $\nu 1j_{15/2}$  resonance in (p,p') and thus has  $\pi=+$ , given the available negative parity neutron hole states. This leaves the 5317.7 level as the possible candidate for  $J^\pi=3^-$ .

<sup>l</sup> L(d,<sup>3</sup>He)=2 and thus configuration= $\pi 1h_{9/2}\pi 2d_{5/2}^{-1}$  for E=5581 6.

<sup>m</sup> L(d,<sup>3</sup>He)=2 and thus configuration= $\pi 1h_{9/2}\pi 2d_{5/2}^{-1}$  for E=5665 5.

<sup>n</sup> L(d,<sup>3</sup>He)=2 and thus configuration= $\pi 1h_{9/2}\pi 2d_{5/2}^{-1}$  for E=5680 6.

<sup>o</sup> L(d,<sup>3</sup>He)=2 and thus configuration= $\pi 1h_{9/2}\pi 2d_{5/2}^{-1}$  for E=6249 7.

<sup>p</sup> E(p,p' $\gamma$ )=6394.5 30 deexciting via E $\gamma$ =2432.8 30, and E(e,e')=6403 10 with  $J^\pi=3^-$ , established by  $\sigma$  and form factor, could correspond to either the 6389.6 5 or 6397.1 15 levels.

<sup>q</sup> A level at 5481 is proposed in (n,n' $\gamma$ ) deexciting via a 1356 $\gamma$  and a 2867 $\gamma$ . The 2867 $\gamma$  is seen in (d,p $\gamma$ ) but the 1356 $\gamma$  is not reported. The 1356 $\gamma$  is seen in (p,p' $\gamma$ ) but the 2867 $\gamma$  is not reported. It is possible that there are two levels, one seen in (n,n' $\gamma$ ) and (p,p' $\gamma$ ), and the other in (n,n' $\gamma$ ) and (d,p $\gamma$ ).

## Adopted Levels, Gammas (continued)

$\gamma(^{208}\text{Pb})$									
$E_i(\text{level})$	$J_i^\pi$	$E_\gamma$	$I_\gamma$	$E_f$	$J_f^\pi$	Mult.#	$\delta^\#$	$\alpha^@$	Comments
2614.522	3 <sup>-</sup>	2614.511 10		0	0 <sup>+</sup>	E3		0.00247	B(E3)(W.u.)=33.8 6 $\alpha$ : value shown is made up of $\alpha=0.00210$ and $\alpha(\text{IPF})=0.00037$ .
3197.711	5 <sup>-</sup>	583.187 2		2614.522	3 <sup>-</sup>	E2		0.0205	B(E2)(W.u.)=0.382 20 Mult.: from $\gamma\gamma(\theta)$ in $\beta^-$ decay and $T_{1/2}$ .
3475.078	4 <sup>-</sup>	277.371 5	50.8 8	3197.711	5 <sup>-</sup>	M1+E2	+0.017 11	0.533	B(M1)(W.u.)=0.07 +22-3; B(E2)(W.u.)=0.10 +35-10 $E_\gamma$ : from $E_\gamma(860\gamma)=E_\gamma(277\gamma)+E_\gamma(583\gamma)$ , with recoil corrections taken into account. Mult.: from $\beta^-$ decay. $\delta$ : weighted average of +0.008 11 from $\beta^-$ decay, and +0.052 45 and +0.038 20 from (n,n' $\gamma$ ) +0.038 20 (1990Go33) in (n,n' $\gamma$ ).
		860.557 4	100	2614.522	3 <sup>-</sup>	M1+E2	+0.014 8	0.0264	B(M1)(W.u.)=0.005 +33-2; B(E2)(W.u.)=0.0005 +15-4 Mult.: from $\beta^-$ decay. $\delta$ : from $\beta^-$ decay. Others: -0.021 21 (2005YaZW) and +0.015 18 (1990Go33) in (n,n' $\gamma$ ).
3708.451	5 <sup>-</sup>	233.33 6 510.74 5	1.36 9 100.0 13	3475.078 4 <sup>-</sup> 3197.711 5 <sup>-</sup>	4 <sup>-</sup> 5 <sup>-</sup>	M1+E2 M1+E2	$\approx 0.6$ -0.052 45	$\approx 0.70$ 0.1027 16	Mult., $\delta$ : from $\beta^-$ decay. Mult., $\delta$ : from $\beta^-$ decay. See discussion in $\beta^-$ decay of the alternate $\delta$ solution of $\approx -0.6$ .
3919.966	6 <sup>-</sup>	1093.95 24 211.51 2	1.75 13 82 5	2614.522 3 <sup>-</sup> 3708.451 5 <sup>-</sup>	3 <sup>-</sup> 5 <sup>-</sup>	[E2] M1(+E2)	+0.04 +7-6	1.126 16	$\delta$ : $\delta(\text{O/Q})=-0.01$ 13. B(M1)(W.u.)<1.0; B(E2)(W.u.)<94 Mult.: from $\beta^-$ decay.
		722.252 8	100	3197.711	5 <sup>-</sup>	M1+E2	+0.31 7	0.0390 12	B(M1)(W.u.)<0.029; B(E2)(W.u.)<2.5 Mult.: from $\beta^-$ decay. $\delta$ : from $\beta^-$ decay. Other:+0.61 +7-6 and +0.65 9 from (n,n' $\gamma$ ).
3946.578	4 <sup>-</sup>	238.22 3	25.3 18	3708.451	5 <sup>-</sup>	[M1+E2]	-0.06 6		B(M1)(W.u.)<0.61; B(E2)(W.u.)<40 $\delta$ : from 1990Go33 in (n,n' $\gamma$ ). Other: +0.05 14 (2005YaZW) in (n,n' $\gamma$ ).
		471.498 14 748.845 12	26.3 19 100 7	3475.078 4 <sup>-</sup> 3197.711 5 <sup>-</sup>	4 <sup>-</sup> 5 <sup>-</sup>	[M1+E2] [M1+E2]		0.125 2 0.0377 1	$\delta$ : -0.06 +17-14 or +0.9 +3-12. B(M1)(W.u.)<0.077; B(E2)(W.u.)<0.42
3961.162	5 <sup>-</sup>	252.755 12 485.95 15 763.429 9	38.3 22 2.5 3 100 3	3708.451 5 <sup>-</sup> 3475.078 4 <sup>-</sup> 3197.711 5 <sup>-</sup>	5 <sup>-</sup> 4 <sup>-</sup> 5 <sup>-</sup>	M1+E2 M1+E2	-0.35 10 -0.12 5	0.633 27 0.0356 6	Mult.: from $\beta^-$ decay. $\delta$ : weighted average of -0.01 6 and -0.16 +9-8 from $\beta^-$ decay, and -0.13 7 and -0.21 +5-6 from (n,n' $\gamma$ ).
3995.438	4 <sup>-</sup>	797.741 10	29.7 12	3197.711	5 <sup>-</sup>	[M1+E2]	+0.34 5	0.0299 5	B(M1)(W.u.)<0.013; B(E2)(W.u.)<1.0 $\delta$ : the large solution is +4.4 9, an unlikely alternative.
		1380.889 12	100	2614.522	3 <sup>-</sup>	[M1(+E2)]	+0.000 +31-21	0.0079	B(M1)(W.u.)<0.0092 $\delta$ : the large solution is -6.7 +8-12, an unlikely alternative. Other: +0.057 16 (1990Go33).
4037.443	7 <sup>-</sup>	117.53 13	11 3	3919.966	6 <sup>-</sup>	[M1,E2]		4.6 13	

**Adopted Levels, Gammas (continued)**

$\gamma(^{208}\text{Pb})$  (continued)

$E_i(\text{level})$	$J_i^\pi$	$E_\gamma$	$I_\gamma$	$E_f$	$J_f^\pi$	Mult.#	$\delta^\#$	$\alpha^@$	Comments
4037.443	7 <sup>-</sup>	839.734 9	100	3197.711	5 <sup>-</sup>	[E2]		0.0094	B(E2)(W.u.)<17 Mult.: $\delta(\text{M3/E2})=+0.010 +21-31$ .
4051.134	3 <sup>-</sup>	576.057 13	17.2 17	3475.078	4 <sup>-</sup>				
		1436.602 12	100	2614.522	3 <sup>-</sup>	[M1+E2]			$\delta$ : +1.7 +3-2 or -0.12 +7-6. Other: -0.05 5 (1990Go33).
4085.52	2 <sup>+</sup>	1471.5 4	0.46 15	2614.522	3 <sup>-</sup>	[E1]		0.00143	B(E1)(W.u.)=0.00035 12
		4085.47 4	100	0	0 <sup>+</sup>	[E2]		0.00165	B(E2)(W.u.)=8.4 5
4125.347	5 <sup>-</sup>	164.34 20	4.9 7	3961.162	5 <sup>-</sup>	[M1,E2]		1.6 7	
		179.5 6	0.92 26	3946.578	4 <sup>-</sup>	[M1,E2]		1.2 6	
		416.79 6	5.0 9	3708.451	5 <sup>-</sup>	[M1+E2]	+0.1 +8-4	0.15 3	B(M1)(W.u.)<0.025; B(E2)(W.u.)<7.2
		650.207 14	25.3 13	3475.078	4 <sup>-</sup>	[M1+E2]		0.035 20	$\delta$ : -0.05 3 or -5.5 +8-12. Other: -0.04 4 or -6.0 +18-11 (1990Go33).
		927.650 8	100.0 25	3197.711	5 <sup>-</sup>	[M1+E2]		0.018 3	$\delta$ : -0.15 5 or +0.90 +10-14. Other: -0.06 6 or +0.90 13 (1990Go33).
4180.414	5 <sup>-</sup>	705.33 2	10.7 20	3475.078	4 <sup>-</sup>	[M1+E2]			$\delta$ : -0.04 7 or -6.3 +16-37.
		982.709 10	100	3197.711	5 <sup>-</sup>	[M1+E2]			$\delta$ : -0.13 +6-5 or +0.86 +14-13. Other: +0.15 15 (1990Go33).
4206.277	6 <sup>-</sup>	497.90 4	20.6 24	3708.451	5 <sup>-</sup>	[M1+E2]			$\delta$ : +0.03 10 or -9 +4-85.
		1008.558 10	100	3197.711	5 <sup>-</sup>	[M1+E2]			$\delta$ : +0.18 +2-1 or +8.6 +14-7. Other: +0.195 15 (1990Go33).
4229.590	2 <sup>-</sup>	1615.068 15	100	2614.522	3 <sup>-</sup>	[M1+E2]	+0.18 +9-10	0.00536 8	B(M1)(W.u.)=0.0125 12; B(E2)(W.u.)=0.05 6 Mult.: the large solution is <-11, >+10, an unlikely alternative. Other: +0.04 3 or -7.8 +29-16 (1990Go33).
		4229.49 9	21.4 21	0	0 <sup>+</sup>	M2		0.00235	B(M2)(W.u.)=0.34 5 Mult.: from (d,py).
4254.795	3 <sup>-</sup>	779.2& 4	5.50 6	3475.078	4 <sup>-</sup>				
		1640.267 15	100	2614.522	3 <sup>-</sup>	[M1+E2]			$\delta$ : -0.21 +5-6 or +2.2 +4-3. Other: -0.11 5 (1990Go33).
4261.871	4 <sup>-</sup>	553.414 8	49 4	3708.451	5 <sup>-</sup>	[M1+E2]			$\delta$ : +0.03 4 or -15 +5-32. Other: +0.02 6 (1990Go33).
		786.79& 2	58 2	3475.078	4 <sup>-</sup>	[M1+E2]			$\delta$ : -0.17 8 or +1.3 +3-2. $E_\gamma$ : rounded-off value from the level energies. The level energy difference gives $E_\gamma=786.791$ 17 (recoil corrected). The value of 786.891 10 given in the source dataset, and placed from this level, may be a misprint.
		1064.15 2	4.4 6	3197.711	5 <sup>-</sup>	[M1+E2]			$\delta$ : -0.40 +10-14 or -1.9 +5-4. Other: +0.02 3 (1990Go33).
		1647.38 2	100 4	2614.522	3 <sup>-</sup>	[M1+E2]			$\delta$ : +0.021 +21-31 or -7.2 +13-14.
4296.560	5 <sup>-</sup>	171.00 20	5.3 14	4125.347	5 <sup>-</sup>	[M1,E2]		1.4 6	
		588.096 6	100 3	3708.451	5 <sup>-</sup>	[M1+E2]	-0.18 +9-8	0.0694 19	B(M1)(W.u.)=0.268 9; B(E2)(W.u.)=9 9 $\delta$ : other: -0.02 18 or +0.8 +3-6 (1990Go33).
		821.540 13	63 3	3475.078	4 <sup>-</sup>	[M1+E2]		0.020 10	$\delta$ : -0.10 4 or -4.2 7. Other: -0.11 4 (1990Go33).
		1098.85 4	10.8 21	3197.711	5 <sup>-</sup>	[M1,E2]		0.010 4	
4323.946	4 <sup>+</sup>	362.81 7	14.8 12	3961.162	5 <sup>-</sup>	[E1]		0.0191	B(E1)(W.u.)=4.2×10 <sup>-5</sup> +8-7
		848.88 4	2.42 4	3475.078	4 <sup>-</sup>	[E1]		0.00338	B(E1)(W.u.)=5.4×10 <sup>-7</sup> +9-8
		1126.236 13	100 3	3197.711	5 <sup>-</sup>	[E1+M2]	+0.042 21	0.02077 6	B(E1)(W.u.)=9.558×10 <sup>-6</sup> 17; B(M2)(W.u.)=0.06 6 $\delta$ : other: +0.003 18 (1990Go33).

## Adopted Levels, Gammas (continued)

$\gamma(^{208}\text{Pb})$ (continued)									
$E_i(\text{level})$	$J_i^\pi$	$E_\gamma$	$I_\gamma$	$E_f$	$J_f^\pi$	Mult. #	$\delta^\#$	$\alpha^@$	Comments
4323.946	4 <sup>+</sup>	1709.6 2	0.51 8	2614.522	3 <sup>-</sup>	[E2]		0.00258	B(E2)(W.u.)=0.00019 +5-4
		4324.3 4	0.31 4	0	0 <sup>+</sup>	[E4]		0.00121	B(E4)(W.u.)=18 1
4358.670	4 <sup>-</sup>	178.5 5	2.1 11	4180.414	5 <sup>-</sup>				
		362.8 5	2.8 7	3995.438	4 <sup>-</sup>				
		883.605 9	100 5	3475.078	4 <sup>-</sup>	[M1+E2]			$\delta$ : -0.22 +6-7 or +1.4 +3-2.
		1160.90 2	38 3	3197.711	5 <sup>-</sup>	[M1+E2]			$\delta$ : +0.19 +6-5 or +10 +13-3. Other: +0.30 10 or +5.2 +46-20 (1990Go33).
		1744.12 2	15.5 13	2614.522	3 <sup>-</sup>	[M1+E2]			$\delta$ : +0.04 +7-6 or -9 +3-10.
4383.285	6 <sup>-</sup>	176.8 5	0.85 25	4206.277	6 <sup>-</sup>				
		257.7 5	0.67 25	4125.347	5 <sup>-</sup>				
		463.30 10	4.1 7	3919.966	6 <sup>-</sup>	[M1+E2]	-0.69 +15-19		B(M1)(W.u.)<0.0096; B(E2)(W.u.)<8.5
		1185.571 13	100 11	3197.711	5 <sup>-</sup>	[M1+E2]			$\delta$ : +0.031 +22-10 or -15 +4-8. Other: +0.063 24 (1990Go33).
4423.647	6 <sup>+</sup>	715.23 2	8.6 11	3708.451	5 <sup>-</sup>	[E1+M2]			$\delta$ : -0.05 7.
		1225.916 13	100	3197.711	5 <sup>-</sup>	[E1+M2]			$\delta$ : -0.010 +20-11. Other: +0.030 17 (1990Go33).
4480.746	6 <sup>-</sup>	771.6 4	8.7 18	3708.451	5 <sup>-</sup>	[M1+E2]			$\delta$ : +0.22 +7-6 or +5.2 +34-14.
		1283.031 12	100	3197.711	5 <sup>-</sup>	[M1+E2]			$\delta$ : +0.031 +11-21 or -19 +6-12. Other: +0.05 3 (1990Go33).
4610.748	8 <sup>+</sup>	573.41 8	3.1 6	4037.443	7 <sup>-</sup>	[E1+M2]	+0.15 +30-26	0.024 17	B(E1)(W.u.)=9.3×10 <sup>-9</sup> 25; B(M2)(W.u.)=0.003 +12-3
		1413.026 13	100	3197.711	5 <sup>-</sup>	[E3]		0.00728	B(E3)(W.u.)=12.6 20
4680.266	7 <sup>-</sup>	473.98 5	40 11	4206.277	6 <sup>-</sup>	[M1+E2]			$\delta$ : +0.27 +10-9 or +5.2 +43-19.
		760.30 2	100	3919.966	6 <sup>-</sup>	[M1+E2]			$\delta$ : +0.19 +4-3 or +5.2 +15-12.
4698.323	3 <sup>-</sup>	436.41 10	7.9 13	4261.871	4 <sup>-</sup>	[M1,E2]		0.10 6	
		443.57 8	41.2 20	4254.795	3 <sup>-</sup>	[M1+E2]	-0.13 +16-14	0.146 4	B(M1)(W.u.)=0.297 13; B(E2)(W.u.)=9 +22-9
		468.76 7	10.0 9	4229.590	2 <sup>-</sup>	[M1,E2]		0.08 4	
		612.88 15	1.7 5	4085.52	2 <sup>+</sup>	[E1]		0.00632	B(E1)(W.u.)=4.1×10 <sup>-5</sup> +15-18
		647.25 9	4.3 9	4051.134	3 <sup>-</sup>	[M1,E2]		0.036 20	
		702.86 14	4.1 6	3995.438	4 <sup>-</sup>	[M1,E2]		0.029 15	
		1223.27 2	100 5	3475.078	4 <sup>-</sup>	[M1+E2]		0.008 3	$\delta$ : +0.07 +7-6 or <-8.6, >+47. Other: 0.00 9 (1990Go33).
		1500.49 3	38 4	3197.711	5 <sup>-</sup>	[E2]		0.00316	B(E2)(W.u.)=1.1 +3-4
		2083.90 4	27 3	2614.522	3 <sup>-</sup>	[M1,E2]		0.0026 6	
		4697.88 14	4.4 6	0	0 <sup>+</sup>	[E3]		0.00174	B(E3)(W.u.)=1.2 +3-5
4708.727	5 <sup>-</sup>	412.17 4	21 5	4296.560	5 <sup>-</sup>	[M1,E2]		0.12 7	
		714.0 10	12 6	3995.438	4 <sup>-</sup>	[M1,E2]		0.028 15	
		748.3 5	67 8	3961.162	5 <sup>-</sup>	[M1,E2]		0.025 13	
		1000.51 12	100 7	3708.451	5 <sup>-</sup>	[M1+E2]	-0.19 +7-8	0.0175 3	B(M1)(W.u.)=0.0332 9; B(E2)(W.u.)=0.4 3
		1511.00 2	60 4	3197.711	5 <sup>-</sup>	[M1+E2]		0.0048 16	$\delta$ : -0.32 +10-11 or +1.2 +4-2.
4711.817	4 <sup>-</sup>	1236.79 4	29 4	3475.078	4 <sup>-</sup>	[M1+E2]			$\delta$ : -0.41 15 or -1.9 +11-6.
		2097.27 2	100	2614.522	3 <sup>-</sup>	[M1+E2]			$\delta$ : +0.11 +3-4 or -23 +10-71.
4761.956	6 <sup>-</sup>	555.63 6	15 4	4206.277	6 <sup>-</sup>				
		636.57 3	25 5	4125.347	5 <sup>-</sup>				
		1564.29 3	100 9	3197.711	5 <sup>-</sup>				
4841.60	1 <sup>-</sup>	4841.46 12		0	0 <sup>+</sup>	[E1]			B(E1)(W.u.)=0.021 3 $I_\gamma$ : $\Gamma_{\gamma 0}/\Gamma=0.85 +139$ from $(\gamma,\gamma')$ .

**Adopted Levels, Gammas (continued)**

$\gamma(^{208}\text{Pb})$  (continued)

$E_i(\text{level})$	$J_i^\pi$	$E_\gamma$	$I_\gamma$	$E_f$	$J_f^\pi$	Mult. #	$\delta^\#$	$\alpha^@$	Comments
4860.78	8 <sup>+</sup>	250.00 9	100	4610.748	8 <sup>+</sup>				
		823.28 11	34 6	4037.443	7 <sup>-</sup>				
4867.91	7 <sup>+</sup>	257.06 5	100 15	4610.748	8 <sup>+</sup>				
		386.7 3	26 13	4480.746	6 <sup>-</sup>	[M1+E2]			$\delta$ : +0.13 +5-6 or +11 +20-4.
		444.15 10	73 15	4423.647	6 <sup>+</sup>				
		484.6 3	14 5	4383.285	6 <sup>-</sup>				
4868.35	0 <sup>+</sup>	830.55 4	38 6	4037.443	7 <sup>-</sup>	[M1+E2]			$\delta$ : -0.40 +36-29 or +1.0 5.
		782.83 2		4085.52	2 <sup>+</sup>				
4895.23	10 <sup>+</sup>	4870 3		0	0 <sup>+</sup>	E0			Mult.: from (p,p'γ).
		34.4	0.041 14	4860.78	8 <sup>+</sup>	[E2]		1003	B(E2)(W.u.)=0.08 3
									Eγ: not observed. Eγ is rounded-off from the level energies. See (x,x'γ) for a discussion of this transition.
		284.49 5	100 8	4610.748	8 <sup>+</sup>	[E2]		0.136	B(E2)(W.u.)=0.0047 8
		857.71 10	20 4	4037.443	7 <sup>-</sup>	[E3]		0.0223	B(E3)(W.u.)=0.32 8
4911.343	4	964.56 6	11.7 17	3946.578	4 <sup>-</sup>				
		1713.62 4	32.8 24	3197.711	5 <sup>-</sup>	[M1+E2]			$\delta$ : -0.29 +10-5 or -2.7 +6-10.
		2296.83 2	100 5	2614.522	3 <sup>-</sup>	[M1+E2]			$\delta$ : -0.08 +4-5 or -4.7 +9-12.
4937.19	3 <sup>-</sup>	2322.65 3	100	2614.522	3 <sup>-</sup>	[M1+E2]			$\delta$ : -0.2 1 or +2.1 +7-6. Other: +0.3 +10-3 (1990Go33).
		4937.19 & 4	7 1	0	0 <sup>+</sup>	[E3]			B(E3)(W.u.)=25 +6-25
									Eγ: from the level energies. Reported only in (p,p'γ) where the energies for the two transitions from this level are given as 2320.6 2 and 4934.7 1.
4953.302	3 <sup>-</sup>	2338.765 14		2614.522	3 <sup>-</sup>	[M1+E2]			$\delta$ : -0.13 11 or +2.0 +7-5 (1990Go33).
4962.428	4 <sup>(-),5(+)</sup>	638.48 2	43 8	4323.946	4 <sup>+</sup>				
		1764.71 3	100	3197.711	5 <sup>-</sup>	[M1+E2]	+0.78 +22-32		B(M1)(W.u.)<0.0048; B(E2)(W.u.)<0.37
4973.918	3 <sup>-</sup>	275.72 24	1.4 6	4698.323	3 <sup>-</sup>	[M1,E2]		0.34 20	
		615.7 5	1.6 5	4358.670	4 <sup>-</sup>	[M1,E2]		0.041 22	
		712.13 25	2.9 6	4261.871	4 <sup>-</sup>	[M1,E2]		0.028 15	
		719.19 4	17.0 10	4254.795	3 <sup>-</sup>	[M1,E2]		0.028 14	
		1265.0 6	3.2 11	3708.451	5 <sup>-</sup>	[E2]		0.00427	B(E2)(W.u.)=0.19 7
		1499.10 10	18.0 10	3475.078	4 <sup>-</sup>	[M1,E2]		0.0048 17	
		1776.10 5	98 3	3197.711	5 <sup>-</sup>	[E2]		0.00244	B(E2)(W.u.)=1.05 14
		2359.39 2	100 4	2614.522	3 <sup>-</sup>	[M1+E2]		0.0022 5	$\delta$ : -0.13 +10-8 or +1.8 +5-4.
		4974.1 6	1.1 4	0	0 <sup>+</sup>	[E3]		0.00060	B(E3)(W.u.)=0.17 7
5010.43	9 <sup>+</sup>	399.60 17		4610.748	8 <sup>+</sup>				
5037.536	3 <sup>-</sup>	808.04 6	4.8 9	4229.590	2 <sup>-</sup>				
		986.39 7	4.0 5	4051.134	3 <sup>-</sup>				
		1562.32 10	7.5 5	3475.078	4 <sup>-</sup>				

**Adopted Levels, Gammas (continued)**

$\gamma(^{208}\text{Pb})$  (continued)

$E_i(\text{level})$	$J_i^\pi$	$E_\gamma$	$I_\gamma$	$E_f$	$J_f^\pi$	Mult.#	$\delta^\#$	$\alpha^@$	Comments
5037.536	3 <sup>-</sup>	2422.997 15	100 4	2614.522	3 <sup>-</sup>	[M1+E2]			$\delta$ : +0.9 +20-3 or +1.8 +10-12.
		5037.4 7	1.20 15	0	0 <sup>+</sup>	[E3]			B(E3)(W.u.)=0.65 10
5069.31	10 <sup>+</sup>	174.13 9		4895.23	10 <sup>+</sup>	M1(+E2)	<0.6	1.78 17	$E_\gamma$ : from the level energies.
5074.81		868.53 6	57 7	4206.277	6 <sup>-</sup>				
		894.45 3	79 11	4180.414	5 <sup>-</sup>				
		1113.57 3	100 14	3961.162	5 <sup>-</sup>				
5075.78		1367.0 10		3708.451	5 <sup>-</sup>				
5079.912	6 <sup>-</sup>	873.635 15	100	4206.277	6 <sup>-</sup>				
		1882.09 10	14.7 22	3197.711	5 <sup>-</sup>				
5085.470	7 <sup>-</sup>	702.1 10	13 5	4383.285	6 <sup>-</sup>				
		879.19 2	100	4206.277	6 <sup>-</sup>	[M1+E2]			$\delta$ : +0.03 +4-3 or -19 +9-75.
5092.99	8 <sup>+</sup>	232.2 3	7.6 18	4860.78	8 <sup>+</sup>				
		482.24 2	100	4610.748	8 <sup>+</sup>				
5127.356	2 <sup>-</sup> ,3 <sup>-</sup>	1652.18 17	6.6 8	3475.078	4 <sup>-</sup>				
		2512.818 12	100 4	2614.522	3 <sup>-</sup>	[M1+E2]	+1.3 +9-6		B(M1)(W.u.)=0.007 7; B(E2)(W.u.)=0.7 4
		5127.5 2	7.5 8	0	0 <sup>+</sup>	[M2,E3]			$I_\gamma$ : from (d,py). Note, however, that $I_\gamma/I_\gamma(2513\gamma)$ =0.177 13 in (n,n' $\gamma$ ) and 0.14 1 in (d,py). B(M2)(W.u.)=0.26 3 if $J^\pi$ =2 <sup>-</sup> , and B(E3)(W.u.)=5.2 6 if $J^\pi$ =3 <sup>-</sup> .
5162.05	9 <sup>+</sup>	151.50 20	47 5	5010.43	9 <sup>+</sup>				
		266.70 20	17 3	4895.23	10 <sup>+</sup>				
		301.25 10	22 3	4860.78	8 <sup>+</sup>				
		551.32 5	100 8	4610.748	8 <sup>+</sup>				
5193.428	5 <sup>+</sup>	769.78 2	100 13	4423.647	6 <sup>+</sup>				
		869.43 20	96 10	4323.946	4 <sup>+</sup>				
		1995.5 & 5	29.2 23	3197.711	5 <sup>-</sup>				
5195.054	3 <sup>-</sup> ,4 <sup>-</sup>	1199.62 2	100	3995.438	4 <sup>-</sup>				
		2580.41 7	42 5	2614.522	3 <sup>-</sup>				
5195.37	7 <sup>+</sup>	327.44 20	18.7 22	4867.91	7 <sup>+</sup>				
		334.5 4	2.6 9	4860.78	8 <sup>+</sup>				
		584.62 15	36 6	4610.748	8 <sup>+</sup>				
		715.0 6	2.20 22	4480.746	6 <sup>-</sup>				
		771.73 20	100 14	4423.647	6 <sup>+</sup>				
		1275.5 5	7.5 31	3919.966	6 <sup>-</sup>				
5213.007	6 <sup>+</sup>	789.358 15	100	4423.647	6 <sup>+</sup>				
		2015.5 5	65 8	3197.711	5 <sup>-</sup>	[E1]			B(E1)(W.u.)=0.00012 +3-4
5213.98	(5 <sup>-</sup> )	1252.98 4	28.2 26	3961.162	5 <sup>-</sup>				
		1505.43 3	26.9 26	3708.451	5 <sup>-</sup>				
		2016.14 & 3	100 7	3197.711	5 <sup>-</sup>				$E_\gamma$ : from the level energies. The transition is a multiplet in the source dataset.
5216.214	4 <sup>+</sup>	892.25 2	31 4	4323.946	4 <sup>+</sup>				

**Adopted Levels, Gammas (continued)**

$\gamma(^{208}\text{Pb})$  (continued)

$E_i(\text{level})$	$J_i^\pi$	$E_\gamma$	$I_\gamma$	$E_f$	$J_f^\pi$	Mult.#	$\delta^\#$	$I_{(\gamma+ce)}$	Comments
5216.214	4 <sup>+</sup>	2601.69 2	100	2614.522	3 <sup>-</sup>	[E1+M2]	+0.095 +45-43		B(E1)(W.u.)=0.00026 3; B(M2)(W.u.)=1.6 15
5235.37	(11 <sup>+</sup> )	340.16 10		4895.23	10 <sup>+</sup>				
5239.3	4 <sup>-</sup>	2625.2 5		2614.522	3 <sup>-</sup>				
5241.1	0 <sup>+</sup>	2626.6 3		2614.522	3 <sup>-</sup>	[E3]		<400	B(E3)(W.u.)<635
									$I_{(\gamma+ce)}$ : $I(\gamma+ce)/I(\gamma+ce)(5241 \text{ E0 transition}) < 4$ from (p,p'γ) (2005Or02).
								100	Mult.: from (p,p'γ).
5245.246	3 <sup>-</sup>	5241 3		0	0 <sup>+</sup>	E0			
		307.80 20	1.4 5	4937.19	3 <sup>-</sup>				
		921.5 2	1.9 4	4323.946	4 <sup>+</sup>	[E1]			B(E1)(W.u.)=0.00025 9
		1193.9 4	1.9 6	4051.134	3 <sup>-</sup>				
		1770.20 8	6.7 5	3475.078	4 <sup>-</sup>	[M1+E2]			$\delta$ : +0.04 17 or <-4.2, >11.
		2630.71 2	100.0 25	2614.522	3 <sup>-</sup>	[M1+E2]			$\delta$ : -0.19 8 or +2.1 5.
		5245.0 7	1.0 2	0	0 <sup>+</sup>	[E3]			B(E3)(W.u.)=2.3 8
5254.12		178.34 10	19 6	5075.78					
		1779.04 15	100	3475.078	4 <sup>-</sup>				
5276.418	4 <sup>-</sup>	1070.13 3	18.4 23	4206.277	6 <sup>-</sup>	[E2]			$E_\gamma$ : from the level energies. The measured value from (n,n'γ) is 1069.72 4. Not included in the least-squares fit.
		1567.97 4	43 5	3708.451	5 <sup>-</sup>				
		2078.64 3	100 7	3197.711	5 <sup>-</sup>				
		2662.02 5	15.0 9	2614.522	3 <sup>-</sup>				
5280.47	0 <sup>-</sup>	438.83 5	27.6 15	4841.60	1 <sup>-</sup>				
		1050.90 4	100	4229.590	2 <sup>-</sup>				
5286.484	2,3 <sup>-</sup>	2671.942 13	100	2614.522	3 <sup>-</sup>	[D+Q]	+0.05 +8-3		
		5287.1 3	21 3	0	0 <sup>+</sup>				
5291.90	1 <sup>-</sup>	5291.74 13		0	0 <sup>+</sup>	[E1]			B(E1)(W.u.)=0.021 5
									$I_\gamma$ : $\Gamma_{\gamma 0}/\Gamma=0.78 +22-11$ from (γ,γ').
5317.041	(3) <sup>+</sup>	993.105 12	100	4323.946	4 <sup>+</sup>				
		2702.42 3	23 3	2614.522	3 <sup>-</sup>				
5317.2		2119.5 6		3197.711	5 <sup>-</sup>				
5339.46	8 <sup>+</sup>	478.59 11	‡	4860.78	8 <sup>+</sup>				
		728.78 6	‡	4610.748	8 <sup>+</sup>				
		1301.74 14	‡	4037.443	7 <sup>-</sup>	[E1]			
5347.270	3 <sup>-</sup>	1295.8 5	18 7	4051.134	3 <sup>-</sup>				
		2732.729 15	100	2614.522	3 <sup>-</sup>	[M1+E2]			$\delta$ : +0.11 8 or +1.0 2.
5380.6	-	2766.1 8		2614.522	3 <sup>-</sup>				
5382.82	3 <sup>+</sup> ,4 <sup>+</sup> ,5 <sup>+</sup>	1387.37 3		3995.438	4 <sup>-</sup>	[E1]			B(E1)(W.u.)=0.0020 3
5384.59	3 <sup>-</sup>	1155.00 2	60 6	4229.590	2 <sup>-</sup>				
		1333.48 22	31 6	4051.134	3 <sup>-</sup>				
		2770.45 20	100 4	2614.522	3 <sup>-</sup>	[D+Q]			$\delta$ : -0.20 +15-21 or -2.6 +10-18.
		5384.37 12	16.9 11	0	0 <sup>+</sup>	[E3]			B(E3)(W.u.)=3.8

## Adopted Levels, Gammas (continued)

$\gamma(^{208}\text{Pb})$ (continued)									
$E_i(\text{level})$	$J_i^\pi$	$E_\gamma$	$I_\gamma$	$E_f$	$J_f^\pi$	Mult. #	$\delta^\#$	Comments	
5481.87	$5^-$	1356.49 4 2867.35 3	83 9 100	4125.347 5 <sup>-</sup> 2614.522 3 <sup>-</sup>	5 <sup>-</sup> 3 <sup>-</sup>	[E2+M3]	+0.042 +53-32	$E_\gamma$ : not reported in (d,p $\gamma$ ). B(E2)(W.u.)=0.24 4; B(M3)(W.u.)=4.E+2 +10-4	
5490.34	(4 <sup>-</sup> ,6 <sup>-</sup> )	1107.0 5 1193.52 20 1283.5 10 1365.0 5 1529.0 5 1781.5 5	83 <sup>†</sup> 13 59 <sup>†</sup> 9 35 <sup>†</sup> 7 100 <sup>†</sup> 13 75 <sup>†</sup> 13 69 <sup>†</sup> 15	4383.285 6 <sup>-</sup> 4296.560 5 <sup>-</sup> 4206.277 6 <sup>-</sup> 4125.347 5 <sup>-</sup> 3961.162 5 <sup>-</sup> 3708.451 5 <sup>-</sup>	6 <sup>-</sup> 5 <sup>-</sup> 6 <sup>-</sup> 5 <sup>-</sup> 5 <sup>-</sup> 5 <sup>-</sup>				
5491.53	(4 <sup>-</sup> ,6 <sup>-</sup> )	1571.49 4	38 4	3919.966 6 <sup>-</sup>	6 <sup>-</sup>			$I_\gamma$ : from (n,n' $\gamma$ ). $I_\gamma/I_\gamma(2294\gamma)=0.48$ +19-14 in (d,p $\gamma$ ). The 1572 $\gamma$ is not reported in (p,p' $\gamma$ ). $\delta$ : +0.16 +6-5 or >+10, <-94. B(E1)(W.u.)=0.058 +4-3 $I_\gamma$ : $\Gamma_{\gamma 0}/\Gamma=0.98$ +2-4 from ( $\gamma,\gamma'$ ). B(M1)(W.u.)=0.0117 19; B(E2)(W.u.)=0.43 8	
5511.78	$1^-$	2293.85 3 5511.70 14	100	3197.711 5 <sup>-</sup> 0 0 <sup>+</sup>	5 <sup>-</sup> 0 <sup>+</sup>	[M1+E2] [E1]			
5516.714	$3^-$	2902.17 2		2614.522 3 <sup>-</sup>	3 <sup>-</sup>	[M1+E2]	-0.94 +15-16		
5536.58	$10^+$	467.30 20 641.3 3	23 7 100	5069.31 10 <sup>+</sup> 4895.23 10 <sup>+</sup>	10 <sup>+</sup> 10 <sup>+</sup>				
5543.01	$7^-$	457.45 20 1062.9 5 1119.1 10 1159.6 3 1336.5 5 1505.9 5 1623.2 5	29 3 16.2 25 7 3 100 8 43 5 25 4 14 4	5085.470 7 <sup>-</sup> 4480.746 6 <sup>-</sup> 4423.647 6 <sup>+</sup> 4383.285 6 <sup>-</sup> 4206.277 6 <sup>-</sup> 4037.443 7 <sup>-</sup> 3919.966 6 <sup>-</sup>	7 <sup>-</sup> 6 <sup>-</sup> 6 <sup>+</sup> 6 <sup>-</sup> 6 <sup>-</sup> 7 <sup>-</sup> 6 <sup>-</sup>				
5545.46	(5 <sup>-</sup> )	1248.5 5 1283.48 10 1420.3 5 1584.35 10 1599.1 5 1837.06 4 2347.51 9	16 3 44 9 38 8 25 9 38 6 100 12 74 15	4296.560 5 <sup>-</sup> 4261.871 4 <sup>-</sup> 4125.347 5 <sup>-</sup> 3961.162 5 <sup>-</sup> 3946.578 4 <sup>-</sup> 3708.451 5 <sup>-</sup> 3197.711 5 <sup>-</sup>	5 <sup>-</sup> 4 <sup>-</sup> 5 <sup>-</sup> 5 <sup>-</sup> 4 <sup>-</sup> 5 <sup>-</sup> 5 <sup>-</sup>				
5548.113	$2^-$	2933.57 2 5547.6 3	100 2.6 4	2614.522 3 <sup>-</sup> 0 0 <sup>+</sup>	3 <sup>-</sup> 0 <sup>+</sup>	[M2] [M1+E2]		B(M2)(W.u.)=0.051 9 B(M1)(W.u.)=0.0158 24; B(E2)(W.u.)=0.03 +7-3	
5561.31	$2^+$	2946.79 5 5560.8 2	100 36 3	2614.522 3 <sup>-</sup> 0 0 <sup>+</sup>	3 <sup>-</sup> 0 <sup>+</sup>	[E2] [E2]	+0.23 +23-17	B(E2)(W.u.)=0.0101 14 B(E2)(W.u.)=0.86 +18-21	
5563.73	$3^-$	2366.3 3 2949.18 4	57 7 100	3197.711 5 <sup>-</sup> 2614.522 3 <sup>-</sup>	5 <sup>-</sup> 3 <sup>-</sup>				
5565.2	(4 <sup>+</sup> )	2089.7 5		3475.078 4 <sup>-</sup>	4 <sup>-</sup>				
5599.48	$0^-$	757.93 7 1369.83 7	41 3 100	4841.60 1 <sup>-</sup> 4229.590 2 <sup>-</sup>	1 <sup>-</sup> 2 <sup>-</sup>				
5639.55	$1^-$	3024.96 9	10.3 9	2614.522 3 <sup>-</sup>	3 <sup>-</sup>				

**Adopted Levels, Gammas (continued)**

$\gamma(^{208}\text{Pb})$  (continued)

$E_i(\text{level})$	$J_i^\pi$	$E_\gamma$	$I_\gamma$	$E_f$	$J_f^\pi$	Mult. #	$\delta^\#$	Comments
5639.55	1 <sup>-</sup>	5639.7 2	100	0	0 <sup>+</sup>	[E1]		B(E1)(W.u.)=0.008 4
5641.98	1,2 <sup>+</sup>	5641.9 2		0	0 <sup>+</sup>			
5649.01	3 <sup>-</sup> ,4 <sup>-</sup>	1387.4 10	35 9	4261.871	4 <sup>-</sup>			
		1523.8 10	82 14	4125.347	5 <sup>-</sup>			
		1654.2 5	59 12	3995.438	4 <sup>-</sup>			
		2451.20 8	100 15	3197.711	5 <sup>-</sup>			
5658.51	5 <sup>-</sup>	3034.52 9	37 2	2614.522	3 <sup>-</sup>	[D+Q]		$\delta$ : -0.17 +13-18 or -3.8 +14-34.
		1663.05 5	60 6	3995.438	4 <sup>-</sup>			
		2460.80 5	100 6	3197.711	5 <sup>-</sup>			
		3044.0 2	11.4 16	2614.522	3 <sup>-</sup>	[E2]		B(E2)(W.u.)=0.063 +16-18
5675.366	2 <sup>-</sup> ,3,4	1317.0 10	4.9 20	4358.670	4 <sup>-</sup>			
		1413.0 10	10.0 20	4261.871	4 <sup>-</sup>			
		1420.0 10	21 5	4254.795	3 <sup>-</sup>			
5686.5	6 <sup>-</sup>	3060.82 2	100 9	2614.522	3 <sup>-</sup>	[D+Q]		$\delta$ : +0.06 +11-4 or +1.1 +3-2.
		1561.0 10	99 8	4125.347	5 <sup>-</sup>			
		1726.0 10	100 9	3961.162	5 <sup>-</sup>			
		1767.0 10	100 10	3919.966	6 <sup>-</sup>			
5690.117	4 <sup>+</sup>	3075.57 2		2614.522	3 <sup>-</sup>	[E1+M2]	-0.031 +31-21	B(E1)(W.u.)=0.000144 13; B(M2)(W.u.)=0.07 +14-7
5694.22	7 <sup>-</sup>	1774.25 12	100	3919.966	6 <sup>-</sup>			
5715.53	2 <sup>+</sup>	3101.07 10	12.6 11	2614.522	3 <sup>-</sup>	[E1]		B(E1)(W.u.)=0.00022 +9-6
		5715.1 2	100	0	0 <sup>+</sup>	[E2]		B(E2)(W.u.)=0.30 +12-8
5721.51	7 <sup>-</sup>	1297.86 3		4423.647	6 <sup>+</sup>	[E1]		B(E1)(W.u.)=0.0031 +8-11
5737.9		1314.6 12		4423.647	6 <sup>+</sup>			
5749.67	(11 <sup>+</sup> )	680.6 2	100	5069.31	10 <sup>+</sup>			
		854.6 2	14 10	4895.23	10 <sup>+</sup>			
5777.96	2 <sup>-</sup> ,3 <sup>-</sup>	1523.03 15	17.8 22	4254.795	3 <sup>-</sup>	[D+Q]	-1.3 +6-42	
		1726.66 17	16.6 25	4051.134	3 <sup>-</sup>			
		3163.43 3	100 9	2614.522	3 <sup>-</sup>	[D+Q]		$\delta$ : -0.38 +7-8 or +4.4 +23-11.
		5777.4 3	5.1 10	0	0 <sup>+</sup>	[M2,E3]		B(M2)(W.u.)=0.32 7; B(E3)(W.u.)=5.1 11
5783.22		1399.93 6		4383.285	6 <sup>-</sup>			
5789.34	2 <sup>+</sup> ,3 <sup>+</sup> ,4 <sup>+</sup>	3174.79 3		2614.522	3 <sup>-</sup>			
5799.41		2324.32 9		3475.078	4 <sup>-</sup>			
5805.0	1	5804.9 3		0	0 <sup>+</sup>	[E1,M1]		
5813.27	3 <sup>-</sup>	2338.18 26	85 14	3475.078	4 <sup>-</sup>			
		3198.72 4	100	2614.522	3 <sup>-</sup>	[M1+E2]		$\delta$ : -0.59 +12-14 or >+6.7, <-4.0.
5819.49	1 <sup>+</sup> ,2 <sup>+</sup>	5819.4 2		0	0 <sup>+</sup>	[M1,E2]		
5825.3		1214.5 5		4610.748	8 <sup>+</sup>			
5844.49	1 <sup>+</sup>	5844.4 2		0	0 <sup>+</sup>			B(M1)(W.u.)=0.38 3 from ( $\gamma,\gamma'$ ), 0.186 +76-24 from (e,e').
5873.573	3 <sup>-</sup>	2398.48 2		3475.078	4 <sup>-</sup>			
5885.55	3 <sup>-</sup>	1588.5 5	14 6	4296.560	5 <sup>-</sup>	[E2]		B(E2)(W.u.)=7 3
		3271.00 3	100	2614.522	3 <sup>-</sup>			
5918.28	3 <sup>-</sup> ,4,5 <sup>-</sup>	2720.57 4	100	3197.711	5 <sup>-</sup>			

Adopted Levels, Gammas (continued)

$\gamma(^{208}\text{Pb})$ (continued)						
$E_i(\text{level})$	$J_i^\pi$	$E_\gamma$	$I_\gamma$	$E_f$	$J_f^\pi$	Mult.#
5918.28	3 <sup>-</sup> ,4,5 <sup>-</sup>	3303.65 7	42 3	2614.522	3 <sup>-</sup>	
5923.67	2 <sup>-</sup>	631.3 3	3.7 7	5291.90	1 <sup>-</sup>	
		678.50 8	30.7 12	5245.246	3 <sup>-</sup>	
		796.7 4	3.9 7	5127.356	2 <sup>-</sup> ,3 <sup>-</sup>	
		886.35 25	8.0 9	5037.536	3 <sup>-</sup>	
		949.82 4	100 3	4973.918	3 <sup>-</sup>	
		1225.41 7	98 5	4698.323	3 <sup>-</sup>	
		1668.60 8	26.7 16	4254.795	3 <sup>-</sup>	
		1694.08 17	10.7 11	4229.590	2 <sup>-</sup>	
		1872.43 8	52 3	4051.134	3 <sup>-</sup>	
		3308.99 15	13.5 18	2614.522	3 <sup>-</sup>	
		5922.6 8	11.1 21	0	0 <sup>+</sup>	[E1,M2] B(E1)(W.u.)=2.8×10 <sup>-7</sup> +19-14; B(M2)(W.u.)=0.037 +26-20
5928.0	10 <sup>+</sup>	858.4 4	54 21	5069.31	10 <sup>+</sup>	
		1033.0 4	100	4895.23	10 <sup>+</sup>	
5946.77	1 <sup>-</sup>	5946.6 2		0	0 <sup>+</sup>	
5965.8		749.6 4		5216.214	4 <sup>+</sup>	
5968.55	4 <sup>-</sup>	1644.1 8	1.0 5	4323.946	4 <sup>+</sup>	[E1] B(E1)(W.u.)=4×10 <sup>-5</sup> +4-2
		1762.6 3	3.4 3	4206.277	6 <sup>-</sup>	[E2] B(E2)(W.u.)=1.5 +7-9
		2260.02 8	34.2 21	3708.451	5 <sup>-</sup>	
		2770.88 8	100 5	3197.711	5 <sup>-</sup>	
5973.0	2 <sup>+</sup>	1648.5 5	40 17	4323.946	4 <sup>+</sup>	
		5973.5 8	100	0	0 <sup>+</sup>	
5992.67	6 <sup>+</sup>	779.8 5	43 18	5213.007	6 <sup>+</sup>	
		797.4 5	54 21	5195.37	7 <sup>+</sup>	
		1511.6 6	66 21	4480.746	6 <sup>-</sup>	
		1609.3 6	73 23	4383.285	6 <sup>-</sup>	
		2795.0 6	100 28	3197.711	5 <sup>-</sup>	
6009.75	3 <sup>-</sup>	1685.7 4	13.7 17	4323.946	4 <sup>+</sup>	[E1] B(E1)(W.u.)=0.00036 +14-17
		1924.19 9	26 3	4085.52	2 <sup>+</sup>	[E1] B(E1)(W.u.)=0.00046 +18-22
		2534.66 4	100 5	3475.078	4 <sup>-</sup>	
6011.64		3397.09 6		2614.522	3 <sup>-</sup>	
6025.8		2030.4 6		3995.438	4 <sup>-</sup>	
6086.56	1 <sup>-</sup>	841.40 20	9.5 10	5245.246	3 <sup>-</sup>	[E2] B(E2)(W.u.)=11 +5-11
		959.5 3	4.6 10	5127.356	2 <sup>-</sup> ,3 <sup>-</sup>	
		1112.70 6	52 4	4973.918	3 <sup>-</sup>	[E2] B(E2)(W.u.)=15 +7-11

**Adopted Levels, Gammas (continued)**

$\gamma(^{208}\text{Pb})$  (continued)

$E_i(\text{level})$	$J_i^\pi$	$E_\gamma$	$I_\gamma$	$E_f$	$J_f^\pi$	Mult. #	Comments
6086.56	1 <sup>-</sup>	1388.19 13	100 5	4698.323	3 <sup>-</sup>	[E2]	B(E2)(W.u.)=10 +4-10
		1831.77 7	73 5	4254.795	3 <sup>-</sup>	[E2]	B(E2)(W.u.)=1.8 +8-12
		1856.73 12	53 4	4229.590	2 <sup>-</sup>		
		2035.30 17	100 5	4051.134	3 <sup>-</sup>	[E2]	B(E2)(W.u.)=1.4 +6-10
		3471.9 2	27 6	2614.522	3 <sup>-</sup>	[E2]	B(E2)(W.u.)=0.026 +13-19
		6085.4 10	3.2 18	0	0 <sup>+</sup>	[E1]	B(E1)(W.u.)=1.8×10 <sup>-7</sup> +13-16
6099.8		860.50 6	100	5239.3	4 <sup>-</sup>		
		1802.7 5	45 22	4296.560	5 <sup>-</sup>		
6100.69	12 <sup>+</sup>	351.4 2	20 4	5749.67	(11 <sup>+</sup> )		
		865.34 20	100	5235.37	(11 <sup>+</sup> )		
6101.1	(5 <sup>+</sup> )	2626		3475.078	4 <sup>-</sup>		
6103.5		538.0 4	100	5565.2	(4 <sup>+</sup> )		
		1807.6 6	63 33	4296.560	5 <sup>-</sup>		
6147.8		2672.7 8		3475.078	4 <sup>-</sup>		
6193.1	2 <sup>+</sup>	6193.1 4		0	0 <sup>+</sup>	[E2]	B(E2)(W.u.)=1.36 11
6242.4		3627.8 9		2614.522	3 <sup>-</sup>		
6255.68	2 <sup>+</sup>	3641.13 6		2614.522	3 <sup>-</sup>		E <sub>γ</sub> : from (n,n'γ). E <sub>γ</sub> =3636 5 reported in (d,pγ).
		6255.5 4		0	0 <sup>+</sup>		E <sub>γ</sub> : from (γ,γ'). Not seen in (d,pγ). Energy is above the cutoff for transitions reported in (n,n'γ).
6263.7	1 <sup>-</sup>	6263.6 1		0	0 <sup>+</sup>		
6274.55	3 <sup>-</sup>	757.8 4	19 6	5516.714	3 <sup>-</sup>		
		2278.3 5	41 11	3995.438	4 <sup>-</sup>		
		3660.3 3	100 7	2614.522	3 <sup>-</sup>		
6313.9	1 <sup>-</sup>	6313.8 1		0	0 <sup>+</sup>		
6340	1 <sup>-</sup> ,2,3 <sup>-</sup>	3725 5		2614.522	3 <sup>-</sup>		
6354.4		2303.3 4		4051.134	3 <sup>-</sup>		
6361.6	1 <sup>-</sup>	6361.5 1		0	0 <sup>+</sup>	[E1]	B(E1)(W.u.)=0.0028 3
6435.57	12 <sup>-</sup>	1200.2 2		5235.37	(11 <sup>+</sup> )		
6444.4	3 <sup>-</sup>	6444.3 2		0	0 <sup>+</sup>		
6448.40	(13 <sup>-</sup> )	348.00 15	100	6100.69	12 <sup>+</sup>		
		1552.7 2	15 4	4895.23	10 <sup>+</sup>		
6486.5	1 <sup>-</sup>	512.98 25	20 5	5973.0	2 <sup>+</sup>	[E1]	B(E1)(W.u.)=0.26 4
		3871.7 7	21 13	2614.522	3 <sup>-</sup>	[E2]	B(E2)(W.u.)=1.6 10
		6485.9 12	100 8	0	0 <sup>+</sup>	[E1]	B(E1)(W.u.)=0.00063 19
6505.6	1	6505.6 22		0	0 <sup>+</sup>		
6512.8	1	6512.7 6		0	0 <sup>+</sup>		
6545.2		3930.6 11		2614.522	3 <sup>-</sup>		E <sub>γ</sub> : from E(level)in (p,p'). E <sub>γ</sub> =6515.2 18 reported in (γ,γ').
6551.93	1 <sup>-</sup> ,2,3 <sup>-</sup>	3937.37 16	100	2614.522	3 <sup>-</sup>		
		6551.8 21	14 1	0	0 <sup>+</sup>		
6617.0	3 <sup>-</sup>	2436.8 5	51 15	4180.414	5 <sup>-</sup>		
		4002.8 5	100	2614.522	3 <sup>-</sup>		
6657.8	4 <sup>+</sup>	2478.7 5	34 9	4180.414	5 <sup>-</sup>		

**Adopted Levels, Gammas (continued)**

$\gamma(^{208}\text{Pb})$ (continued)							Comments
$E_i(\text{level})$	$J_i^\pi$	$E_\gamma$	$I_\gamma$	$E_f$	$J_f^\pi$	Mult. #	
6657.8	4 <sup>+</sup>	4042.7 2	100	2614.522	3 <sup>-</sup>		
6682.46	(5 <sup>-</sup> )	2324.2 5	63 15	4358.670	4 <sup>-</sup>		
		2974.10 20	34 7	3708.451	5 <sup>-</sup>		
		4067.5 8	100 15	2614.522	3 <sup>-</sup>		
6687.8	5 <sup>-</sup>	2207.1 7		4480.746	6 <sup>-</sup>		$E_\gamma$ : from the level energies. $E_\gamma=2211.0$ 5 is reported in (p,p' $\gamma$ ) for what is probably the same level as that seen in (p,p') at 6689.1 15 and in ( $\alpha,\alpha'$ ) at 6687.4 8.
6699.60	(3 <sup>-</sup> )	1049.9 4	22 6	5649.01	3 <sup>-</sup> , 4 <sup>-</sup>		
		2470.1 6	21 7	4229.590	2 <sup>-</sup>		
		4085.4 3	100 7	2614.522	3 <sup>-</sup>		
6719.8	1 <sup>-</sup>	6719.7 5		0	0 <sup>+</sup>		B(E1)(W.u.)=0.0121 +18-11 $E_\gamma$ : from ( $\gamma,\gamma'$ ). Others: 6718.4 3 (p,p' $\gamma$ ), 6716.2 4 (d,p $\gamma$ ). $I_\gamma$ : $\Gamma_{\gamma 0}/\Gamma=1.00$ +0-11 from ( $\gamma,\gamma'$ ).
6739.6		2381.4 1		4358.670	4 <sup>-</sup>		
6743.42	14 <sup>-</sup>	295.31 25	47 8	6448.40	(13 <sup>-</sup> )		
		1508.1 2	100	5235.37	(11 <sup>+</sup> )		
6766.6		4152.0 10		2614.522	3 <sup>-</sup>		
6773.4	1,2,3 <sup>-</sup>	6773.3 15		0	0 <sup>+</sup>		
6789.1	(2 <sup>-</sup> ,3 <sup>+</sup> )	4174.5 6		2614.522	3 <sup>-</sup>		
6800.8		2504.2 20		4296.560	5 <sup>-</sup>		
6820.0	(2 <sup>-</sup> ,3 <sup>-</sup> )	872.2 7	100	5946.77	1 <sup>-</sup>		
		2873.7 4	85 59	3946.578	4 <sup>-</sup>		
6897.3		2188.1 5	52 16	4708.727	5 <sup>-</sup>		
		2668.1 5	100	4229.590	2 <sup>-</sup>		
6913	2 <sup>+</sup>	6913 4		0	0 <sup>+</sup>		
6920.7		4306.1 8		2614.522	3 <sup>-</sup>		
6929.6	2 <sup>-</sup>	4315.0 5		2614.522	3 <sup>-</sup>		
6969.3	2 <sup>-</sup>	3771.6 5		3197.711	5 <sup>-</sup>		
6980	1,2 <sup>+</sup>	6980 40		0	0 <sup>+</sup>		$I_\gamma$ : $\Gamma_{\gamma 0}=0.95$ eV 10. $\Gamma_{\gamma 0}/\Gamma\approx 0.27$ .
7001.0		3803.3 4		3197.711	5 <sup>-</sup>		
7020.2	(3 <sup>-</sup> )	1052.3 6	38 11	5968.55	4 <sup>-</sup>		
		2660.3 6	100 19	4358.670	4 <sup>-</sup>		
		2696.7 7	44 11	4323.946	4 <sup>+</sup>		
		2758.6 7	55 14	4261.871	4 <sup>-</sup>		
7063.53	1 <sup>-</sup>	7063.4 2		0	0 <sup>+</sup>	[E1]	B(E1)(W.u.)=0.0218 +14-20 $E_\gamma$ : from ( $\gamma,\gamma'$ ). Others: 7062.1 1 (p,p' $\gamma$ ), 7063.4 5 (d,p $\gamma$ ). Note that E(level)=7063.4 15 in (p,p') and 7064.1 6 in (d,p). $I_\gamma$ : $\Gamma_{\gamma 0}/\Gamma=0.98$ +2-7 from ( $\gamma,\gamma'$ ). B(E1)(W.u.)=0.0108 9 $I_\gamma$ : $\Gamma_{\gamma 0}/\Gamma=1$ from ( $\gamma,\gamma'$ ).
7083.2	1 <sup>-</sup>	7083.1 3		0	0 <sup>+</sup>	[E1]	
7137.3	3 <sup>-</sup> , 4 <sup>-</sup>	4522.7 4		2614.522	3 <sup>-</sup>		
7177.0	1	7176.9 3		0	0 <sup>+</sup>		$E_\gamma$ : from the level energy. $E_\gamma=7176$ 4 in ( $\gamma,\gamma'$ ).
7196.6		4582.0 10		2614.522	3 <sup>-</sup>		

**Adopted Levels, Gammas (continued)**

$\gamma(^{208}\text{Pb})$  (continued)

$E_i(\text{level})$	$J_i^\pi$	$E_\gamma$	$E_f$	$J_f^\pi$	Mult. <sup>#</sup>	Comments
7206.9	1	7206.8 5	0	0 <sup>+</sup>		
7218.6		4020.8 14	3197.711	5 <sup>-</sup>		$E_\gamma$ : from the level energies. $E_\gamma=4018.5$ in (d,p $\gamma$ ).
7240	1 <sup>-</sup>	7240 2	0	0 <sup>+</sup>		$E_\gamma$ : from the level energies. See the comment on E(level).
7264.4		4066.6 10	3197.711	5 <sup>-</sup>		
7278.68	1 <sup>+</sup>	7278.54 20	0	0 <sup>+</sup>	[M1]	B(M1)(W.u.)=0.098 3 $I_\gamma$ : $\Gamma_{\gamma 0}/\Gamma=1$ from ( $\gamma,\gamma'$ ).
7315.4	2 <sup>+</sup>	7315.3 20	0	0 <sup>+</sup>		
7332.4	1 <sup>-</sup>	7332.3 8	0	0 <sup>+</sup>	[E1]	B(E1)(W.u.)=0.031 +5-3 $I_\gamma$ : $\Gamma_{\gamma 0}/\Gamma=1.00$ +0-12 in ( $\gamma,\gamma'$ ).
7389.0	3 <sup>-</sup>	3913.9 10	3475.078	4 <sup>-</sup>		
7415	1 <sup>-</sup>	7415 3	0	0 <sup>+</sup>		
7528.79		1080.2 2	6448.40	(13 <sup>-</sup> )		
		1428.0 2	6100.69	12 <sup>+</sup>		
7548.6	1 <sup>-</sup>	7548.5 6	0	0 <sup>+</sup>		$E_\gamma$ : from the level energy. $E_\gamma=7547.4$ 26 in ( $\gamma,\gamma'$ ).
7631	1 <sup>-</sup>	7631 4	0	0 <sup>+</sup>		
7685.4	1,2 <sup>+</sup>	7685.2 5	0	0 <sup>+</sup>		
7722.6	1	7722.5 24	0	0 <sup>+</sup>		
7913	1 <sup>(-)</sup>	7913 3	0	0 <sup>+</sup>		
7974.04	(15 <sup>-</sup> )	445.1 2	7528.79			
		1230.8 2	6743.42	14 <sup>-</sup>		
8026.95	(14 <sup>-</sup> )	498.0 2	7528.79			
		1283.4 2	6743.42	14 <sup>-</sup>		
		1578.6 2	6448.40	(13 <sup>-</sup> )		
8264.38		237.5 2	8026.95	(14 <sup>-</sup> )		
8350.79	(15 <sup>-</sup> )	323.7 2	8026.95	(14 <sup>-</sup> )		
		376.8 2	7974.04	(15 <sup>-</sup> )		
		1607.6 2	6743.42	14 <sup>-</sup>		
8562.94	(16 <sup>-</sup> )	212.3 2	8350.79	(15 <sup>-</sup> )		
8723.50		459.2 2	8264.38			
		1980.0 2	6743.42	14 <sup>-</sup>		
8812.70	(14 <sup>-</sup> ,15,16 <sup>-</sup> )	249.9 2	8562.94	(16 <sup>-</sup> )		
		785.6 2	8026.95	(14 <sup>-</sup> )		
9061.2	(17 <sup>+</sup> )	2317.8 2	6743.42	14 <sup>-</sup>		
9103.1		42	9061.2	(17 <sup>+</sup> )		
		290.4 2	8812.70	(14 <sup>-</sup> ,15,16 <sup>-</sup> )		
9394.4		291.3 2	9103.1			
10136.8		742.4 2	9394.4			
10196.1		801.7	9394.4			
10342.0		947.6	9394.4			
10357.4		963.0	9394.4			
10372.2		235.4	10136.8			
10552.4		356.3	10196.1			

Adopted Levels, Gammas (continued)

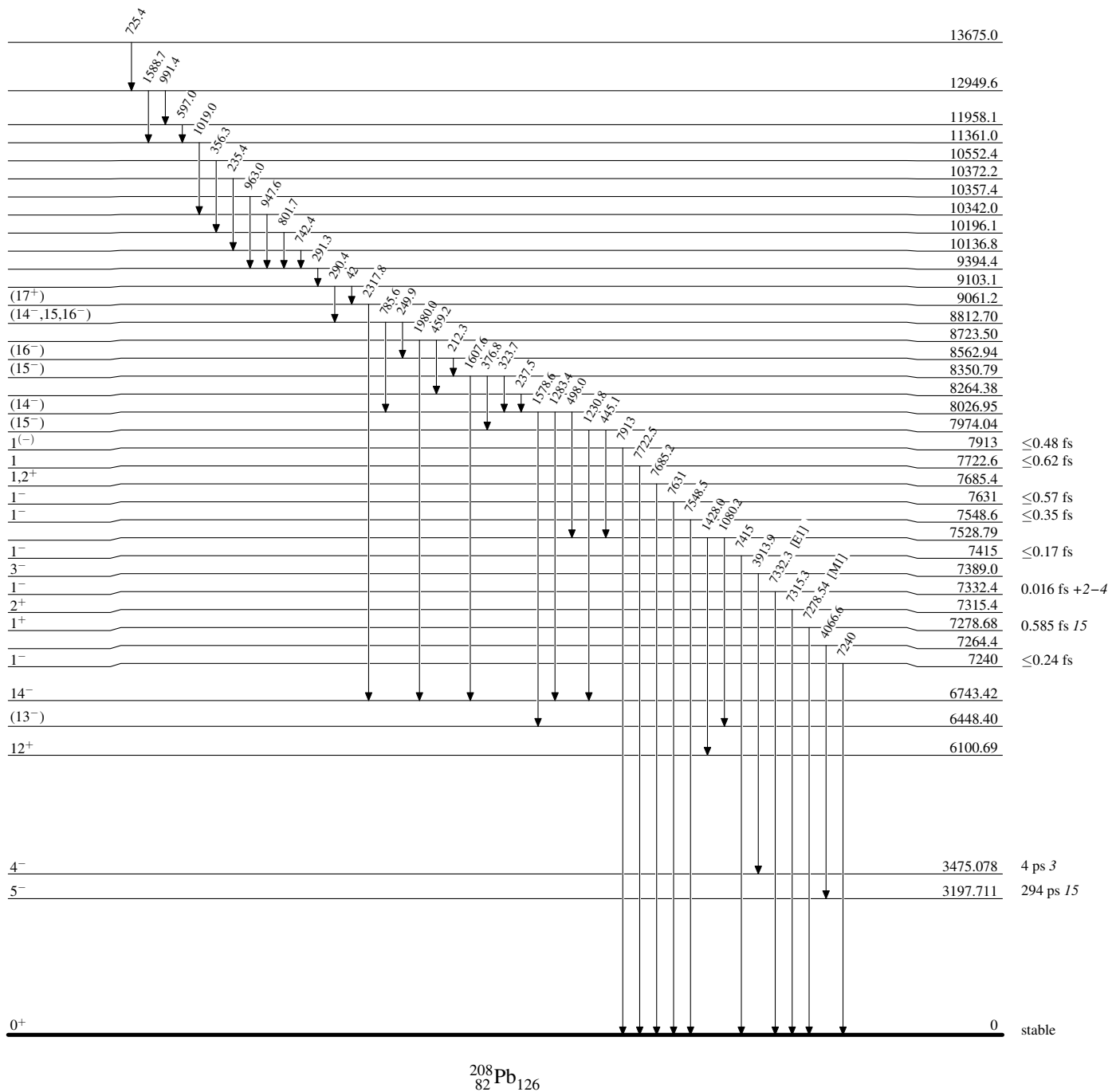
$\gamma(^{208}\text{Pb})$  (continued)

<u>E<sub>i</sub>(level)</u>	<u>E<sub><math>\gamma</math></sub></u>	<u>E<sub>f</sub></u>
11361.0	1019.0	10342.0
11958.1	597.0	11361.0
12949.6	991.4	11958.1
	1588.7	11361.0
13675.0	725.4	12949.6

<sup>†</sup> From (d,p $\gamma$ ). See comment on the 5490 multiplet.  
<sup>‡</sup> For the 5339 level, I $\gamma$ (478 $\gamma$ ):728 $\gamma$ :1301 $\gamma$  is reported as 63 8err; aut=J. Tuli; dat=18-Dec-2007; com=Fixed typos from pnpi rpt; 63 8:100 11:25 11 in (d,p $\gamma$ ) and as 130 29:100 19:48 9 in (n,n' $\gamma$ ). These data suggest that I $\gamma$ (728 $\gamma$ ) in (d,p $\gamma$ ) may be a factor of two too large. The alternative possibility is that I $\gamma$ (478 $\gamma$ ) and I $\gamma$ (1301 $\gamma$ ) are both a factor of two too large in (n,n' $\gamma$ ).  
<sup>#</sup> From  $\gamma(\theta)$  in (n,n' $\gamma$ ), except where noted otherwise. Single mult assignments given in square brackets are based on the adopted  $J^\pi$  values. Mixed mult assignments in square brackets are based on mult=D+Q, Q+O..., from (n,n' $\gamma$ ) with the mult character based on the adopted  $J^\pi$  values.  
<sup>@</sup> Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on  $\gamma$ -ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.  
<sup>&</sup> Placement of transition in the level scheme is uncertain.

**Adopted Levels, Gammas**Level Scheme

Intensities: Type not specified

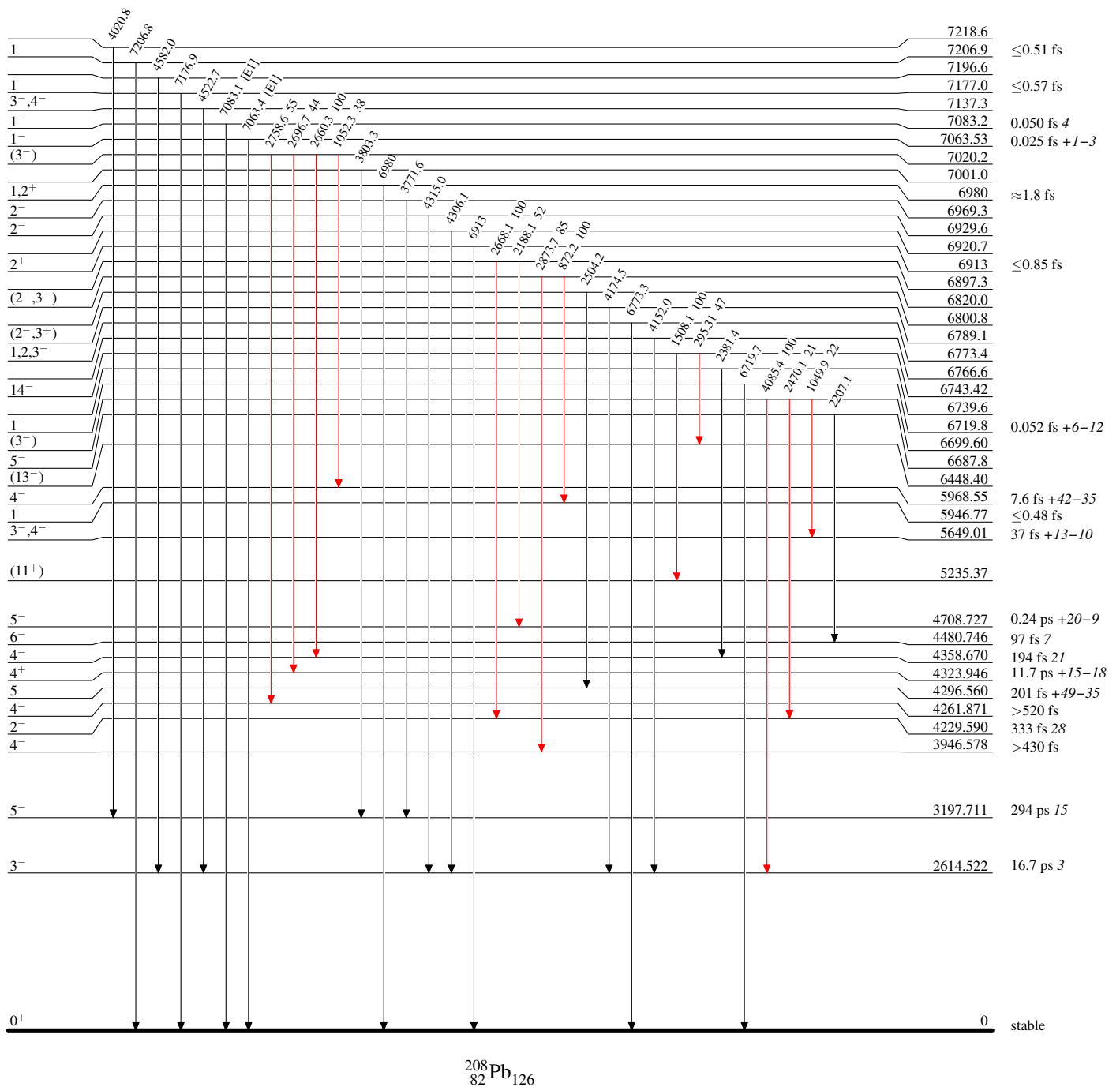


**Adopted Levels, Gammas****Level Scheme (continued)**

Intensities: Type not specified

**Legend**

- $\rightarrow$   $I_\gamma < 2\% \times I_\gamma^{\max}$   
 $\rightarrow$   $I_\gamma < 10\% \times I_\gamma^{\max}$   
 $\rightarrow$   $I_\gamma > 10\% \times I_\gamma^{\max}$



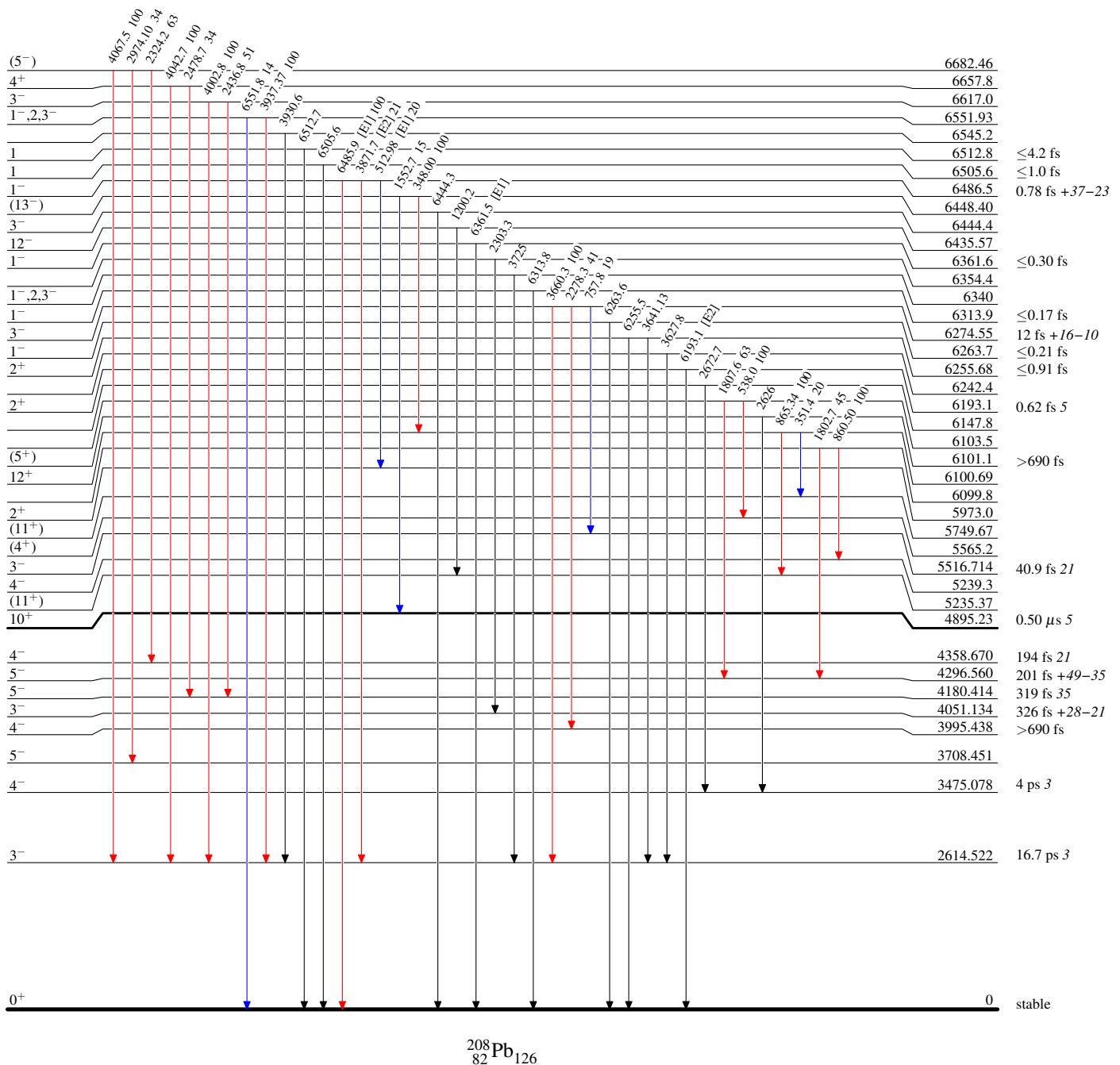
# Adopted Levels, Gammas

## Level Scheme (continued)

Intensities: Type not specified

## Legend

- $I_\gamma < 2\% \times I_\gamma^{\max}$
- $I_\gamma < 10\% \times I_\gamma^{\max}$
- $I_\gamma > 10\% \times I_\gamma^{\max}$



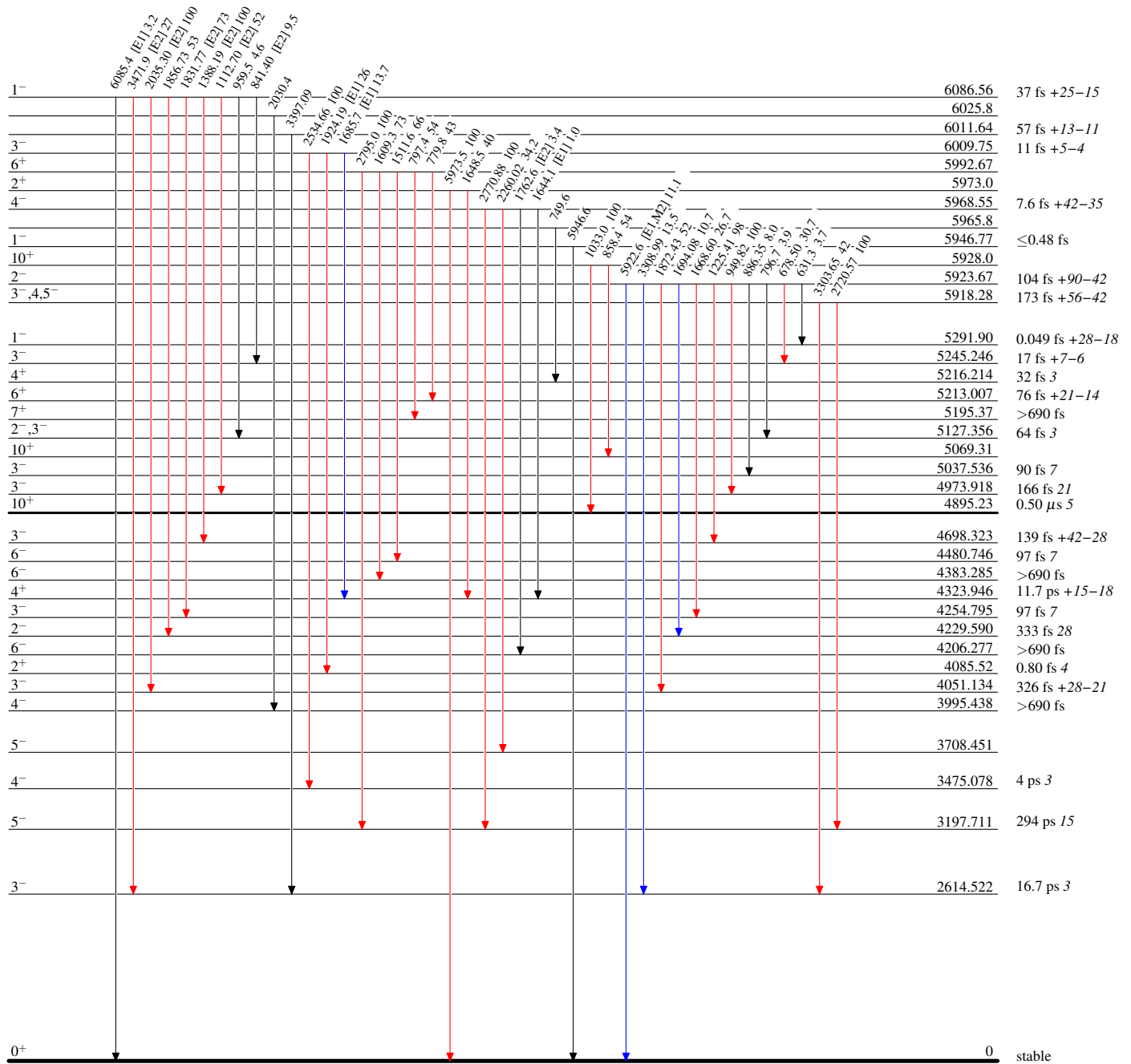
## Adopted Levels, Gammas

## Level Scheme (continued)

Intensities: Type not specified

## Legend

- $\longrightarrow$   $I_\gamma < 2\% \times I_\gamma^{\max}$   
 $\longrightarrow$   $I_\gamma < 10\% \times I_\gamma^{\max}$   
 $\longrightarrow$   $I_\gamma > 10\% \times I_\gamma^{\max}$






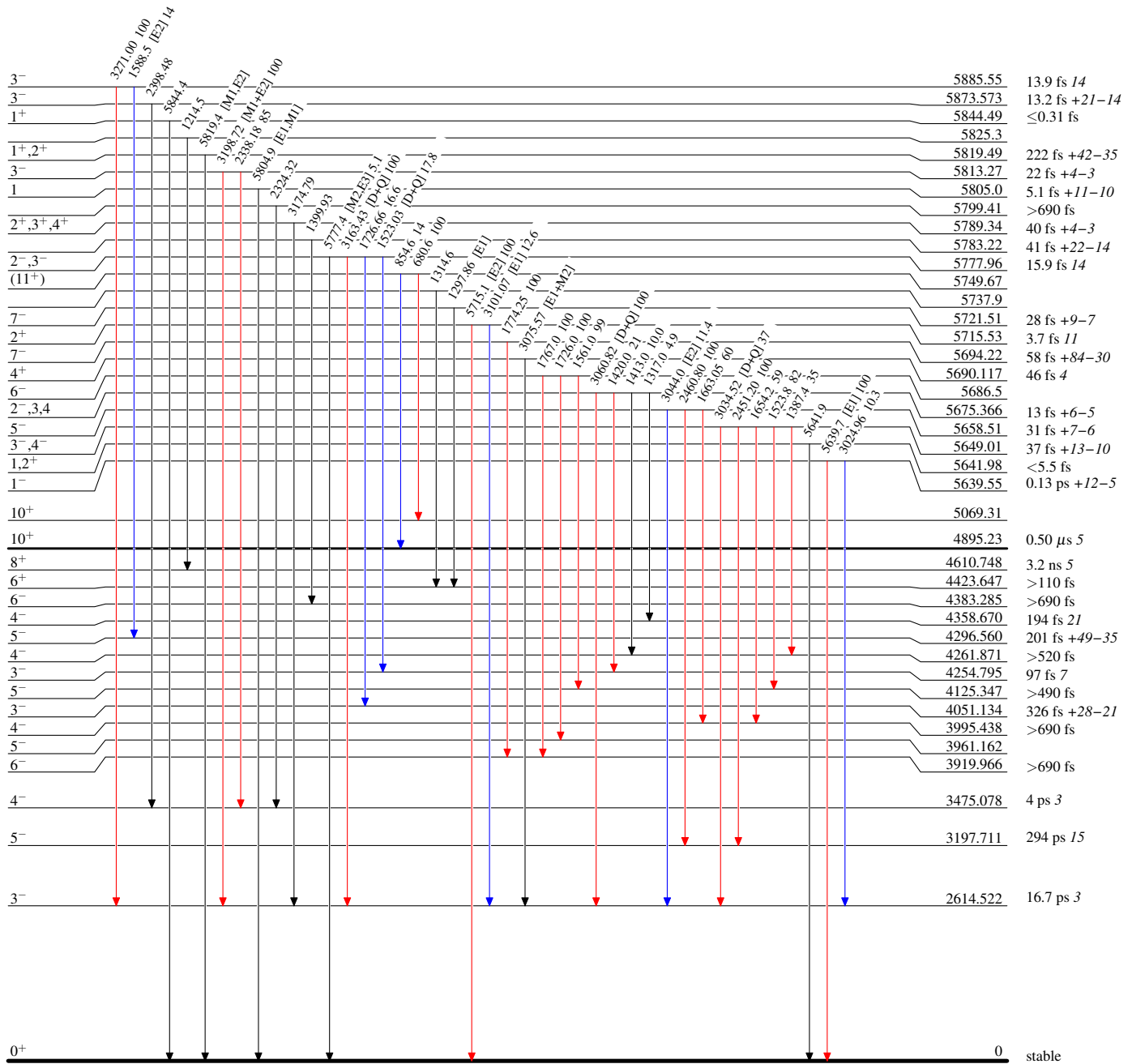
## Adopted Levels, Gammas

## Level Scheme (continued)

Intensities: Type not specified

## Legend

-   $I_\gamma < 2\% \times I_\gamma^{\max}$   
  $I_\gamma < 10\% \times I_\gamma^{\max}$   
  $I_\gamma > 10\% \times I_\gamma^{\max}$



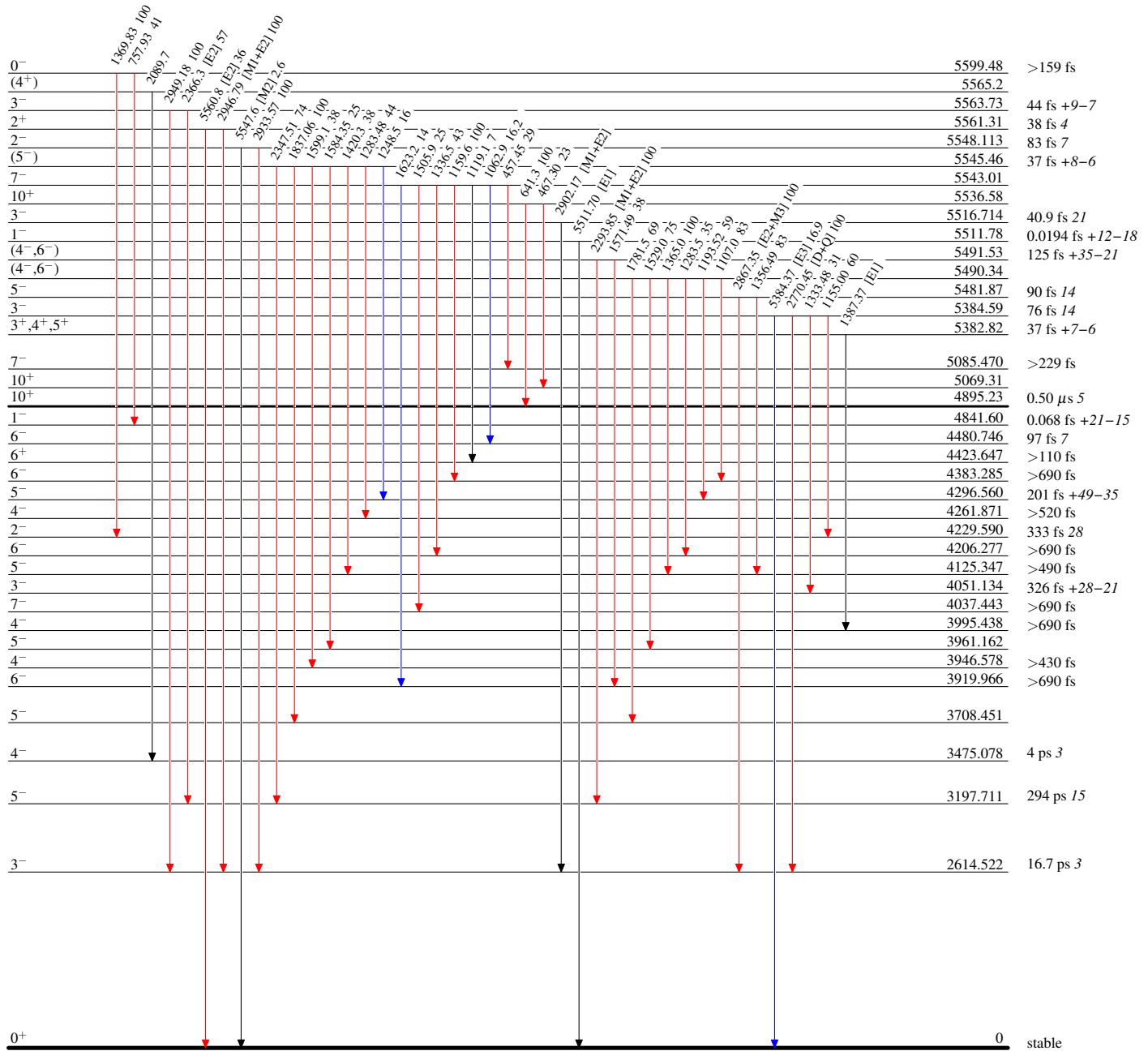
## Adopted Levels, Gammas

## Level Scheme (continued)

Intensities: Type not specified

## Legend

- $I_\gamma < 2\% \times I_\gamma^{\text{max}}$   
→  $I_\gamma < 10\% \times I_\gamma^{\text{max}}$   
→  $I_\gamma > 10\% \times I_\gamma^{\text{max}}$

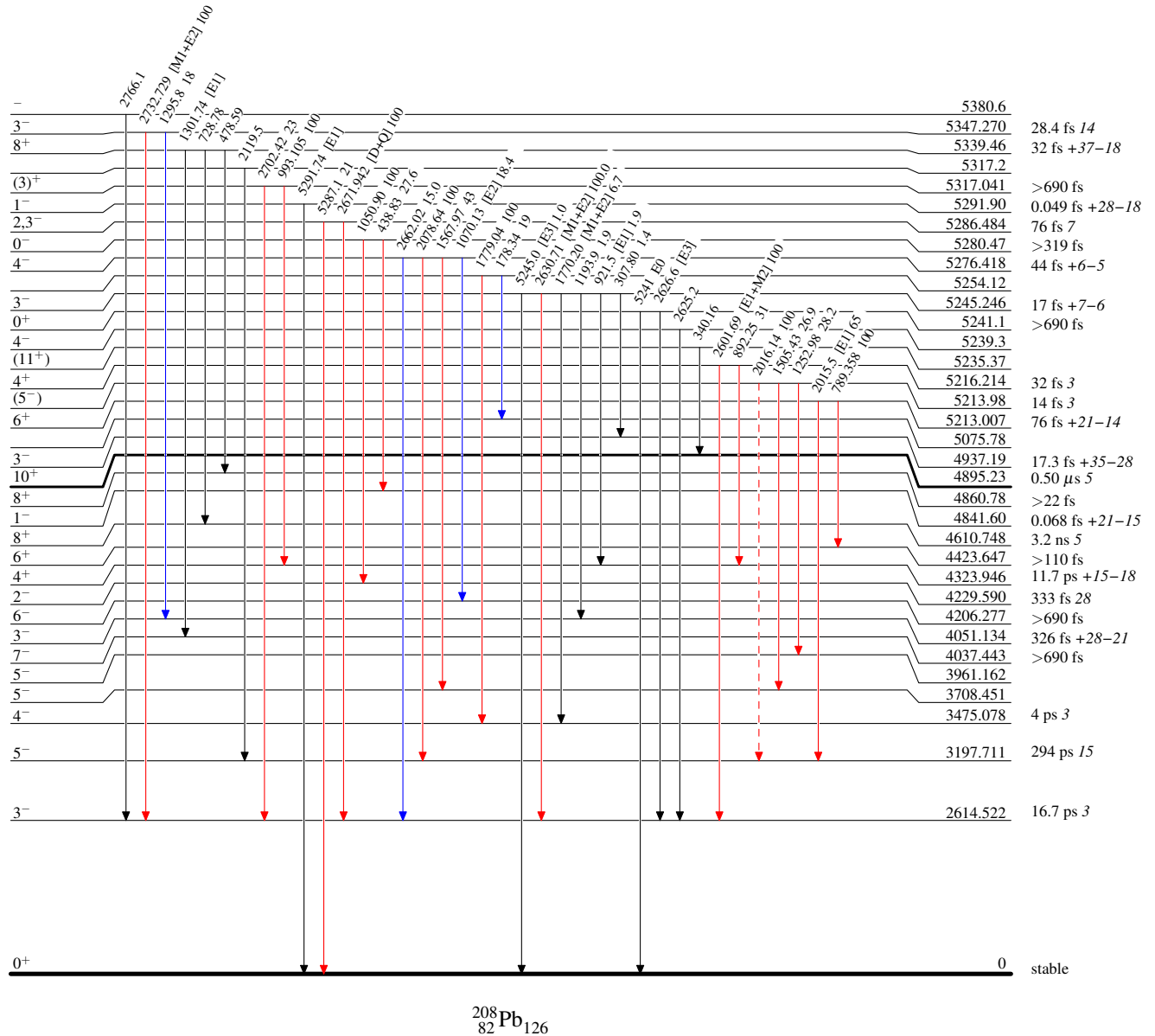


**Adopted Levels, Gammas****Level Scheme (continued)**

Intensities: Type not specified

**Legend**

- ▶  $I_\gamma < 2\% \times I_\gamma^{\max}$
- ▶  $I_\gamma < 10\% \times I_\gamma^{\max}$
- ▶  $I_\gamma > 10\% \times I_\gamma^{\max}$
- - - - -▶  $\gamma$  Decay (Uncertain)



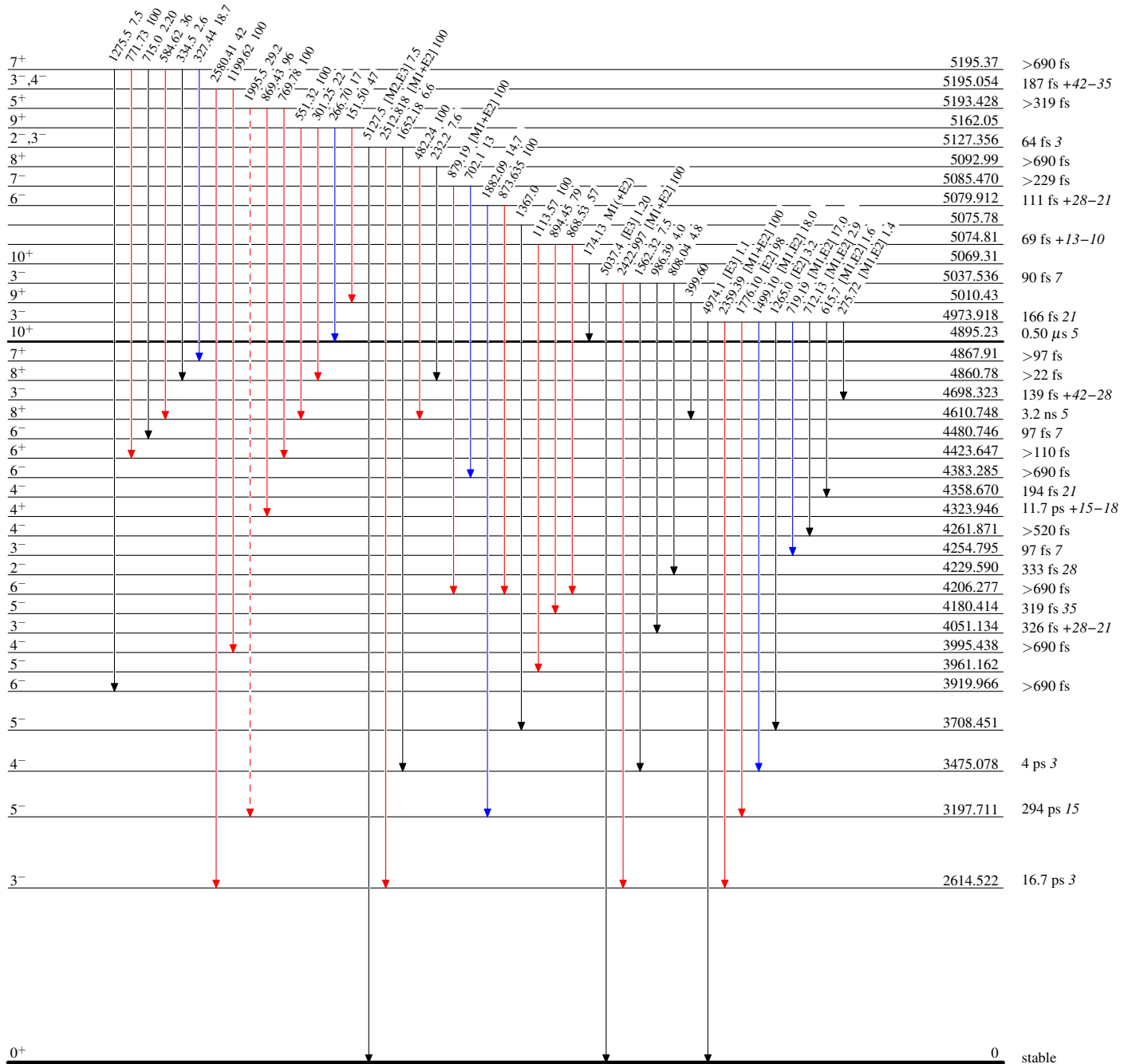
## Adopted Levels, Gammas

## Legend

## Level Scheme (continued)

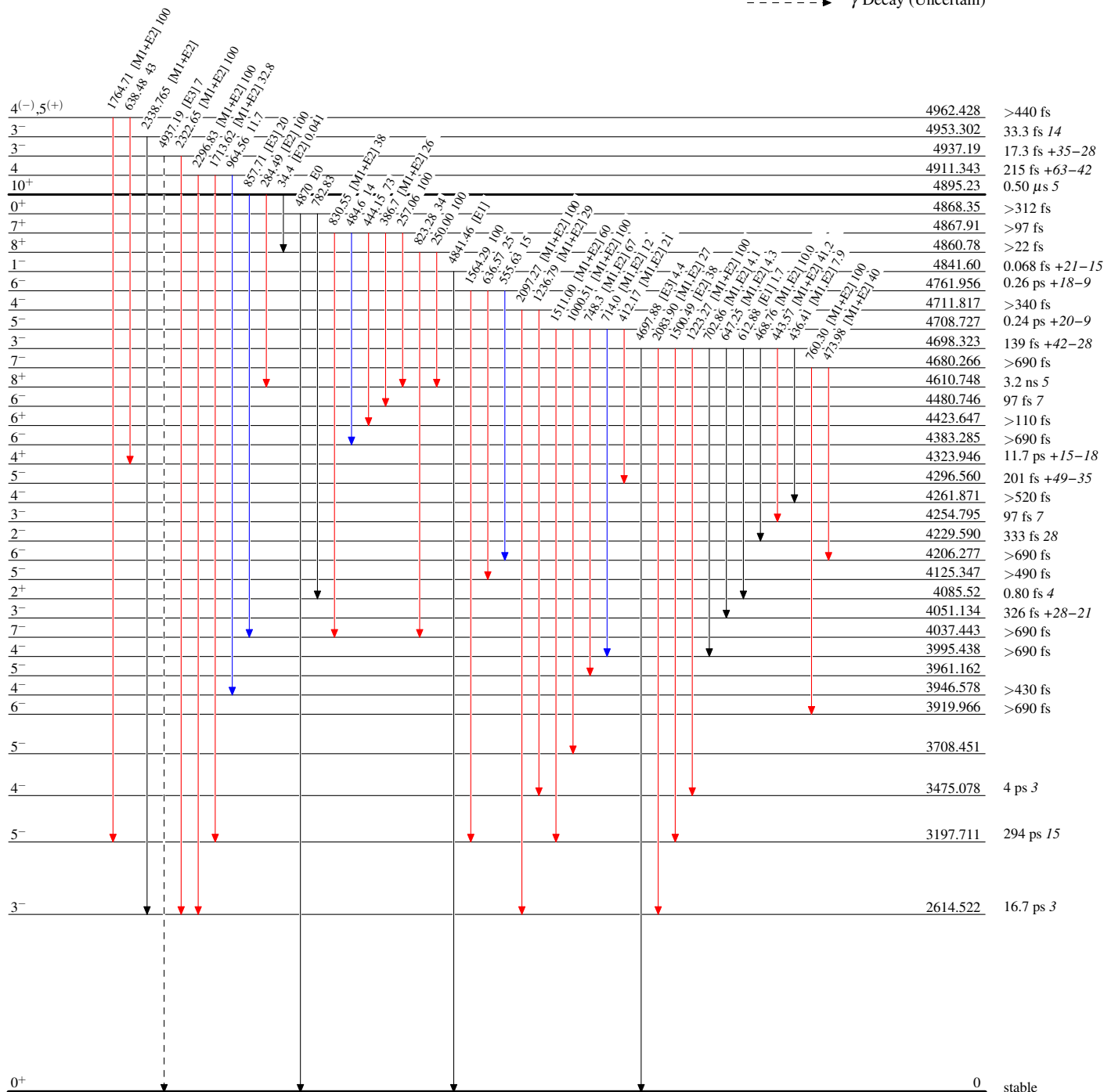
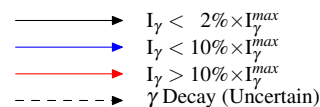
Intensities: Type not specified

- $I_\gamma < 2\% \times I_\gamma^{\max}$   
—→  $I_\gamma < 10\% \times I_\gamma^{\max}$   
—→  $I_\gamma > 10\% \times I_\gamma^{\max}$   
- - - - -→  $\gamma$  Decay (Uncertain)



### Legend

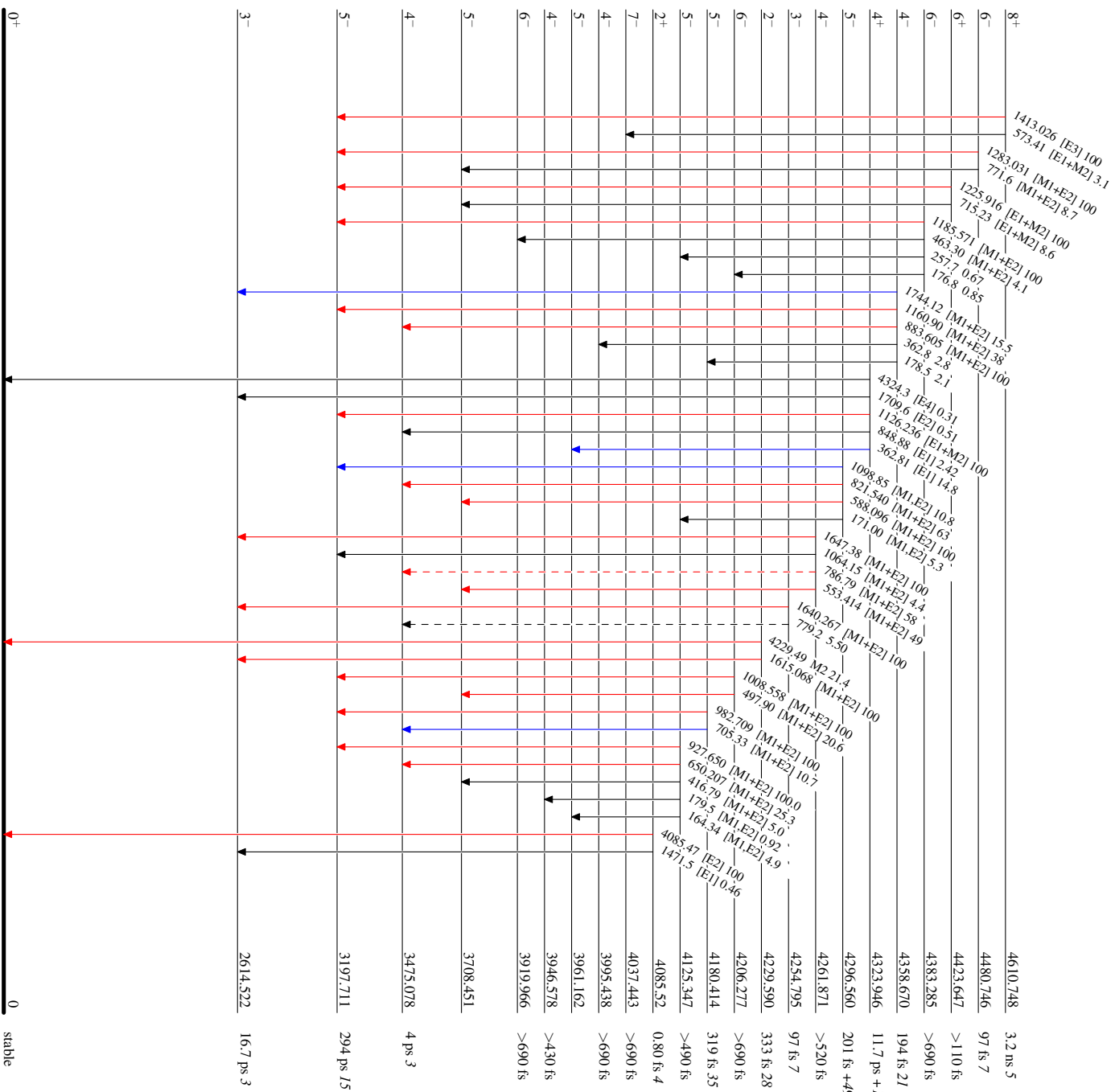
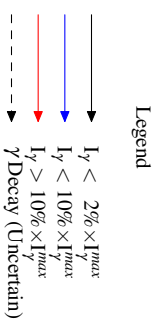
Intensities: Type not specified

 $^{208}_{82}\text{Pb}_{126}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Type not specified



**Adopted Levels, Gammas****Level Scheme (continued)**

Intensities: Type not specified

**Legend**

- $I_\gamma < 2\% \times I_\gamma^{\max}$   
—→  $I_\gamma < 10\% \times I_\gamma^{\max}$   
—→  $I_\gamma > 10\% \times I_\gamma^{\max}$

