

Adopted Levels, Gammas

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	Jun Chen <sup>#</sup> and Balraj Singh		NDS 135, 1 (2016)	31-May-2016

$Q(\beta^-) = -6426.10$  10;  $S(n) = 11480.67$  6;  $S(p) = 10276.67$  15;  $Q(\alpha) = -6257.34$  25 [2012Wa38](#)

$S(2n) = 19843.49$  15,  $S(2p) = 18085.29$  15 ([2012Wa38](#)).

Identification of stable  $^{42}\text{Ca}$  by F.W. Aston, Nature 133, 684 (1934) through mass spectrographic studies.

$^{42}\text{Ca}(n,n)$ : [1989Ra06](#): E=thermal. Measured Bragg diffraction patterns, deduced scattering lengths.

$^{42}\text{Ca}(^3\text{He},^3\text{He})$ : [1971Ra35](#): E=13.0 MeV; [1973Mo13](#): E=28 MeV. Measured  $\sigma(\theta)$ .

$^{42}\text{Ca}(^{48}\text{Ti},^{48}\text{Ti})$ : [1990Vo07](#), [1988Br02](#): E=240-725 MeV. Measured  $\sigma(\theta)$ , DWBA analysis.

Hyperfine structure and isotope-shift measurements: [2000Mu17](#), [2015Go24](#).

Some recent theoretical structure references (levels, B(E2), etc.): [2016Wo02](#) (shape coexistence), [2012Ca13](#), [2012Ca27](#), [2012Ha26](#).

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Population of levels in decays/reactions labeled with XREF=Y

$^{42}\text{K} \beta^-$  (12.355 h): 0, 1525, 1837, 2424, 2752, 3447  
 $^{42}\text{Sc} \varepsilon$  decay (680.79 ms): 0, 1525, 1837  
 $^{42}\text{Sc} \varepsilon$  decay (61.7 s): 0, 1525, 2424, 2752, 3189  
 $^{38}\text{Ar}(^6\text{Li},d)$ : 0, 1525, 1837, 2424, 2752, 3300, 3654, 4443, 4448, 5866, 6016+6020, 6313+6390, 6516, 6716+6720  
 $^{40}\text{Ar}(^3\text{He},n)$ : 0, 1525, 1837, 2424, 3300(?), 3392, 3654, 9270, 10205, 14700  
 $^{40}\text{Ca}(t,p\gamma)$ : 0, 1520, 2420, 3890, 5850, 6020, 6520, 6700, 6820  
 $^{40}\text{Ca}(\alpha,^2\text{He})$ : 0, 1530, 2750, 3190, 3660, 4830, 5380, 7280, 8810, 9080, 9330, 9600, 9870, 10160  
 $^{40}\text{Ca}(^{14}\text{C},^{12}\text{C}), (^{12}\text{C},^{10}\text{C})$ : 0, 1700, 2800, 3500, 4800  
 $^{40}\text{Ca}(^{96}\text{Zr},^{94}\text{Zr})$ : 0, 5866  
 $^{41}\text{Ca}(n,\gamma)$  E=thermal: 0, 1524.7, 2424.2, 2752.4, 3253.9, 3446.9, 3954.4, 3999.7, 4690.1, 4759.7, 5017.1, 11480.7  
 $^{42}\text{Ca}(\gamma,\gamma)$ : 0, 1525  
 $^{42}\text{Ca}(\pi^+,\pi^+'), (\pi^-, \pi^-')$ : 0, 1520, 2420, 3440, 4104, 4680, 6300  
 $^{42}\text{Ca}(d,d')$ : 0, 1524, 1835, 2423, 2749, 3445  
 $^{42}\text{Ca}(^{16}\text{O},^{16}\text{O}')$ : 0, 1525, 1837, 2424, 2752, 3254, 3447, 4100, 4449, 4690, 4971  
Coulomb excitation: 0, 1525  
 $^{45}\text{Sc}(p,\alpha), (\text{pol } p,\alpha)$ : 0, 1525, 1837, 2424, 2752, 3190, 3254, 3954, 4100, 4117  
 $^{46}\text{Ti}(d,^6\text{Li})$ : 0, 1525, 1837  
 $^{96}\text{Zr}(^{40}\text{Ca},^{42}\text{Ca}\gamma)$ : 0, 1525, 1837, 2424, 2752, 3189, 3254, 3447, 3654, 3954, 4443, 4760, 5017, 5866

 $^{42}\text{Ca}$  LevelsCross Reference (XREF) Flags

<b>A</b>	$^{24}\text{Mg}(^{24}\text{Mg},\alpha 2p\gamma)$	<b>P</b>	$^{41}\text{Ca}(d,p), (\text{pol } d,p)$	<b>AD</b>	$^{40}\text{Ca}(t,p\gamma)$
<b>B</b>	$^{27}\text{Al}(^{18}\text{O},2np\gamma)$	<b>Q</b>	$^{42}\text{Ca}(e,e')$	<b>AE</b>	$^{40}\text{Ca}(\alpha,^2\text{He})$
<b>C</b>	$^{27}\text{Al}(^{19}\text{F},\alpha\gamma)$	<b>R</b>	$^{42}\text{Ca}(p,p'\gamma)$	<b>AF</b>	$^{40}\text{Ca}(^{14}\text{C},^{12}\text{C}), (^{12}\text{C},^{10}\text{C})$ ,
<b>D</b>	$^{28}\text{Si}(^{16}\text{O},2p\gamma)$	<b>S</b>	$^{42}\text{Ca}(p,p')$	<b>AG</b>	$^{40}\text{Ca}(^{96}\text{Zr},^{94}\text{Zr})$
<b>E</b>	$^{30}\text{Si}(^{18}\text{O},\alpha 2n\gamma)$	<b>T</b>	$^{42}\text{Ca}(\alpha,\alpha')$	<b>AH</b>	$^{41}\text{Ca}(n,\gamma)$ E=thermal
<b>F</b>	$^{38}\text{Ar}(\alpha,\gamma)$ :resonances	<b>U</b>	$^{43}\text{Ca}(p,d)$	<b>AI</b>	$^{42}\text{Ca}(\gamma,\gamma)$
<b>G</b>	$^{39}\text{K}(\alpha,p)$	<b>V</b>	$^{43}\text{Ca}(d,t)$	<b>AJ</b>	$^{42}\text{Ca}(\pi^+,\pi^+'), (\pi^-, \pi^-')$
<b>H</b>	$^{39}\text{K}(\alpha,p\gamma)$	<b>W</b>	$^{43}\text{Ca}(^3\text{He},\alpha)$	<b>AK</b>	$^{42}\text{Ca}(d,d')$
<b>I</b>	$^{40}\text{Ca}(t,p)$	<b>X</b>	$^{44}\text{Ca}(p,t)$	<b>AL</b>	$^{42}\text{Ca}(^{16}\text{O},^{16}\text{O}')$
<b>J</b>	$^{41}\text{K}(p,\gamma)$	<b>Y</b>	$^{42}\text{K} \beta^-$ decay (12.355 h)	<b>AM</b>	Coulomb excitation
<b>K</b>	$^{41}\text{K}(p,n), (p,p)$ :resonances	<b>Z</b>	$^{42}\text{Sc} \varepsilon$ decay (680.79 ms)	<b>AN</b>	$^{45}\text{Sc}(p,\alpha), (\text{pol } p,\alpha)$
<b>L</b>	$^{41}\text{K}(p,\alpha)$ :resonances	<b>Others:</b>		<b>AO</b>	$^{46}\text{Ti}(d,^6\text{Li})$
<b>M</b>	$^{41}\text{K}(^3\text{He},d\gamma)$	<b>AA</b>	$^{42}\text{Sc} \varepsilon$ decay (61.7 s)	<b>AP</b>	$^{96}\text{Zr}(^{40}\text{Ca},^{42}\text{Ca}\gamma)$
<b>N</b>	$^{41}\text{K}(^3\text{He},d)$	<b>AB</b>	$^{38}\text{Ar}(^6\text{Li},d)$		
<b>O</b>	$^{41}\text{Ca}(n,\alpha)$ :resonances	<b>AC</b>	$^{40}\text{Ar}(^3\text{He},n)$		

**Adopted Levels, Gammas (continued)**

<sup>42</sup>Ca Levels (continued)

E(level) <sup>†</sup>	J <sup>π</sup> #	T <sub>1/2</sub> <sup>‡</sup>	XREF	Comments
0.0 <sup>b</sup>	0 <sup>+</sup>	stable	ABC E GHI J MN PQRSTU VWXYZ	XREF: Others: AA, AB, AC, AD, AE, AF, AG, AH, AI, AJ, AK, AL, AM, AN, AO, AP The rms charge radius (<r <sup>2</sup> > <sup>1/2</sup> : 3.5081 fm 2I (2013An02 evaluation). J <sup>π</sup> : L(t,p)=L(p,t)=0 from 0 <sup>+</sup> . Adopted (1977En02) neutron-stripping spectroscopic factor=1.6 2 (L=3). Adopted (1977En02) neutron-pickup spectroscopic factor=0.58 6 (L=3). Adopted (1977En02) proton-stripping spectroscopic factor=3.2 4 (L=2).
1524.71 <sup>b</sup> 3	2 <sup>+</sup>	0.83 ps 3	ABCDE GHI J N PQRSTU VWXYZ	XREF: Others: AA, AB, AC, AD, AE, AF, AH, AI, AJ, AK, AL, AM, AN, AO, AP μ=+0.08 12 (2003Sc21,2014StZZ) Q=-0.19 8 (1973To07,2014StZZ,2013StZZ) J <sup>π</sup> : L(t,p)=L(p,t)=2 from 0 <sup>+</sup> . T <sub>1/2</sub> : weighted average of 0.62 ps 2I (α,pγ), 0.97 ps 22 (γ,γ), 1.11 ps 2I (p,p'γ) and 0.825 ps 28 (coulomb excitation). μ: from transient field integral perturbed angular correlation (2003Sc21). Q: reorientation method (1973To07). Adopted (1977En02) neutron-stripping spectroscopic factor=0.04 2 (L=1), 0.48 12 (L=3). Adopted (1977En02) neutron-pickup spectroscopic factor=0.18 3 (L=3), small (L=1). Adopted (1977En02) proton-stripping spectroscopic factor=0.04 3 (L=2).
1837.31 <sup>c</sup> 18	0 <sup>+</sup>	387 ps 6	E GHI J N PQRSTU VWXYZ	XREF: Others: AB, AC, AF, AK, AL, AN, AO, AP J <sup>π</sup> : L(t,p)=L(p,t)=0 from 0 <sup>+</sup> . T <sub>1/2</sub> : from (p,p'γ). Adopted (1977En02) neutron-stripping spectroscopic factor=0.18 5 (L=3). Adopted (1977En02) neutron-pickup spectroscopic factor=0.05 2 (L=3). Adopted (1977En02) proton-stripping spectroscopic factor=0.3 2 (L=2).
2424.15 <sup>c</sup> 4	2 <sup>+</sup>	140 fs 40	B E GH J MN PQRSTU VWXY	XREF: Others: AA, AB, AC, AD, AF, AH, AJ, AK, AL, AN, AP J <sup>π</sup> : L(t,p)=L(p,t)=2 from 0 <sup>+</sup> . T <sub>1/2</sub> : weighted average of 114 fs 30 (α,pγ) and 210 fs 50 (p,p'γ). Adopted (1977En02) neutron-stripping spectroscopic factor=0.56 14 (L=3), small (L=1). Adopted (1977En02) neutron-pickup spectroscopic factor=0.16 7 (L=3), (0,0) (L=1). Adopted (1977En02) proton-stripping spectroscopic factor=0.05 5 (L=2).
2752.40 <sup>b</sup> 4	4 <sup>+</sup>	2.8 ps 4	ABCDE GHI J M PQRSTU VWXY	XREF: Others: AA, AB, AE, AF, AH, AK, AL, AN, AP J <sup>π</sup> : L(t,p)=L(p,t)=4 from 0 <sup>+</sup> . T <sub>1/2</sub> : weighted average of 3.5 ps 3 ( <sup>18</sup> O,2npγ), 2.63 ps 28 ( <sup>16</sup> O,2pγ) and 1.6 ps 7 (α,pγ). Adopted (1977En02) neutron-stripping spectroscopic factor=0.03 1 (L=1), 0.86 22 (L=3). Adopted (1977En02) neutron-pickup spectroscopic factor=0.59 10 (L=3), 0.01 (L=1).

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**Adopted Levels, Gammas (continued)**

$^{42}\text{Ca}$  Levels (continued)

E(level) <sup>†</sup>	J <sup>π</sup> #	T <sub>1/2</sub> <sup>‡</sup>	XREF							Comments														
3189.26 <sup>b</sup> 10	6 <sup>+</sup>	5.28 ns 15	A	B	C	D	E	G	H	I	J	M	P	R	T	U	V	W	XREF: Others: <b>AA, AE, AN, AP</b> $\mu = -2.49$ 9 (1975Yo02,2014StZZ) $J^\pi$ : L( $\alpha, ^2\text{He}$ )=L( $\alpha, \alpha'$ )=6 from 0 <sup>+</sup> . $T_{1/2}$ : weighted average of 5.30 ns 16 ( $\alpha, \text{p}\gamma$ ) and 5.27 ns 14 ( $\alpha, \alpha'$ ). $\mu$ : DPAD (1975Yo02). Adopted (1977En02) neutron-stripping spectroscopic factor=1.2 3 (L=3). Adopted (1977En02) neutron-pickup spectroscopic factor=0.99 18 (L=3) (L=3), 0.01 (L=1).					
3253.89 <sup>c</sup> 5	4 <sup>+</sup>	123 fs 21	B	E	g	H	I	J					P	R	T	V	X	XREF: Others: <b>AH, AL, AN, AP</b> $J^\pi$ : L( $\alpha, \alpha'$ )=L(p,t)=4 from 0 <sup>+</sup> . $T_{1/2}$ : weighted average of 118 fs 21 ( $\alpha, \text{p}\gamma$ ) and 210 fs +100-70 (p,p' $\gamma$ ). Adopted (1977En02) neutron-stripping spectroscopic factor=0.22 6 (L=3), small (L=1). Adopted (1977En02) neutron-pickup spectroscopic factor=0.08 2 (L=3), 0.00 (L=1).						
3300.0 4	0 <sup>+</sup>	>0.9 ps		g	H	I	J		N			R	S	T	V	X	XREF: Others: <b>AB, AC, AF</b> $J^\pi$ : L( $^6\text{Li}, \text{d}$ )=L(p,t)=0 from 0 <sup>+</sup> .							
3392.01 24	2 <sup>+</sup>	135 fs 40		H	I	J						P	R	S	T	V	X	XREF: Others: <b>AC</b> $J^\pi$ : L(t,p)=L( $\alpha, \alpha'$ )=2 from 0 <sup>+</sup> . $T_{1/2}$ : weighted average of 118 fs 21 in ( $\alpha, \text{p}\gamma$ ) and 230 fs 50 in (p,p' $\gamma$ ). Adopted (1977En02) neutron-stripping spectroscopic factor=0.01 1 (L=1), 0.01 1 (L=3). Adopted (1977En02) neutron-pickup spectroscopic factor=0.01 (L=3), 0.01 1 (L=1).						
3446.94 <sup>d</sup> 5	3 <sup>-</sup>	0.27 ps 9	B	E	G	H	I	J	M	N			P	Q	R	S	T	U	V	W	X	Y	Z	XREF: Others: <b>AF, AH, AJ, AK, AL, AP</b> $B(E3)^\uparrow = 0.0110$ 18 (1971He08,1989It02) $B(E3)$ from (e,e'). $J^\pi$ : L(t,p)=L(p,t)=3 from 0 <sup>+</sup> . $T_{1/2}$ : weighted average of 0.23 ps 7 ( $\alpha, \text{p}\gamma$ ) and 0.45 ps 14 (p,p' $\gamma$ ). Adopted (1977En02) neutron-stripping spectroscopic factor=small (L=0 and L=2). Adopted (1977En02) neutron-pickup spectroscopic factor=0.26 17 (L=0), 0.12 3 (L=2). Adopted (1977En02) proton-stripping spectroscopic factor=0.28 4 (L=1+3).
3654.0 3	2 <sup>+</sup>	49 fs 35		G	H	I	J					P	R	S	T	U	V	W	X	XREF: Others: <b>AB, AC, AE, AP</b> $J^\pi$ : L(t,p)=L(p,t)=2 from 0 <sup>+</sup> . $T_{1/2}$ : from ( $\alpha, \text{p}\gamma$ ). Other: 40 fs +60-40 from (p,p' $\gamma$ ). $J^\pi$ : L(p,p')=2 or 3.				
3780 10 3885.0 4	(2 <sup>+</sup> , 3 <sup>-</sup> ) 1 <sup>-</sup>								H	I	J		N	P	R	S	T	V	XREF: Others: <b>AD</b> $J^\pi$ : $\Delta J = 1$ $\gamma$ to 0 <sup>+</sup> and L( $\alpha, \alpha'$ )=3, L( $^3\text{He}, \text{d}$ )=1(+3).					
3954.39 <sup>d</sup> 6	4 <sup>-</sup>	3.36 ps 21	B	E	G	H	I					M	N	P	R	S	V	XREF: Others: <b>AH, AN, AP</b> $J^\pi$ : $\gamma(\theta, \text{lin pol})$ in ( $^{18}\text{O}, \alpha 2n\gamma$ ) and ( $\alpha, \text{p}\gamma$ ); L( $^3\text{He}, \text{d}$ )=3; L( $^3\text{He}, \alpha$ )=0(+2); $\sigma(\theta)$ and $A_y(\theta)$ in (pol p, $\alpha$ ). $T_{1/2}$ : from ( $\alpha, \text{p}\gamma$ ). XREF: Others: <b>AH</b>						
3999.66 9	4 <sup>+</sup>			E		H	I	J					P	R	S	XREF: Others: <b>AH</b> $J^\pi$ : $\gamma(\theta, \text{lin pol})$ in ( $^{18}\text{O}, \alpha 2n\gamma$ ) and gammas to 2 <sup>+</sup> and 4 <sup>+</sup> .								
4047.0 4	3 <sup>-</sup>	0.17 ps 5		G	H	I	J					N	P	R	S	T	V	$J^\pi$ : L( $^3\text{He}, \text{d}$ )=1+3 from 3/2 <sup>+</sup> , L( $^3\text{He}, \alpha$ )=0+2; $\gamma$ to 2 <sup>+</sup> .						

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**Adopted Levels, Gammas (continued)**

<sup>42</sup>Ca Levels (continued)

E(level) <sup>†</sup>	J <sup>π</sup> #	T <sub>1/2</sub> <sup>‡</sup>	XREF				Comments
4099.65 <sup>d</sup> 11	5 <sup>-</sup>	0.45 ps 10	ABCDE	GHIJ	MN	pQRSTUVwX	T <sub>1/2</sub> : from (α,pγ). XREF: Others: <a href="#">AJ</a> , <a href="#">AL</a> , <a href="#">AN</a> J <sup>π</sup> : L(p,t)=L(p,p')=L(α,α')=5 from 0 <sup>+</sup> ; σ(θ) and Ay(θ) in (pol p,α); also γ(θ,lin pol). T <sub>1/2</sub> : from (α,pγ). Adopted ( <a href="#">1977En02</a> ) neutron-stripping spectroscopic factor=small (L=2). Adopted ( <a href="#">1977En02</a> ) neutron-pickup spectroscopic factor=0.43 13 (L=2). Adopted ( <a href="#">1977En02</a> ) proton-stripping spectroscopic factor=0.46 9 (L=3).
4117.1 3	3 <sup>-</sup>			H J	N p R	w	XREF: Others: <a href="#">AN</a> J <sup>π</sup> : γ(θ,lin pol) in (p,p'γ); σ(θ) and Ay(θ) in (pol p,α).
4180 2	0					W	<a href="#">Additional information 1.</a>
4232.0 4	1			HIJ	N P RS		J <sup>π</sup> : γ(θ,lin pol).
4342.3 6	(0 <sup>+</sup> to 4 <sup>+</sup> )			g iJ	rs	w	J <sup>π</sup> : γ to 2 <sup>+</sup> . <a href="#">Additional information 2.</a>
4354.0 5	4 <sup>-</sup>	0.47 ps 7		gHi	P rs	Vw	J <sup>π</sup> : γ(θ,lin pol) in (α,pγ); L(d,t)=2.
4418.0 4	3 <sup>-</sup>			GH J	MN P	UVWX	T <sub>1/2</sub> : from (α,pγ). J <sup>π</sup> : L(p,t)=3 from 0 <sup>+</sup> ; also L(d,p)=0+2 from 7/2 <sup>-</sup> , L( <sup>3</sup> He,d)=1+3 from 3/2 <sup>+</sup> .
4443.0 6	4 <sup>+</sup>			H	QRST	v	XREF: Others: <a href="#">AB</a> , <a href="#">AL</a> , <a href="#">AP</a> XREF: S(4470).
4448.8 4	2 <sup>+</sup>			HIJ	p R	v	J <sup>π</sup> : L(p,p')=L(α,α')=4 from 0 <sup>+</sup> . XREF: Others: <a href="#">AB</a> , <a href="#">AL</a>
4505.0 5	(2,3,4) <sup>+</sup>			HI	P S		J <sup>π</sup> : L(t,p)=2 from 0 <sup>+</sup> ; gammas to 0 <sup>+</sup> and 3 <sup>-</sup> . J <sup>π</sup> : L(d,p)=1+3 from 7/2 <sup>-</sup> ; and gammas to 2 <sup>+</sup> and 4 <sup>+</sup> .
4566.9 5	(1,2 <sup>+</sup> )			HIJ	P S		J <sup>π</sup> : gammas to 0 <sup>+</sup> and 2 <sup>+</sup> .
4666 10	(3,4) <sup>-</sup>			i	P		XREF: Others: <a href="#">AF</a> J <sup>π</sup> : L(d,p)=0+2 from 7/2 <sup>-</sup> this level was not adopted by <a href="#">1990En08</a> since the (d,p) cross section is small.
4690.06 10	3 <sup>-</sup>			GHi	N PQ	TuVwX	XREF: Others: <a href="#">AF</a> , <a href="#">AH</a> , <a href="#">AJ</a> , <a href="#">AL</a> J <sup>π</sup> : L(t,p)=L(p,t)=3 from 0 <sup>+</sup> .
4717.53 <sup>c</sup> 14	6 <sup>+</sup>	83 fs 32	A	E Hi	n		XREF: Others: <a href="#">AF</a> J <sup>π</sup> : γγ(θ)(DCO) and γ(lin pol) in ( <sup>18</sup> O,α2nγ).
4717.6 4	3 <sup>-</sup>			i	n P S		T <sub>1/2</sub> : from (α,pγ). XREF: Others: <a href="#">AF</a>
4759.71 16	2 <sup>+</sup>			HIJ	P T	X	J <sup>π</sup> : L(p,p')=3 from 0 <sup>+</sup> ; L(d,p)=0+2 from 7/2 <sup>-</sup> . XREF: Others: <a href="#">AF</a> , <a href="#">AH</a> , <a href="#">AP</a>
4866.0 6	2 <sup>+</sup>			HIJ	P ST	X	J <sup>π</sup> : L(t,p)=L(p,t)=2 from 0 <sup>+</sup> . XREF: Others: <a href="#">AE</a> , <a href="#">AF</a>
4897.0 <sup>d</sup> 3	5 <sup>-</sup>	47 fs 21		E GHi		uvwX	J <sup>π</sup> : L(t,p)=L(α,α')=L(p,p')=2; but L(α, <sup>2</sup> He)=4. XREF: Others: <a href="#">AF</a>
4904.0 5	3 <sup>-</sup>			HiJ	N P	Tuvw	J <sup>π</sup> : γ(θ,lin pol). T <sub>1/2</sub> : from (α,pγ). XREF: Others: <a href="#">AF</a>
4946.9 10	(1,2,3) <sup>-</sup>			Hi	N P		J <sup>π</sup> : L(α,α')=3. This requires E3 to g.s. E(level): if T <sub>1/2</sub> <50 fs then E3 50% to g.s. is unlikely. In that case another level of J <sup>π</sup> =2 <sup>+</sup> is required. XREF: Others: <a href="#">AF</a> J <sup>π</sup> : L( <sup>3</sup> He,d)=1(+3) from 3/2 <sup>+</sup> and γ to 2 <sup>+</sup> .

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**Adopted Levels, Gammas (continued)**

$^{42}\text{Ca}$  Levels (continued)

E(level) <sup>†</sup>	J <sup>π</sup> #	T <sub>1/2</sub> <sup>‡</sup>	XREF					Comments
4971.0 5	3 <sup>-</sup>		GHiJ	N PQ ST	X		XREF: Others: <a href="#">AF</a> , <a href="#">AL</a> J <sup>π</sup> : L(p,p')=L(p,t)=3 from 0 <sup>+</sup> .	
5017.14 11	4 <sup>+</sup>		HI	P T V X			XREF: Others: <a href="#">AF</a> , <a href="#">AH</a> , <a href="#">AP</a> J <sup>π</sup> : L(t,p)=L(p,t)=4 from 0 <sup>+</sup> .	
5075.0 8	(1,2,3) <sup>-</sup>		GHI	N P			J <sup>π</sup> : L( <sup>3</sup> He,d)=1(+3) from 3/2 <sup>+</sup> and γ to 3 <sup>-</sup> .	
5158.0 7	3 <sup>-</sup>		GHI	N T			J <sup>π</sup> : L(α,α')=3 from 0 <sup>+</sup> .	
5188.0 11	(2,3,4) <sup>+</sup>		H	Vw			J <sup>π</sup> : γ to 3 <sup>-</sup> ; L(d,t)=3.	
5210.3 7	(2 <sup>+</sup> )		Hi j	N p T Vwx			J <sup>π</sup> : γ to 4 <sup>+</sup> . L(t,p)=L(α,α')=2. It is assumed that the level at 5200 5 in (t,p) and 5205 5 in (α,α') is the same as 5210 2 in (α,pγ).	
5212.98 19	6		E				J <sup>π</sup> : from γ(θ,DCO) in ( <sup>18</sup> O,α2nγ).	
5214.1 6	(2 <sup>+</sup> )		H j	p wx			J <sup>π</sup> : gammas to 2 <sup>+</sup> and 4 <sup>+</sup> ; L(p,t)=2. It is assumed that the level at 5213 in (p,t) is the same as this level. See also comment for 5210 level. <a href="#">Additional information 3.</a>	
5320.0 5	(3,4) <sup>-</sup>		GHI	N P RS UVw			XREF: Others: <a href="#">AK</a> XREF: U(5340). J <sup>π</sup> : L(d,p)=0(+2) and L(d,t)=0+2 from 7/2 <sup>-</sup> .	
5345.0 10	0 <sup>+</sup>		H	R wx			XREF: Others: <a href="#">AJ</a> , <a href="#">AK</a> XREF: X(5332). J <sup>π</sup> : L(p,t)=0 and γ to 2 <sup>+</sup> .	
5358.0 6	2 <sup>+</sup>		HIJ	P X			J <sup>π</sup> : γ to 0 <sup>+</sup> and L(d,p)=1 from 7/2 <sup>-</sup> .	
5380.0 6	5 <sup>-</sup>		HI	T V X			XREF: Others: <a href="#">AE</a> J <sup>π</sup> : gammas to 4 <sup>+</sup> and 6 <sup>+</sup> ; L(d,t)=2 from 7/2 <sup>-</sup> . Inconsistent with L(α, <sup>2</sup> He)=6.	
5393.0 7	(3) <sup>-</sup>		GHi	N P t w			J <sup>π</sup> : gammas to 2 <sup>+</sup> ; L( <sup>3</sup> He,d)=1(+3) from 3/2 <sup>+</sup> and L(d,p)=(0+2).	
5407 4	3 <sup>-</sup>		i	N P t Vw			J <sup>π</sup> : L( <sup>3</sup> He,d)=1+3; L(d,p)=0.	
5439.0 10	(3,4) <sup>-</sup>		Hi	P V			J <sup>π</sup> : L(d,p)=L(d,t)=0 from 7/2 <sup>-</sup> .	
5466 5	(1 to 5) <sup>-</sup>		i	N			J <sup>π</sup> : L( <sup>3</sup> He,d)=3.	
5472.0 6	(2,3,4) <sup>+</sup>		Hi	P V X			J <sup>π</sup> : γ to 2 <sup>+</sup> ; L(d,p)=L(d,t)=1 from 7/2 <sup>-</sup> ; L(p,t)=(4) favors 4 <sup>+</sup> .	
5490.77 <sup>d</sup> 13	6 <sup>-</sup>	59 fs 14	ABCDE GH		v x		J <sup>π</sup> : from γ(θ,lin pol,DCO). T <sub>1/2</sub> : from (α,pγ).	
5491.0 8	3 <sup>-</sup>		H	N T v x			J <sup>π</sup> : L(α,α')=3. But inconsistent with L(d,t)=3(+1) for a level at 5488 5.	
5510.0 8	3 <sup>-</sup>		Hi	N Q T			XREF: Others: <a href="#">AJ</a> , <a href="#">AK</a> , <a href="#">AL</a> XREF: T(5527). J <sup>π</sup> : L(e,e')=L(α,α')=3.	
5530.0 7	2 <sup>+</sup>		Hi	P X			J <sup>π</sup> : L(p,t)=2 and L(d,p)=1.	
5578.0 11	(0 <sup>+</sup> to 4 <sup>+</sup> )		HI				J <sup>π</sup> : γ to 2 <sup>+</sup> .	
5593.0 5	3 <sup>-</sup>		GHiJ	N T V x			J <sup>π</sup> : L( <sup>3</sup> He,d)=1+3 from 3/2 <sup>+</sup> ; L(d,t)=0+2 from 7/2 <sup>-</sup> .	
5601.0 8	(3 <sup>-</sup> ,4 <sup>-</sup> )		Hi	Wx			J <sup>π</sup> : L( <sup>3</sup> He,α)=(0+2) from 7/2 <sup>-</sup> . It is assumed that the level at 5610 20 in ( <sup>3</sup> He,α) is the same as the level at 5601 2 in (α,pγ).	
5624.0 7	3 <sup>-</sup>		GHi	N P T			J <sup>π</sup> : L( <sup>3</sup> He,d)=1(+3) from 3/2 <sup>+</sup> ; L(d,p)=0(+2) from 7/2 <sup>-</sup> .	
5665.0 6	(3 <sup>-</sup> )		gHi	n q T w			J <sup>π</sup> : L(α,α')=L(p,t)=3. It is assumed that the level at 5665 2 in (α,pγ) is the same as 5667 5 in (α,α') and 5664 in (p,t).	
5670.0 7	(3 <sup>-</sup> )		gHi	Pq w			J <sup>π</sup> : gammas to 2 <sup>+</sup> and 3 <sup>-</sup> ; L(d,p)=0+2. It is assumed that the level at 5670 2 in (α,pγ) is the same as 5669 10 in (d,p).	
5691.77 17	6 <sup>+</sup>		E Hi	P T w			J <sup>π</sup> : γ(θ,DCO) in ( <sup>18</sup> O,α2nγ); gammas to 4 <sup>+</sup> and 6 <sup>+</sup> . But L(α,α')=(4,5) gives (4 <sup>+</sup> ,5 <sup>-</sup> ).	
5716.0 10	2 <sup>+</sup>		Hi	n t X			J <sup>π</sup> : L(p,t)=2.	

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**Adopted Levels, Gammas (continued)**

<sup>42</sup>Ca Levels (continued)

E(level) <sup>†</sup>	J <sup>π</sup> #	T <sub>1/2</sub> <sup>‡</sup>	XREF			Comments
5725.0 10	(2 <sup>+</sup> to 6 <sup>+</sup> )		Hi	n	t	J <sup>π</sup> : γ to 4 <sup>+</sup> .
5738.0 5	(2 <sup>+</sup> )		J		S	J <sup>π</sup> : gammas to 0 <sup>+</sup> and 2 <sup>+</sup> ; L(p,p')=2,3.
5744.01 <sup>d</sup> 11	7 <sup>-</sup>	0.42 ps 10	ABCDE	GHi		J <sup>π</sup> : ΔJ=2 γ to 5 <sup>-</sup> ; γ to 6 <sup>+</sup> from γ(θ,lin pol,DCO). T <sub>1/2</sub> : from (α,pγ). Other: 10.5 ps 10 is reported in ( <sup>16</sup> O,2pγ) using RDM. It may suggest two closely spaced levels.
5769.0 7	3 <sup>-</sup>		Hi		Vwx	J <sup>π</sup> : gammas to 2 <sup>+</sup> and 4 <sup>+</sup> ; L(d,t)=2 from 7/2 <sup>-</sup> .
5774.9 7	(4,5) <sup>+</sup>		Hi	P	wx	J <sup>π</sup> : gammas to 4 <sup>+</sup> and 6 <sup>+</sup> ; L(d,p)=1 from 7/2 <sup>-</sup> .
5797.0 6	(1,2) <sup>+</sup>		HI	p	V	XREF: Others: <b>AK, AL</b> XREF: I(5790).
5802.0 10	3 <sup>-</sup>		GH	N pQ	STUVWx	J <sup>π</sup> : gammas to 0 <sup>+</sup> and 2 <sup>+</sup> ; L(d,t)=3 from 7/2 <sup>-</sup> . XREF: Others: <b>AK, AL</b> XREF: G(5791)N(5795)T(5794)U(5790)W(5790). J <sup>π</sup> : L(α,α')=3.
5822.0 10	(1,2,3) <sup>-</sup>		H	N	x	J <sup>π</sup> : γ to 2 <sup>+</sup> ; L( <sup>3</sup> He,d)=1 from 3/2 <sup>+</sup> .
5860 10	0 <sup>+</sup>		I			J <sup>π</sup> : L(t,p)=0.
5866.0 8	(1,2,3 <sup>-</sup> )		gH			XREF: Others: <b>AB, AD, AG, AP</b> J <sup>π</sup> : gammas to 0 <sup>+</sup> and 2 <sup>+</sup> . If this level is the same as 5860 in (t,p) with L=0, then placement of 4028.5γ is incorrect as it would be E0.
5875.0 7	2 <sup>+</sup>		gH	N	T	J <sup>π</sup> : L(α,α')=2.
5924.0 5	(3,4) <sup>-</sup>		GHI	N P	t V	XREF: Others: <b>AJ, AK</b> XREF: I(5920).
5925.5 3	(5)		E HI		st V	J <sup>π</sup> : gammas to 4 <sup>+</sup> , 4 <sup>-</sup> and 5 <sup>-</sup> ; L(d,p)=0+2 from 7/2 <sup>-</sup> . XREF: Others: <b>AJ, AK</b> XREF: I(5920).
5956 10	(3,4) <sup>-</sup>			P		J <sup>π</sup> : L(d,p)=0+2 from 7/2 <sup>-</sup> .
5980 5	3 <sup>-</sup>		I	N	UV	XREF: Others: <b>AK</b> XREF: I(5980).
5994.0 8	3 <sup>-</sup>		HI	P	UV	J <sup>π</sup> : L( <sup>3</sup> He,d)=1 from 3/2 <sup>+</sup> ; L(d,t)=0(+2) from 7/2 <sup>-</sup> . XREF: Others: <b>AK</b> XREF: I(5980).
6003.0 10	3 <sup>-</sup> ,4 <sup>-</sup>		HI	p	UV	J <sup>π</sup> : γ to 2 <sup>+</sup> ; L(d,p)=0+2; L(d,t)=0+(2) from 7/2 <sup>-</sup> . XREF: Others: <b>AK</b> XREF: I(5980).
6016 5	0 <sup>+</sup>		I	n	T	J <sup>π</sup> : L(d,p)=0+2 from 7/2 <sup>-</sup> . XREF: Others: <b>AB</b>
6020.0 7	(4 <sup>+</sup> ,5,6 <sup>-</sup> )		H	n		J <sup>π</sup> : L(t,p)=0. L(α,α')=2 is inconsistent. <b>Additional information 4.</b> XREF: Others: <b>AB</b>
6028.0 6	(3) <sup>-</sup>		H	P	tuvw	J <sup>π</sup> : gammas to 4 <sup>-</sup> and 6 <sup>+</sup> ; 5 <sup>-</sup> or 6 <sup>-</sup> are supported by 11/2 <sup>-</sup> transfer in (α,p) from 3/2 <sup>+</sup> . <b>Additional information 5.</b>
6038.0 7	(1,2,3) <sup>-</sup>		H	N	T v	J <sup>π</sup> : L(d,p)=0+2 from 7/2 <sup>-</sup> ; γ to 2 <sup>+</sup> . XREF: Others: <b>AD, AJ</b> XREF: AD(6020).
6080	0 <sup>+</sup>				X	J <sup>π</sup> : L(α,α')=(1+3) from 3/2 <sup>+</sup> ; L(d,t)=2(+0) from 7/2 <sup>-</sup> ; γ to 2 <sup>+</sup> . <b>Additional information 6.</b>
6093.5 8	(3 <sup>-</sup> to 7 <sup>-</sup> )		H	n q	v	J <sup>π</sup> : L(p,t)=0. J <sup>π</sup> : γ to 5 <sup>-</sup> .
6104.0 7	(0 <sup>+</sup> to 4 <sup>+</sup> )		H	n q	v	J <sup>π</sup> : γ to 2 <sup>+</sup> .
6113.0 8	4 <sup>+</sup>		GHI	PQ	T V	XREF: Others: <b>AK</b> XREF: G(6096)I(6105).

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**Adopted Levels, Gammas (continued)**

$^{42}\text{Ca}$  Levels (continued)

E(level) <sup>†</sup>	J <sup>π</sup> #	T <sub>1/2</sub> <sup>‡</sup>	XREF		Comments
6140.8 6	6 <sup>-</sup>	49 fs +21-14	gHi	p	J <sup>π</sup> : L(t,p)=4. J <sup>π</sup> : γ(θ) to 6 <sup>-</sup> in (α,py); γ to 4 <sup>-</sup> ,5 <sup>-</sup> . T <sub>1/2</sub> : from (α,py).
6144.72 <sup>d</sup> 14	7 <sup>-</sup>	<70 fs	ABCDE gHI	p	J <sup>π</sup> : from γ(θ,lin pol,DCO). T <sub>1/2</sub> : from (α,py).
6158 5	3 <sup>-</sup>		i	N P T V	J <sup>π</sup> : L(α,α')=3.
6182.0 7	(1,2,3 <sup>-</sup> )		Hi	N T	J <sup>π</sup> : E=6182 γ to 0 <sup>+</sup> .
6212.0 10	3 <sup>-</sup>		Hi	P S Vw	J <sup>π</sup> : L(d,p)=0+2 from 7/2 <sup>-</sup> ; L(p,p')=2 or 3 from 0 <sup>+</sup> .
6240 5	3 <sup>-</sup>			N P T V	J <sup>π</sup> : L(α,α')=3.
6247.9 6	(4 <sup>+</sup> ,5,6 <sup>-</sup> )		H		J <sup>π</sup> : gammas to 4 <sup>-</sup> and 6 <sup>+</sup> .
6274 7	2 <sup>+</sup>		I	P	J <sup>π</sup> : L(t,p)=2.
6313 7	(2 to 5) <sup>+</sup>		G I	P T VW	XREF: Others: AB, AJ XREF: I(6290).
6390 10	(3,4) <sup>-</sup>		I	P RST	J <sup>π</sup> : L(d,p)=1 and Ay(θ). XREF: Others: AB, AJ XREF: I(6400)AJ(6300).
6408.57 <sup>d</sup> 12	8 <sup>-</sup>	31.0 ps 25	ABCDE GH	w	J <sup>π</sup> : L(d,p)=0 from 7/2 <sup>-</sup> ; L(π <sup>+</sup> ,π <sup>+</sup> )=(3). J <sup>π</sup> : ΔJ=2 E2 γ to 6 <sup>-</sup> ; ΔJ=1 γ to 7 <sup>-</sup> from γ(θ,lin pol,DCO). T <sub>1/2</sub> : from ( <sup>16</sup> O,2py).
6426 10	(2 to 5) <sup>+</sup>		i	P w	J <sup>π</sup> : L(d,p)=1 from 7/2 <sup>-</sup> .
6462 10	(3,4) <sup>-</sup>		i	P	J <sup>π</sup> : L(d,p)=0+2 from 7/2 <sup>-</sup> .
6516.0 6			I	P TU W	XREF: Others: AB, AD J <sup>π</sup> : L(d,p)=1 from 7/2 <sup>-</sup> . L(p,d)=0+2 from 7/2 <sup>-</sup> is incompatible. L(t,p)=(0) suggests (0 <sup>+</sup> ) and L( <sup>3</sup> He,α)=(4) suggests (4 <sup>+</sup> ).
6541.8 6	5 <sup>+</sup>		H	P	J <sup>π</sup> : gammas to 5 <sup>-</sup> ,6 <sup>+</sup> , and 6 <sup>-</sup> ; L(d,p)=1 from 7/2 <sup>-</sup> .
6553.72 <sup>d</sup> 12	9 <sup>-</sup>	42 ps 3	ABCDE GH		J <sup>π</sup> : ΔJ=2 E2 γ to 7 <sup>-</sup> ; ΔJ=1 γ to 8 <sup>-</sup> from γ(θ,lin pol,DCO).
6572 15	(2 to 5) <sup>+</sup>		i	P w	J <sup>π</sup> : L(d,p)=1 from 7/2 <sup>-</sup> .
6584.7 8	(5 <sup>-</sup> to 8 <sup>-</sup> )		GHi	w	J <sup>π</sup> : gammas to 7 <sup>-</sup> and 6 <sup>-</sup> .
6614 15	(3,4) <sup>+</sup>		i	P T	J <sup>π</sup> : L(d,p)=1 and analyzing power in (d,p).
6636.30 <sup>c</sup> 15	8 <sup>+</sup>	36 fs 15	E HI	P RST W	XREF: Others: AK XREF: I(6640)P(6653)W(6660). J <sup>π</sup> : from γ(θ,DCO) in ( <sup>18</sup> O,α2nγ). T <sub>1/2</sub> : from (α,py).
6674.8 10	(4 <sup>+</sup> to 8 <sup>+</sup> )		H	P T W	XREF: Others: AL XREF: P(6670)W(6660). J <sup>π</sup> : γ to 6 <sup>+</sup> .
6715.9 7	(4 <sup>+</sup> )		H	P	XREF: Others: AB J <sup>π</sup> : γ to 6 <sup>+</sup> ; γ to (2 <sup>+</sup> ); L(d,p)=(1+3) from 7/2 <sup>-</sup> .
6718.14 17	7		E		J <sup>π</sup> : ΔJ=1 γ to 6 <sup>+</sup> from γ(θ,DCO) in ( <sup>18</sup> O,α2nγ).
6720 8	0 <sup>+</sup>		I		XREF: Others: AB, AD XREF: AD(?). J <sup>π</sup> : L(t,p)=0.
6746.5 8	4 <sup>+</sup>		GHI	P T X	XREF: Others: AL XREF: P(6760). J <sup>π</sup> : L(d,p)=1 from 7/2 <sup>-</sup> ; J <sub>n</sub> =1/2+3/2 in (pol d,p); γ transitions to 5 <sup>-</sup> in (α,py). But 3/2 <sup>+</sup> transfer in (α,p) from 3/2 <sup>+</sup> favors 3 <sup>+</sup> .
6781 7			G I	P TU W	XREF: I(6800).
6816.8 10	(4,5) <sup>+</sup>		HI	P	XREF: Others: AD

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**Adopted Levels, Gammas (continued)**

<sup>42</sup>Ca Levels (continued)

E(level) <sup>†</sup>	J <sup>π</sup> #	T <sub>1/2</sub> <sup>‡</sup>	XREF		Comments
6895.8 6	4 <sup>+</sup>		HI	P	J <sup>π</sup> : γ to 6 <sup>+</sup> ; L(d,p)=1 from 7/2 <sup>-</sup> .
6920 4	(3,4) <sup>+</sup>		I	P	J <sup>π</sup> : gammas to 3 <sup>-</sup> and 6 <sup>+</sup> ; L(d,p)=1 from 7/2 <sup>-</sup> .
6931 7	(2,3) <sup>+</sup>		G I	P ST V	J <sup>π</sup> : L(d,p)=1 from 7/2 <sup>-</sup> ; J <sub>n</sub> =1/2 in (pol d,p). XREF: I(6940).
6940.2 6	(5 <sup>-</sup> ,6,7 <sup>-</sup> )		Hi	t	J <sup>π</sup> : 3/2 <sup>+</sup> transfer in (α,p) from 3/2 <sup>+</sup> and L(d,p)=1+3 from 7/2 <sup>-</sup> .
6961 15	(3,4) <sup>+</sup>			P	J <sup>π</sup> : gammas to 5 <sup>-</sup> and 7 <sup>-</sup> .
6975.5 5	(5 <sup>+</sup> )		GH	P	J <sup>π</sup> : L(d,p)=1 from 7/2 <sup>-</sup> ; J <sub>n</sub> =1/2 in (pol d,p).
7020 12	4 <sup>+</sup>		G I	PQ s w	J <sup>π</sup> : gammas to 5 <sup>-</sup> , 6 <sup>+</sup> , and 6 <sup>-</sup> ; 13/2 <sup>+</sup> transfer in (α,p) from 3/2 <sup>+</sup> .
7041 15	(3 <sup>-</sup> ,4 <sup>-</sup> )			P s w	XREF: Others: <a href="#">AL</a> XREF: I(7010).
7103 7	(1 to 4) <sup>-</sup>		G I	Q	J <sup>π</sup> : 11/2 <sup>+</sup> transfer in (α,p) from 3/2 <sup>+</sup> ; L(d,p)=1+3 from 7/2 <sup>-</sup> ; J <sub>n</sub> =1/2+5/2 in (pol d,p).
7129.9 10	4 <sup>+</sup>		Hi	P	J <sup>π</sup> : L(d,p)=(0+2) from 7/2 <sup>-</sup> .
7153 7	(3,4) <sup>+</sup>		G i	P	XREF: Others: <a href="#">AL</a> XREF: I(7110).
7180 20	2 <sup>+</sup>		I		J <sup>π</sup> : 5/2 <sup>-</sup> transfer in (α,p) from 3/2 <sup>+</sup> .
7197.9 10			H	P	J <sup>π</sup> : L(d,p)=1 from 7/2 <sup>-</sup> ; J <sub>n</sub> =1/2+3/2 in (pol d,p); γ to 6 <sup>+</sup> .
7228 7	(3 <sup>-</sup> ,4 <sup>-</sup> )		G	P	J <sup>π</sup> : L(d,p)=1 from 7/2 <sup>-</sup> ; J <sub>n</sub> =1/2 in (pol d,p); 11/2 <sup>+</sup> transfer in (α,p) favors 4 <sup>+</sup> .
7273 7	(3,4) <sup>+</sup>		G I	P	J <sup>π</sup> : L(t,p)=2.
7282.02 14	9 <sup>-</sup>		A E HI	U	J <sup>π</sup> : γ to 6 <sup>+</sup> , but L(d,p)=(0+2) from 7/2 <sup>-</sup> suggests (3 <sup>-</sup> ,4 <sup>-</sup> ).
7344.7 10	(6 <sup>-</sup> to 10 <sup>-</sup> )		G I	R	J <sup>π</sup> : 5/2 <sup>-</sup> transfer in (α,p) from 3/2 <sup>+</sup> gives (1 to 4) <sup>(-)</sup> and L(d,p)=(0+2) from 7/2 <sup>-</sup> gives (3 <sup>-</sup> ,4 <sup>-</sup> ).
7348 15	(3,4) <sup>+</sup>			P	XREF: Others: <a href="#">AJ</a> , <a href="#">AK</a> , <a href="#">AL</a> XREF: I(7257).
7360.6 10	(5 <sup>-</sup> to 9 <sup>-</sup> )		H		J <sup>π</sup> : L(d,p)=1 from 7/2 <sup>-</sup> ; J <sub>n</sub> =1/2 in (pol d,p); 3/2 <sup>+</sup> transfer in (α,p) from 3/2 <sup>+</sup> favors 3 <sup>+</sup> .
7368.46 <sup>d</sup> 15	10 <sup>-</sup>	1.9 ps 8	ABCDE H		XREF: Others: <a href="#">AE</a> , <a href="#">AJ</a> , <a href="#">AL</a> XREF: I(7280).
7388.8 10	4 <sup>+</sup>		HI	PQ S	J <sup>π</sup> : gammas to 8 <sup>-</sup> and 9 <sup>-</sup> ; γ(θ,DCO) in ( <sup>18</sup> O,α2nγ). But L(α, <sup>2</sup> He)=(5,6,7) suggest (7 <sup>-</sup> ).
7415.87 15	8 <sup>+</sup>		E H	P S w	XREF: Others: <a href="#">AJ</a> , <a href="#">AL</a> XREF: I(7320).
7421.2 8	(4 <sup>+</sup> to 8 <sup>+</sup> )		H	P RS U w	J <sup>π</sup> : γ to 8 <sup>-</sup> .
7468 15	(2 to 5) <sup>(+)</sup>			P	J <sup>π</sup> : L(d,p)=1 from 7/2 <sup>-</sup> ; J <sub>n</sub> =1/2 in (pol d,p).
7520 15	(3,4) <sup>+</sup>			P	J <sup>π</sup> : γ to 7 <sup>-</sup> .
					J <sup>π</sup> : from γ(θ,lin pol,DCO). T <sub>1/2</sub> : weighted average of 2.6 ps 11 in ( <sup>18</sup> O,2npy) and 1.5 ps 8 in ( <sup>16</sup> O,2py).
					XREF: Others: <a href="#">AL</a> XREF: P(7401).
					J <sup>π</sup> : γ to 6 <sup>+</sup> ; L(d,p)=1 from 7/2 <sup>-</sup> ; J <sub>n</sub> =1/2+3/2 in (pol d,p).
					XREF: Others: <a href="#">AJ</a> , <a href="#">AL</a> XREF: P(7422).
					J <sup>π</sup> : from γ(θ,DCO) in ( <sup>18</sup> O,α2nγ); γ to 6 <sup>+</sup> .
					XREF: Others: <a href="#">AL</a> XREF: P(7438).
					J <sup>π</sup> : γ to 6 <sup>+</sup> .
					J <sup>π</sup> : L(d,p)=(1+3) from 7/2 <sup>-</sup> .
					J <sup>π</sup> : L(d,p)=1 from 7/2 <sup>-</sup> ; J <sub>n</sub> =1/2 in (pol d,p).

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**Adopted Levels, Gammas (continued)**

<sup>42</sup>Ca Levels (continued)

E(level) <sup>†</sup>	J <sup>π</sup> #	T <sub>1/2</sub> <sup>‡</sup>	XREF			Comments
7543.1 6	(4 <sup>+</sup> to 7 <sup>-</sup> )		H		w	J <sup>π</sup> : gammas to 5 <sup>-</sup> and 6 <sup>+</sup> .
7562.5 10	(4 <sup>+</sup> ,5 <sup>+</sup> )		H	PQ	w	XREF: Others: <b>AK, AL</b> XREF: P(7571).
7600 15	(2 <sup>+</sup> to 5 <sup>+</sup> )			P		J <sup>π</sup> : γ to 6 <sup>+</sup> ; L(d,p)=(1) from 7/2 <sup>-</sup> .
7634.03 23	(6,8 <sup>+</sup> )		E H			J <sup>π</sup> : L(d,p)=(1+3) from 7/2 <sup>-</sup> .
7643 15	3 <sup>+</sup> ,4 <sup>+</sup>			P		J <sup>π</sup> : γ to 6 <sup>+</sup> ; γ(θ,DCO) in ( <sup>18</sup> O,α2nγ).
7696.8 10	4 <sup>+</sup>		H	P		J <sup>π</sup> : L(d,p)=1 from 7/2 <sup>-</sup> ; J <sub>n</sub> =1/2+3/2 in (pol d,p).
7726.5 10	(4 <sup>+</sup> to 8 <sup>+</sup> )		H			J <sup>π</sup> : L(d,p)=1 from 7/2 <sup>-</sup> ; J <sub>n</sub> =1/2+3/2 in (pol d,p); γ to 6 <sup>+</sup> .
7750.66 17	(11) <sup>-</sup>	<2.1 ps	CD			J <sup>π</sup> : γ to 6 <sup>+</sup> . J <sup>π</sup> : ΔJ=1 γ to 10 <sup>-</sup> ; γ(lin pol). T <sub>1/2</sub> : from ( <sup>16</sup> O,2pγ).
7758.0 6	(6 <sup>-</sup> ,7 <sup>-</sup> )		H			J <sup>π</sup> : gammas to 5 <sup>-</sup> , 6 <sup>-</sup> , 7 <sup>-</sup> and 8 <sup>-</sup> .
7760 15	(3,4) <sup>+</sup>			P		J <sup>π</sup> : L(d,p)=1 from 7/2 <sup>-</sup> ; J <sub>n</sub> =(1/2) in (pol d,p).
7793 15	(3,4) <sup>+</sup>			P		J <sup>π</sup> : L(d,p)=1 from 7/2 <sup>-</sup> ; J <sub>n</sub> =1/2 in (pol d,p).
7800.7 10	(5 <sup>-</sup> to 9 <sup>-</sup> )		H			J <sup>π</sup> : γ to 7 <sup>-</sup> .
7838.9 12	(2 <sup>+</sup> to 6 <sup>+</sup> )		H			J <sup>π</sup> : γ to (4 <sup>+</sup> ).
7921.2 8	(4 <sup>+</sup> to 8 <sup>+</sup> )		H			J <sup>π</sup> : γ to 6 <sup>+</sup> .
7939.8 8	(4 <sup>+</sup> to 8 <sup>+</sup> )		H			J <sup>π</sup> : gammas to 6 <sup>+</sup> .
8052.6 10	(4 <sup>+</sup> to 8 <sup>+</sup> )		H			J <sup>π</sup> : γ to 6 <sup>+</sup> .
8059.7 8	(6 <sup>-</sup> to 9 <sup>-</sup> )		H			J <sup>π</sup> : gammas to 7 <sup>-</sup> and 8 <sup>-</sup> .
8082.7 10	(7 <sup>-</sup> to 11 <sup>-</sup> )		H			J <sup>π</sup> : γ to 9 <sup>-</sup> .
8103.2 8	(4 <sup>+</sup> to 8 <sup>+</sup> )		H			J <sup>π</sup> : gammas to 6 <sup>+</sup> .
8170 20					W	
8297.46 <sup>d</sup> 15	11 <sup>-</sup>	<1.7 ps	ABCDE H		TU W	XREF: Others: <b>AJ</b> XREF: W(8260). J <sup>π</sup> : ΔJ=1 M1 γ to 10 <sup>-</sup> ; γ to 9 <sup>-</sup> ; γ(θ,pol,DCO). T <sub>1/2</sub> : from ( <sup>18</sup> O,2npγ).
8364.8 8	(6 <sup>-</sup> ,7,8 <sup>+</sup> )		H	R U W		XREF: W(8330).
8449.7 6	(7,8) <sup>-</sup>		H	Q S U W		J <sup>π</sup> : gammas to 6 <sup>+</sup> and 8 <sup>-</sup> . XREF: W(8410).
8450	0 <sup>+</sup>				X	J <sup>π</sup> : gammas to 6 <sup>-</sup> and 9 <sup>-</sup> . J <sup>π</sup> : L(p,t)=0 from 0 <sup>+</sup> .
8511.7 8	(6 <sup>-</sup> to 9 <sup>-</sup> )				U	XREF: Others: <b>AB, AJ, AK</b> XREF: AK(8520).
8517.0 11	(3 to 9)		H		U W	J <sup>π</sup> : gammas to 7 <sup>-</sup> and 8 <sup>-</sup> . XREF: Others: <b>AJ, AK</b> XREF: W(8520).
8522.3 3	(10)		C		U W	J <sup>π</sup> : γ to (5,7). XREF: Others: <b>AJ, AK</b> XREF: W(8520).
8580.9 12	(2 <sup>+</sup> to 6 <sup>+</sup> )		H		TU W	J <sup>π</sup> : ΔJ=1 γ to (11) <sup>-</sup> ; γ(θ) in ( <sup>19</sup> F,αγ). XREF: W(8600).
8611.9 12	(2 <sup>+</sup> to 6 <sup>+</sup> )		H		TU W	J <sup>π</sup> : γ to (4 <sup>+</sup> ). XREF: W(8600).
8615.13 15	9		E			J <sup>π</sup> : γ to (4 <sup>+</sup> ).
8722.30 15	9		E			J <sup>π</sup> : from γ(θ,DCO) in ( <sup>18</sup> O,α2nγ).
8744.9 11	(8 <sup>-</sup> to 12 <sup>-</sup> )		H			J <sup>π</sup> : from γ(θ,DCO) in ( <sup>18</sup> O,α2nγ).
8773.7 8	(5,6,7)		H	Q U		J <sup>π</sup> : γ to 10 <sup>-</sup> . XREF: Others: <b>AE</b> XREF: AE(8810).
8847.97 <sup>c</sup> 20	(10 <sup>+</sup> )		E H	Q U W		J <sup>π</sup> : gammas to 6 <sup>-</sup> and 6 <sup>+</sup> . XREF: Others: <b>AE</b> XREF: AE(8810). J <sup>π</sup> : gammas to 8 <sup>+</sup> ; γ(θ,DCO) in ( <sup>18</sup> O,α2nγ).

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**Adopted Levels, Gammas (continued)**

$^{42}\text{Ca}$  Levels (continued)

E(level) <sup>†</sup>	J <sup>π</sup> #	XREF				Comments
8951.3 11	(6 <sup>+</sup> to 10 <sup>+</sup> )			H		J <sup>π</sup> : γ to 8 <sup>+</sup> .
9015.01 14	10 <sup>+</sup>	A	E			J <sup>π</sup> : from γ(θ,DCO) in ( $^{18}\text{O},\alpha 2n\gamma$ ); gammas to 8 <sup>+</sup> , 9 <sup>-</sup> and 11 <sup>-</sup> .
9036.9 11	(8 <sup>-</sup> to 12 <sup>-</sup> )			H	UV	XREF: Others: AE XREF: AE(9080). J <sup>π</sup> : γ to 10 <sup>-</sup> .
9115 5				F		
9191 5				F		
9205.9 8	(7 <sup>-</sup> to 9 <sup>-</sup> )			H	UV	XREF: Others: AE XREF: AE(9080). J <sup>π</sup> : gammas to 7 <sup>-</sup> and 9 <sup>-</sup> .
9241.9? 9				E		J <sup>π</sup> : from γ(θ,DCO) in ( $^{18}\text{O},\alpha 2n\gamma$ ).
9270						XREF: Others: AC
9280 5	1 <sup>-@</sup>			F		
9311.08 16	(8,10 <sup>+</sup> )			E		J <sup>π</sup> : ΔJ=(0,2) γ to (6,8 <sup>+</sup> ); γ to 8 <sup>+</sup> ; γ(θ,DCO) in ( $^{18}\text{O},\alpha 2n\gamma$ ).
9330 50						XREF: Others: AE
9367 5				F		
9377.7 10	(5 <sup>-</sup> to 9 <sup>-</sup> )			H		J <sup>π</sup> : γ to 7 <sup>-</sup> .
9426 5				F		
9470 5				F		
9561 5				F		
9600 50	(5 <sup>-</sup> ,6 <sup>+</sup> )					XREF: Others: AE J <sup>π</sup> : L(α, $^2\text{He}$ )=(5,6).
9635 5				F		
9672 5				F		
9699 5				F		
9723 5				F		
9750 10	(2 <sup>-</sup> )				M Q S UVW	XREF: Others: AL T=2 XREF: W(9740). J <sup>π</sup> : M2 excitation in (e,e'); g.s. analog of $^{42}\text{Ca}$ .
9757 5				F		
9759.7 10	(7 <sup>-</sup> to 11 <sup>-</sup> )			H		J <sup>π</sup> : γ to 9 <sup>-</sup> .
9770	(2 <sup>+</sup> )				Q	J <sup>π</sup> : E2 excitation in (e,e').
9784 5				F		
9786.29 14	(9 <sup>-</sup> ,11)	A	E			J <sup>π</sup> : from γ(θ,DCO) in ( $^{18}\text{O},\alpha 2n\gamma$ ); gammas to 9, 10 <sup>+</sup> , 10 <sup>-</sup> and 11 <sup>-</sup> .
9841.6 10	(5,6) <sup>-</sup>			H	UVW	XREF: Others: AE, AL XREF: AE(9870). J <sup>π</sup> : γ to 7 <sup>-</sup> ; L(p,d)=L( $^3\text{He},\alpha$ )=2 from 7/2 <sup>-</sup> .
9850 10	(3 <sup>-</sup> )				M X	T=2 J <sup>π</sup> : possible IAS of $^{42}\text{Ca}$ at 107 keV.
9947 5				F		
10000 10	(4 <sup>-</sup> )				M u w	T=2 J <sup>π</sup> : possible IAS of $^{42}\text{Ca}$ at 258 keV; L( $^3\text{He},d$ )=3 from 3/2 <sup>+</sup> .
10035.6 10	(5 <sup>-</sup> to 9 <sup>-</sup> )			H	u w	J <sup>π</sup> : γ to 7 <sup>-</sup> .
10038 5				F		
10160 50						XREF: Others: AE
10168.69 16	(10,12 <sup>+</sup> )	A	E			J <sup>π</sup> : from γ(θ,DCO) in ( $^{18}\text{O},\alpha 2n\gamma$ ); gammas to 10 <sup>+</sup> and 11 <sup>-</sup> .
10205 5				F		XREF: Others: AC
10231 5				F		
10282 5	1 <sup>-@</sup>			F		
10314 5				F		
10358 5	1 <sup>-@</sup>			F		
10389 5				F		
10450.0 10	(5 <sup>-</sup> )				M QRS U W	T=2

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**Adopted Levels, Gammas (continued)**

$^{42}\text{Ca}$  Levels (continued)

E(level) <sup>†</sup>	J <sup>π</sup> #	XREF	Comments
			XREF: U(10430)W(10430). J <sup>π</sup> : possible IAS of $^{42}\text{Ca}$ at 699. L( $^3\text{He},d$ )=3 from $3/2^+$ .
10453 5		F	
10500 5	1 <sup>-</sup> @	F	
10510 20			W T=2
10527 5		F	
10561 5		F	
10588 5		F	
10610 20			W T=2
10612 5		F	
10633 5		F	
10652 5		F	
10673 5	1 <sup>-</sup> @	F	
10700 5	@	F	
10726 5	1 <sup>-</sup> @	F	
10783 5	1 <sup>-</sup> @	F	
10805 5	1 <sup>-</sup> @	F	
10842 5	1 <sup>-</sup> @	F	
10884 5	1 <sup>-</sup> @	F	
10905 5	1 <sup>-</sup> @	F	
10916 5	1 <sup>-</sup> @	F	
10968 5		F	
10970 20	3 <sup>-</sup>		U WX T=2 J <sup>π</sup> : L(p,t)=3 from 0 <sup>+</sup> and L(p,d)=0 from 7/2 <sup>-</sup> .
10985 5		F	
11013 5	1 <sup>-</sup> @	F	
11048 5		F	
11076 5	1 <sup>-</sup> @	F	
11108 5	1 <sup>-</sup> @	F	
11149 5	1 <sup>-</sup> @	F	
11165.7 9	(10,12)	E	J <sup>π</sup> : $\gamma(\theta, \text{DCO})$ in ( $^{18}\text{O}, \alpha 2n\gamma$ ).
11185 5	1 <sup>-</sup> @	F	
11223 5	1 <sup>-</sup> @	F	
11235 5	(1 <sup>+</sup> )		Q T=2 J <sup>π</sup> : M1 excitation in (e,e').
11279 5		F	
11303.7 10		F J	
11309.5 10		J	
11319.3 10		J	
11326.1 10		J	
11331.0 10		J	
11335.9 10	1 <sup>-</sup> @	F J	
11343.7 10		J	
11361.3 7	(1,2 <sup>+</sup> )	J	J <sup>π</sup> : $\gamma(\theta)$ in (p, $\gamma$ ).
11363.2 10		J	
11380.8 10	1 <sup>-</sup> @	F J	
11398.4 10		J	
11401.3 10		F J	
11405.1 <sup>c</sup> 11	(12 <sup>+</sup> )	E	J <sup>π</sup> : $\gamma(\theta, \text{DCO})$ in ( $^{18}\text{O}, \alpha 2n\gamma$ ).
11409.1 10		J	
11412.0 10		J	
11416.9 10		J	

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**Adopted Levels, Gammas (continued)**

$^{42}\text{Ca}$  Levels (continued)

E(level) <sup>†</sup>	J <sup>π</sup> #	XREF	Comments
11426.0 10		J L	
11429.6 15	(0 <sup>+</sup> ,1 <sup>-</sup> ,2 <sup>+</sup> )&	L	
11432.3 10		J L	
11436.1 10	(1 <sup>-</sup> ,2 <sup>+</sup> )&	J L	
11439.7 10	1 <sup>-</sup> @	F J L	
11440 20	3 <sup>-</sup> ,4 <sup>-</sup>		U WX T=2 J <sup>π</sup> : L(p,d)=L( <sup>3</sup> He,α)=0 from 7/2 <sup>-</sup> .
11445.6 10		J L	
11447.7 15	(0 <sup>+</sup> ,1 <sup>-</sup> ,2 <sup>+</sup> )&	L	
11449.0 15		L	
11450.5 15		L	
11453.1 15		L	
11464.7 15		L	
11468.1 15		L	
11469.3 15	(1 <sup>-</sup> ,2 <sup>+</sup> )&	L	
11473.5 15	(1 <sup>-</sup> ,2 <sup>+</sup> )&	L	
11475.8 15		L	
11477.7 15		L	
(11480.64 7)	3 <sup>-</sup> ,4 <sup>-</sup>		XREF: Others: AH J <sup>π</sup> : s-wave capture in $^{41}\text{Ca}$ g.s. (J <sup>π</sup> =7/2 <sup>-</sup> ).
11481.77 9		0	
11485.20 6	(2 <sup>+</sup> )&	L 0	
11486.86 6		0	
11488.7 15	1 <sup>-</sup> @	F L	
11490.40 9		L 0	
11493.6 15		L	
11495.41 6		0	
11499.0 1		L 0	
11500.20 6		L 0	
11503.70 11		L 0	
11507.10 15	(0 <sup>+</sup> ,1 <sup>-</sup> ,2 <sup>+</sup> )&	L 0	
11508.8 15		L	
11510.34 16	(1 <sup>-</sup> )&	L 0	
11512.5 15		L	
11514.36 15		0	
11516.6 15	(1 <sup>-</sup> )&	L	
11519.5 3		F L 0	
11523.3 15	(1 <sup>-</sup> ,2 <sup>+</sup> )&	L 0	
11525.4 15		L	
11527.4 15	(1 <sup>-</sup> ,2 <sup>+</sup> )&	L	
11529.3 15	(0 <sup>+</sup> ,1 <sup>-</sup> ,2 <sup>+</sup> )&	L	
11530.7 3		L 0	
11532.6 15		L	
11537.12 25		0	
11540.0 15	(1 <sup>-</sup> )&	L	
11542.3 15	(0 <sup>+</sup> ,1 <sup>-</sup> ,2 <sup>+</sup> )&	L	
11543.6 15		L	
11544.4 15	1 <sup>-</sup> @	F L	
11550.0 15	(0 <sup>+</sup> ,1 <sup>-</sup> ,2 <sup>+</sup> )&	L	
11551.5 15		L	
11555.4 15	(1 <sup>-</sup> )&	L	
11556.3 15		L	

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Adopted Levels, Gammas (continued)

$^{42}\text{Ca}$  Levels (continued)

E(level) <sup>†</sup>	J <sup>π</sup> #	XREF	Comments
11558.1	15	L	
11562.8	15	L	
11569.2	1 <sup>-</sup> &	L	
11571.7	(0 <sup>+</sup> ,1 <sup>-</sup> ,2 <sup>+</sup> )&	L	
11572.8	(1 <sup>-</sup> ,3 <sup>-</sup> ,4 <sup>+</sup> )&	L	
11575.2	(3 <sup>-</sup> ,4 <sup>+</sup> )&	L	
11576.2	15	L	
11589.8	(1 <sup>-</sup> )&	L	
11591.1	15	L	
11592.6	15	L	
11594.6	15	L	
11596.7	1 <sup>-</sup> &	L	
11599.4	(1 <sup>-</sup> ,2 <sup>+</sup> )&	L	
11601.8	1 <sup>-</sup> &	L	
11603.5	15	L	
11612.5	1 <sup>-</sup> &	F KL	
11614.0	15	L	
11616.0	1 <sup>-</sup> &	L	
11621.0	(1 <sup>-</sup> ,2 <sup>+</sup> )&	L	
11632.8	15	L	
11634.5	(1 <sup>-</sup> ,2 <sup>+</sup> )&	L	
11636.1	(1 <sup>-</sup> ,2 <sup>+</sup> )&	L	
11637.4	(1 <sup>-</sup> ,2 <sup>+</sup> )&	L	
11639.4	1 <sup>-</sup> &	KL	E(level): possible analog of 1927 level in $^{42}\text{Ca}$ .
11641.1	15	L	
11643.5	15	L	
11644.1	(1 <sup>-</sup> ,2 <sup>+</sup> )&	JKL	
11646.2	(4 <sup>+</sup> )&	L	
11651.2	(1 <sup>-</sup> ,2 <sup>+</sup> )&	J L	
11653.4	15	JKL	
11654.2	(1 <sup>-</sup> )&	L	
11656.8	(1 <sup>-</sup> )&	L	
11658		JK	
11662.2	(1 <sup>-</sup> ,2 <sup>+</sup> )&	F JKL	
11664.9	15	L	
11670.9	4 2 <sup>+</sup> &	JKL	
11674.0	5 (1 <sup>-</sup> ,2 <sup>+</sup> ) <sup>a</sup>	JK	
11680		J	
11685		JK	
11689.2	(1 <sup>-</sup> ,2 <sup>+</sup> )&	L	
11693.0	4 (1 <sup>-</sup> ,2 <sup>+</sup> ) <sup>a</sup>	JK	
11695.0	(3 <sup>-</sup> )&	L	
11697.3	15	J L	
11699.7	15	J L	
11707.5	4 2 <sup>+</sup> &	J L	
11709.2	(1 <sup>-</sup> ,2 <sup>+</sup> )&	JKL	
11710.1	15	JKL	
11718.3	15	JKL	
11725.7	9 (8 <sup>-</sup> to 11)	E	J <sup>π</sup> : γ to 9 and 10 <sup>-</sup> .

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Adopted Levels, Gammas (continued) $^{42}\text{Ca}$  Levels (continued)

<u>E(level)<sup>†</sup></u>	<u>J<math>\pi</math>#</u>	<u>XREF</u>
11727.1 3	2+&	JKL
11728.2 15		L
11729.3 15		L
11733.0 15		JKL
11737.4 15	(0 <sup>+</sup> ,1 <sup>-</sup> ,2 <sup>+</sup> )&	L
11738.4 4	1-&	JKL
11743.4 5	(1 <sup>-</sup> ,2 <sup>+</sup> ) <sup>a</sup>	JKL
11748.0 15		L
11752.3 15		JKL
11756.6 15	(1 <sup>-</sup> )&	JKL
11758		J
11760		JK
11763		JK
11768		JK
11772.7 15	(1 <sup>-</sup> ,2 <sup>+</sup> )&	J L
11775.0 4	(1 <sup>-</sup> ,2 <sup>+</sup> ) <sup>a</sup>	JK
11777.2 15		L
11778.5 15	(0 <sup>+</sup> ,1 <sup>-</sup> ,2 <sup>+</sup> )&	JKL
11783.0 15	(1 <sup>-</sup> ,2 <sup>+</sup> )&	L
11784.7 15	(1 <sup>-</sup> ),2+&	L
11786.1 15		JKL
11787.5 15		L
11789.8 15		L
11792		J
11795.2 4	(1 <sup>-</sup> ,2 <sup>+</sup> ) <sup>a</sup>	J L
11798.3 15	(1 <sup>-</sup> ,2 <sup>+</sup> )&	JKL
11805.4 4	(1 <sup>-</sup> ,2 <sup>+</sup> )&	JKL
11809.7 15	(1 <sup>-</sup> ,2 <sup>+</sup> )&	JKL
11811.1 15	(1 <sup>-</sup> ,2 <sup>+</sup> )&	L
11814		JK
11818.0 15		L
11821.1 4		E
11822.4 4	(1 <sup>-</sup> )&	JKL
11824.0 15	(1 <sup>-</sup> ,2 <sup>+</sup> )&	L
11829.0 15	(1 <sup>-</sup> ,2 <sup>+</sup> )&	JKL
11830.2 15	(2 <sup>+</sup> )&	L
11831.8 15		JKL
11836.4 15	(4 <sup>+</sup> )&	JKL
11843.3 5	(1 <sup>-</sup> ,2 <sup>+</sup> )&	JKL
11844.9 15	(1 <sup>-</sup> ,2 <sup>+</sup> )&	L
11846.8 15		L
11850		JK
11852.6 15	1-&	JKL
11856.4 15		JKL
11865.6 15	(0 <sup>+</sup> ,1 <sup>-</sup> ,2 <sup>+</sup> )&	KL
11868.0 4	(1 <sup>-</sup> ,2 <sup>+</sup> ) <sup>a</sup>	JK
11871.5 4	(1 <sup>-</sup> ,2 <sup>+</sup> ) <sup>a</sup>	JKL
11872.8 15		L
11873.7 4	(1 <sup>-</sup> ,2 <sup>+</sup> ) <sup>a</sup>	JKL
11881		JK
11885.2 15	(1 <sup>-</sup> ,2 <sup>+</sup> ,3 <sup>-</sup> )&	JKL

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Adopted Levels, Gammas (continued) $^{42}\text{Ca}$  Levels (continued)

E(level) <sup>†</sup>	J $\pi$ #	XREF	Comments
11887		JK	
11895.3 15	(1 <sup>-</sup> ,2 <sup>+</sup> )&	JKL	
11902.0 15	(1 <sup>-</sup> ,2 <sup>+</sup> )&	JKL	
11906.3 15	(1 <sup>-</sup> ,3 <sup>-</sup> )&	JKL	
11910.6 15	(1 <sup>-</sup> ,2 <sup>+</sup> )&	JKL	
11916		JK	
11921		JK	
11923.3 15	(1 <sup>-</sup> ,2 <sup>+</sup> )&	L	
11925.6 5	(1 <sup>-</sup> ,2 <sup>+</sup> ) <sup>a</sup>	JKL	
11929		K	
11933.1 15	(1 <sup>-</sup> ,2 <sup>+</sup> )&	KL	
11937		JK	
11941.9 15	2 <sup>+</sup> &	L	
11944.4 15	1 <sup>-</sup> &	J L	
11950.1 15		JKL	
11953		JK	
11959.2 5	(1 <sup>-</sup> )	J L	
11962.8 15	(1 <sup>-</sup> ,2 <sup>+</sup> )&	JKL	
11967		JK	
11970.2 15	1 <sup>-</sup> &	KL	
11976.8 15	(2 <sup>+</sup> )&	L	
11980.3 4	1 <sup>-</sup> &	JKL	
11989.0 15	(2 <sup>+</sup> ,3 <sup>-</sup> )&	L	
11992.1 15	(1 <sup>-</sup> ,2 <sup>+</sup> )&	L	
12000.2 15	2 <sup>+</sup> &	L	
12005.0 15	(1 <sup>-</sup> ,2 <sup>+</sup> )&	L	
12006.3 15		L	
12012.0 15	(2 <sup>+</sup> )&	L	
12013.6 15		L	
12020.4 15	(1 <sup>-</sup> ,2 <sup>+</sup> )&	L	
12029.5 15	(0 <sup>+</sup> ,1 <sup>-</sup> ,2 <sup>+</sup> )&	L	
12032.5 15	(3 <sup>-</sup> )&	L	
12039.8 15	1 <sup>-</sup> &	L	
12041.8 15		L	
12042.8 15		L	
12050.9 15	(1 <sup>-</sup> ,2 <sup>+</sup> )&	L	
12052.0 15		L	
12061.8 15		L	
12066.2 15	(1 <sup>-</sup> ,2 <sup>+</sup> )&	L	
12070.1 15	(2 <sup>+</sup> )&	L	
12071.4 15		L	
12082.8 15		L	
12085.2 15		L	
12091.9 15		L	
12099		L	
12101.3 15	1 <sup>-</sup> &	JKL	E(level): possible analog of 2356 level in $^{42}\text{Ca}$ .
12105.1 15		J L	
12109		JK	
12112.2 15	1 <sup>-</sup> &	JKL	

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued) $^{42}\text{Ca}$  Levels (continued)

E(level) <sup>†</sup>	J <sup>π</sup> #	XREF	Comments
12116.5 15	(2 <sup>+</sup> )&	KL	
12123.8 15	(1 <sup>-</sup> ,2 <sup>+</sup> )&	JKL	
12127.6 15		JKL	
12130		J	
12135.2 15		JKL	
12137.9 15		L	
12142		JK	
12144.7 15		JKL	
12146.8 15		L	
12148.5 15		J L	
12153.7 15	2 <sup>+</sup> &	JKL	
12156		J	
12158.6 15	1 <sup>-</sup> &	KL	
12160		JK	
12163.1 15	1 <sup>-</sup> &	JKL	
12168 3	(1 <sup>-</sup> )&	JKL	
12172.0 5	(1,2 <sup>+</sup> ) <sup>a</sup>	JK	
12175.7 15	1 <sup>-</sup> &	KL	
12180		JK	
12182.8 15	1 <sup>-</sup> &	KL	
12185		JK	
12187.7 15		JKL	
12198		JK	
12198.1 11		E	
12203.0 15	(1 <sup>-</sup> ,3 <sup>-</sup> )&	JKL	
12204.1 15		JKL	
12207.9 15	(0 <sup>+</sup> ,1 <sup>-</sup> ,2 <sup>+</sup> )&	JKL	
12210.4 15		L	
12212.2 15		JKL	
12216		JK	
12221.0 15		L	
12222.7 15		J L	
12226.3 15		JKL	
12230.5 15	(1 <sup>-</sup> ,2 <sup>+</sup> ,3 <sup>-</sup> )&	JKL	
12236		JK	
12238.4 15	(1 <sup>-</sup> ,3 <sup>-</sup> )&	JKL	
12239.4 15		J L	
12246.4 15	(1 <sup>-</sup> ,2 <sup>+</sup> )&	L	
12247.6 15		L	
12251.8 15	(1 <sup>-</sup> )&	L	
12255		JK	
12260.2 15	(2 <sup>+</sup> ,3 <sup>-</sup> )&	L	
12263		JK	
12265.2 15	1 <sup>-</sup> &	L	
12268.1 15	3 <sup>-</sup> &	L	
12270		JK	
12271.8 15	(1 <sup>-</sup> ,2 <sup>+</sup> )&	L	
12277.2 15	(0 <sup>+</sup> ,1 <sup>-</sup> ,2 <sup>+</sup> ,3 <sup>-</sup> ,4 <sup>+</sup> )&	JKL	
12278.7 15		JKL	
12280	0 <sup>+</sup>	J	X J <sup>π</sup> : L(p,t)=0 from 0 <sup>+</sup> .
12285.7 15	(1 <sup>-</sup> ,2 <sup>+</sup> )&	J L	

Continued on next page (footnotes at end of table)



Adopted Levels, Gammas (continued) $^{42}\text{Ca}$  Levels (continued)

E(level) <sup>†</sup>	$J^\pi$ <sup>#</sup>	XREF	Comments
12287.7 15		JKL	
12291.3 15		JKL	
12294.9 15		L	
12298.6 15	(1 <sup>-</sup> ,2 <sup>+</sup> ,3 <sup>-</sup> )&	JKL	
12300.6 15		JKL	
12304.9 15		JKL	
12308.2 15		KL	
12310.9 15		JKL	
12314		JK	
12316		J	
12320.6 15	(0 <sup>+</sup> ,1 <sup>-</sup> ,2 <sup>+</sup> )&	L	
12323.2 15	(1 <sup>-</sup> ,2 <sup>+</sup> )&	JKL	
12327.0 15		JKL	
12330		JK	
12336		JKL	
12340		KL	
12344		JK	
12348		JKL	
12351		JKL	
12358		J L	
12362		JKL	
12369		JKL	
12374		JKL	
12377		L	
12381		JKL	
12383		L	
12386		JKL	
12390		J	
12397		J L	
12701.4 4		E	
12814.7 8		E	
13712.8 11		E	
13762.8 13		E	
14700 50	0 <sup>+</sup>		XREF: Others: AC $J^\pi$ : L( $^3\text{He,n}$ )=0.
15251.7 13		E	
$17.4 \times 10^3$ 1	1 <sup>-</sup>	J	$\Gamma=3.3$ MeV 5 (1973Di03) $J^\pi$ : GDR, T=1 (p, $\gamma$ ).
$20.4 \times 10^3$ 1	1 <sup>-</sup>	J	$\Gamma=4.4$ MeV 1 (1973Di03) $J^\pi$ : GDR, T=2 (p, $\gamma$ ).

<sup>†</sup> From least-squares adjustment to measured  $E_\gamma$  data when such data are available. Otherwise weighted averages of available level energies from different reactions are taken.

<sup>‡</sup> Primarily from ( $\alpha$ ,p $\gamma$ ) and (p,p' $\gamma$ ) by Doppler Shift Attenuation Method (DSAM) or Recoil Distance Method (RDM), unless otherwise noted.

<sup>#</sup> When L-transfer arguments are used, the target spin-parity is  $J^\pi=3/2^+$  for  $^{41}\text{K}$ ;  $J^\pi=0^+$  for  $^{40}\text{Ca}$ ,  $^{42}\text{Ca}$  and  $^{44}\text{Ca}$ ;  $J^\pi=7/2^-$  for  $^{43}\text{Ca}$ . When assigning  $J^\pi$  to a level based on  $\gamma$  transitions from this level to a level of known  $J^\pi$ , evaluators use the following rules: if  $E_\gamma < 4$  MeV, transitions are considered to be E1, M1 or E2; if  $E_\gamma > 4$  MeV, M2 and E3 are also considered as possible.

<sup>@</sup> From angular distributions of the ground-state  $\gamma$ -rays from resonant states in ( $\alpha$ , $\gamma$ ).

<sup>&</sup> From comparison of experimental data of angular distributions with theoretical predictions in (p, $\alpha$ ):resonance.

<sup>a</sup> From  $\gamma(\theta)$  and analysis of proton-resonance data in (p, $\gamma$ ).

Continued on next page (footnotes at end of table)

**Adopted Levels, Gammas (continued)** **${}^{42}\text{Ca}$  Levels (continued)**

- <sup>b</sup> Band(A): g.s., Yrast band.  
<sup>c</sup> Band(B): Excited 0<sup>+</sup> band.  
<sup>d</sup> Band(C): Negative-parity structure.

Adopted Levels, Gammas (continued)

E <sub>i</sub> (level)	J <sub>i</sub> <sup>π</sup>	$\gamma(^{42}\text{Ca})$							I <sub>(<math>\gamma+ce</math>)</sub>	Comments
		E <sub><math>\gamma</math></sub> <sup>†</sup>	I <sub><math>\gamma</math></sub> <sup>†</sup>	E <sub>f</sub>	J <sub>f</sub> <sup>π</sup>	Mult. <sup>‡</sup>	$\delta^{\ddagger}$	$\alpha^{\#}$		
1524.71	2 <sup>+</sup>	1524.67 3	100	0.0	0 <sup>+</sup>	E2				B(E2)(W.u.)=9.5 4
1837.31	0 <sup>+</sup>	312.60 25	100 6	1524.71	2 <sup>+</sup>	E2		0.00349		B(E2)(W.u.)=55 5
		1837.3		0.0	0 <sup>+</sup>	E0			2.05 17	I <sub><math>\gamma</math></sub> : represents 97.95% 17 decay branching for level. $\rho^2$ (E0)=0.140 12, $q_K^2$ (E0/E2)=0.92 8, X(E0/E2)=0.089 8 (2005Ki02 evaluation). Decay takes place by pair formation. $\Gamma$ (pair production)= $1.6 \times 10^{-8}$ eV 2 from (e,e') (1978Gr02). I <sub>(<math>\gamma+ce</math>)</sub> : from (p,p' $\gamma$ ).
2424.15	2 <sup>+</sup>	586.9 <sup>@</sup>	<1.5	1837.31	0 <sup>+</sup>					
		899.41 4	100 2	1524.71	2 <sup>+</sup>	M1+E2	-0.17 2			B(M1)(W.u.)=0.15 5; B(E2)(W.u.)=15 6
		2424.16 7	43 2	0.0	0 <sup>+</sup>	E2				B(E2)(W.u.)=1.7 5
2752.40	4 <sup>+</sup>	328.2	1.0 4	2424.15	2 <sup>+</sup>	[E2]				B(E2)(W.u.)=60 30
		1227.65 3	100.0 4	1524.71	2 <sup>+</sup>	E2				B(E2)(W.u.)=8.3 12
3189.26	6 <sup>+</sup>	436.84 12	100	2752.40	4 <sup>+</sup>	E2				B(E2)(W.u.)=0.777 22
3253.89	4 <sup>+</sup>	501.46 3	64 7	2752.40	4 <sup>+</sup>	[M1]				B(M1)(W.u.)=0.50 11
		829.7	18 9	2424.15	2 <sup>+</sup>	[E2]				B(E2)(W.u.)=1.3 $\times 10^2$ 8
		1729.19 5	100 7	1524.71	2 <sup>+</sup>	E2(+M3)	+0.05 4			B(E2)(W.u.)=19 4
3300.0	0 <sup>+</sup>	875.8	100 1	2424.15	2 <sup>+</sup>	E2				B(E2)(W.u.)<1.3 $\times 10^2$
		1775.3	8 4	1524.71	2 <sup>+</sup>	E2				B(E2)(W.u.)<0.31
3392.01	2 <sup>+</sup>	967.8	45 10	2424.15	2 <sup>+</sup>					
		1554.7	15 3	1837.31	0 <sup>+</sup>	[E2]				B(E2)(W.u.)=3.2 +14-7
		1867.3	100 4	1524.71	2 <sup>+</sup>	M1+E2	+1.7 4			B(M1)(W.u.)=0.0026 +11-6; B(E2)(W.u.)=6.4 +27-15
		3391.9	87 8	0.0	0 <sup>+</sup>	E2				B(E2)(W.u.)=0.43 9
3446.94	3 <sup>-</sup>	692.0 8	6.6 18	2752.40	4 <sup>+</sup>	[E1]				B(E1)(W.u.)=0.00025 11
		1022.77 4	57 2	2424.15	2 <sup>+</sup>	[E1]				B(E1)(W.u.)=0.00068 23
		1922.18 7	100 3	1524.71	2 <sup>+</sup>	E1(+M2)	+0.02 7			B(E1)(W.u.)=0.00018 6; B(M2)(W.u.)<0.7
3654.0	2 <sup>+</sup>	1229.8	4.2 10	2424.15	2 <sup>+</sup>					
		1816.7	7 4	1837.31	0 <sup>+</sup>	[E2]				B(E2)(W.u.)=4 +18-3
		2129.2	100 3	1524.71	2 <sup>+</sup>	M1(+E2)	-0.06 17			B(M1)(W.u.)=0.035 25; B(E2)(W.u.)<0.55
		3653.8	22.2 10	0.0	0 <sup>+</sup>	E2				B(E2)(W.u.)=0.34 25
3885.0	1 <sup>-</sup>	1460.8	4 2	2424.15	2 <sup>+</sup>					
		2047.6	93 3	1837.31	0 <sup>+</sup>	E1				
		3884.8	100 4	0.0	0 <sup>+</sup>	E1				
3954.39	4 <sup>-</sup>	507.45 3	100 4	3446.94	3 <sup>-</sup>	M1+E2	+0.11 5			B(M1)(W.u.)=0.042 4; B(E2)(W.u.)=6 +6-4
		1202.0	18 4	2752.40	4 <sup>+</sup>	E1				B(E1)(W.u.)=1.5 $\times 10^{-5}$ 4
3999.66	4 <sup>+</sup>	1247.2	7 4	2752.40	4 <sup>+</sup>					
		1575.5	49 5	2424.15	2 <sup>+</sup>					
		2474.80 10	100 5	1524.71	2 <sup>+</sup>					
4047.0	3 <sup>-</sup>	600.1	22 5	3446.94	3 <sup>-</sup>	M1+E2	+0.21 12			B(M1)(W.u.)=0.07 3; B(E2)(W.u.)=30 +70-25
		1294.6	29 8	2752.40	4 <sup>+</sup>	[E1]				B(E1)(W.u.)=0.00024 11
		1622.8	29 10	2424.15	2 <sup>+</sup>	[E1]				B(E1)(W.u.)=0.00012 6
		2522.2	100 11	1524.71	2 <sup>+</sup>	[E1]				B(E1)(W.u.)=0.00011 4

Adopted Levels, Gammas (continued)

$\gamma(^{42}\text{Ca})$  (continued)

$E_i(\text{level})$	$J_i^\pi$	$E_\gamma^\dagger$	$I_\gamma^\dagger$	$E_f$	$J_f^\pi$	Mult. <sup>‡</sup>	$\delta^\ddagger$	Comments
4099.65	5 <sup>-</sup>	652.8		3446.94	3 <sup>-</sup>			
		910.37 <i>15</i>	100 3	3189.26	6 <sup>+</sup>	E1(+M2)	+0.04 2	B(E1)(W.u.)=0.00102 24
		1347.26 <i>14</i>	61 3	2752.40	4 <sup>+</sup>	E1+M2	-0.09 4	B(E1)(W.u.)=0.00019 5
4117.1	3 <sup>-</sup>	670.1	61 <i>11</i>	3446.94	3 <sup>-</sup>			
		1692.8	21 6	2424.15	2 <sup>+</sup>			
		2592.2	100 7	1524.71	2 <sup>+</sup>			
4232.0	1	1807.8	27 5	2424.15	2 <sup>+</sup>			
		4231.8	100 5	0.0	0 <sup>+</sup>			
4342.3	(0 <sup>+</sup> to 4 <sup>+</sup> )	1918.1	100	2424.15	2 <sup>+</sup>			
4354.0	4 <sup>-</sup>	399.6	9 2	3954.39	4 <sup>-</sup>	M1+E2	>0.09	B(M1)(W.u.)<0.046; B(E2)(W.u.)>3.9 $\delta$ : also,<-0.09.
		907.0	53 9	3446.94	3 <sup>-</sup>			
		1100.1	20 5	3253.89	4 <sup>+</sup>	[E1]		B(E1)(W.u.)=0.00010 3
		1601.6	100 9	2752.40	4 <sup>+</sup>	E1		B(E1)(W.u.)=0.00016 3
4418.0	3 <sup>-</sup>	971.0	67 <i>12</i>	3446.94	3 <sup>-</sup>			
		1993.8	25 8	2424.15	2 <sup>+</sup>			
		2893.2	100 <i>13</i>	1524.71	2 <sup>+</sup>			
4443.0	4 <sup>+</sup>	1189.1	10 3	3253.89	4 <sup>+</sup>			
		1690.6	100 5	2752.40	4 <sup>+</sup>			
		2018.8	16 4	2424.15	2 <sup>+</sup>			
4448.8	2 <sup>+</sup>	794.8	34 6	3654.0	2 <sup>+</sup>			
		1001.8	37 9	3446.94	3 <sup>-</sup>			
		2611.4	49 <i>11</i>	1837.31	0 <sup>+</sup>			
		2924.0	100 <i>17</i>	1524.71	2 <sup>+</sup>			
		4448.5	66 <i>14</i>	0.0	0 <sup>+</sup>			
4505.0	(2,3,4) <sup>+</sup>	1113.0	34 6	3392.01	2 <sup>+</sup>			
		1251.1	15 4	3253.89	4 <sup>+</sup>			
		1752.6	64 <i>11</i>	2752.40	4 <sup>+</sup>			
		2980.2	100 <i>13</i>	1524.71	2 <sup>+</sup>			
4566.9	(1,2 <sup>+</sup> )	682.0	47 9	3885.0	1 <sup>-</sup>			
		2142.8	100 9	2424.15	2 <sup>+</sup>			
		3042.2	100 9	1524.71	2 <sup>+</sup>			$I_\gamma$ : $I_\gamma(3043)/I_\gamma(2143)=78/44$ in (p, $\gamma$ ).
		4566		0.0	0 <sup>+</sup>			$I_\gamma$ : $I_\gamma(4566)/I_\gamma(2143)=100/44$ in (p, $\gamma$ ).
4690.06	3 <sup>-</sup>	2265.8	22 6	2424.15	2 <sup>+</sup>			
		3165.24 <i>11</i>	100 6	1524.71	2 <sup>+</sup>			
4717.53	6 <sup>+</sup>	1463.7 3	95 5	3253.89	4 <sup>+</sup>	[E2]		B(E2)(W.u.)=48 +30-13
		1525.5	35 7	3189.26	6 <sup>+</sup>			
		1965.2 4	100 3	2752.40	4 <sup>+</sup>	[E2]		B(E2)(W.u.)=12 +7-3
4759.71	2 <sup>+</sup>	2335.70 30	57 29	2424.15	2 <sup>+</sup>			
		2922.5	43 <i>14</i>	1837.31	0 <sup>+</sup>			
		3235.1	86 29	1524.71	2 <sup>+</sup>			
		4759.6	100 29	0.0	0 <sup>+</sup>			
4866.0	2 <sup>+</sup>	2441.8	100 9	2424.15	2 <sup>+</sup>			

Adopted Levels, Gammas (continued)

γ(<sup>42</sup>Ca) (continued)

E <sub>i</sub> (level)	J <sub>i</sub> <sup>π</sup>	E <sub>γ</sub> <sup>†</sup>	I <sub>γ</sub> <sup>†</sup>	E <sub>f</sub>	J <sub>f</sub> <sup>π</sup>	Mult. <sup>‡</sup>	δ <sup>‡</sup>	Comments
4866.0	2 <sup>+</sup>	3341.2	22 9	1524.71	2 <sup>+</sup>			
		4865.7	22 9	0.0	0 <sup>+</sup>			I <sub>γ</sub> : I <sub>γ</sub> (4866)/I <sub>γ</sub> (3341)=100/100 in (p,γ).
4897.0	5 <sup>-</sup>	779.0	8 1	4117.1	3 <sup>-</sup>	[E2]		B(E2)(W.u.)=3.1×10 <sup>2</sup> 15
		797.8 3	100 4	4099.65	5 <sup>-</sup>	M1+E2	+0.14 8	I <sub>γ</sub> : branching most likely incorrect.
		1449.0	18 4	3446.94	3 <sup>-</sup>	E2		B(M1)(W.u.)=0.7 4; B(E2)(W.u.)=70 +230-60
4904.0	3 <sup>-</sup>	2151.5	36 9	2752.40	4 <sup>+</sup>			B(E2)(W.u.)=31 16
		2479.8	45 9	2424.15	2 <sup>+</sup>			
		4903.7	100 18	0.0	0 <sup>+</sup>	[E3]		
4946.9	(1,2,3) <sup>-</sup>	2522.7	100	2424.15	2 <sup>+</sup>			
4971.0	3 <sup>-</sup>	1016.6	91 14	3954.39	4 <sup>-</sup>			
		2546.7	100 17	2424.15	2 <sup>+</sup>			
		3446.1	94 17	1524.71	2 <sup>+</sup>			E <sub>γ</sub> : (p,γ) reported 1526, 2281 and 4968 γ transitions instead of the three transition given here from (α,pγ).
5017.14	4 <sup>+</sup>	1763.12 12	100 7	3253.89	4 <sup>+</sup>			
		3492.2	21 7	1524.71	2 <sup>+</sup>			
5075.0	(1,2,3) <sup>-</sup>	657.0	47 10	4418.0	3 <sup>-</sup>			
		1628.0	100 10	3446.94	3 <sup>-</sup>			
5158.0	3 <sup>-</sup>	2733.7	85 17	2424.15	2 <sup>+</sup>			
		3633.1	100 17	1524.71	2 <sup>+</sup>			
5188.0	(2,3,4) <sup>+</sup>	770.0	100	4418.0	3 <sup>-</sup>			
5210.3	(2 <sup>+</sup> )	1956.1	100 5	3253.89	4 <sup>+</sup>			
		2457.5	14 5	2752.40	4 <sup>+</sup>			
5212.98	6	1213.2 3	100 10	3999.66	4 <sup>+</sup>			
		1959.1 4	75 9	3253.89	4 <sup>+</sup>			
5214.1	(2 <sup>+</sup> )	1217 3	100 8	3999.66	4 <sup>+</sup>			
		2789.7	25 7	2424.15	2 <sup>+</sup>			
		3689.1	39 8	1524.71	2 <sup>+</sup>			
		5213.7 @		0.0	0 <sup>+</sup>			γ reported in (p,γ) only.
5320.0	(3,4) <sup>-</sup>	902.0	61 11	4418.0	3 <sup>-</sup>			
		1220.3	61 11	4099.65	5 <sup>-</sup>			
		1273.0	26 5	4047.0	3 <sup>-</sup>			
		1365.6	100 13	3954.39	4 <sup>-</sup>			
		2066.1	16 5	3253.89	4 <sup>+</sup>			
5345.0	0 <sup>+</sup>	3820.1	100	1524.71	2 <sup>+</sup>			
5358.0	2 <sup>+</sup>	2933.7	33 20	2424.15	2 <sup>+</sup>			
		5357.6	100 20	0.0	0 <sup>+</sup>			
5380.0	5 <sup>-</sup>	2126.1	52 10	3253.89	4 <sup>+</sup>			
		2190.5	86 12	3189.26	6 <sup>+</sup>			
		2627.5	100 14	2752.40	4 <sup>+</sup>			
5393.0	(3) <sup>-</sup>	2968.7	33 12	2424.15	2 <sup>+</sup>			
		3868.1	100 12	1524.71	2 <sup>+</sup>			
5439.0	(3,4) <sup>-</sup>	1339.3	100	4099.65	5 <sup>-</sup>			

## Adopted Levels, Gammas (continued)

 $\gamma(^{42}\text{Ca})$  (continued)

$E_i(\text{level})$	$J_i^\pi$	$E_\gamma$ †	$I_\gamma$ †	$E_f$	$J_f^\pi$	Mult. ‡	$\delta$ ‡	Comments
5472.0	(2,3,4) <sup>+</sup>	2218.1	100 10	3253.89	4 <sup>+</sup>			
		2719.5	43 8	2752.40	4 <sup>+</sup>			
		3947.1	16 10	1524.71	2 <sup>+</sup>			
5490.77	6 <sup>-</sup>	2301.6 2	100	3189.26	6 <sup>+</sup>	E1(+M2)	+0.10 8	B(E1)(W.u.)=0.00077 19
5491.0	3 <sup>-</sup>	1374.0	100 13	4117.1	3 <sup>-</sup>			
		3966.1	45 13	1524.71	2 <sup>+</sup>			
5510.0	3 <sup>-</sup>	1463.0	47 12	4047.0	3 <sup>-</sup>			
		2063.0	100 12	3446.94	3 <sup>-</sup>			
5530.0	2 <sup>+</sup>	3105.7	100 13	2424.15	2 <sup>+</sup>			
		4005.1	43 13	1524.71	2 <sup>+</sup>			
5578.0	(0 <sup>+</sup> to 4 <sup>+</sup> )	2185.9	100	3392.01	2 <sup>+</sup>			
5593.0	3 <sup>-</sup>	1638.6	100 15	3954.39	4 <sup>-</sup>			
		3168.7	56 8	2424.15	2 <sup>+</sup>			
		4068.1	52 15	1524.71	2 <sup>+</sup>			
		5592.6	52 15	0.0	0 <sup>+</sup>	[E3]		$E_\gamma$ : reported only in (p, $\gamma$ ).
5601.0	(3 <sup>-</sup> ,4 <sup>-</sup> )	1096.0	49 15	4505.0	(2,3,4) <sup>+</sup>			
		1601.3	100 15	3999.66	4 <sup>+</sup>			
5624.0	3 <sup>-</sup>	1624.3	100 15	3999.66	4 <sup>+</sup>			
		5623.6	60 15	0.0	0 <sup>+</sup>	[E3]		
5665.0	(3 <sup>-</sup> )	1247.0	51 11	4418.0	3 <sup>-</sup>			
		1710.6	100 16	3954.39	4 <sup>-</sup>			
		3240.7	71 13	2424.15	2 <sup>+</sup>			
5670.0	(3 <sup>-</sup> )	2223.0	100 16	3446.94	3 <sup>-</sup>			
		4145.1	79 16	1524.71	2 <sup>+</sup>			
5691.77	6 <sup>+</sup>	974.1 2	100 13	4717.53	6 <sup>+</sup>			
		2437.8 3	83 13	3253.89	4 <sup>+</sup>			
		2502.4	30 9	3189.26	6 <sup>+</sup>			
5716.0	2 <sup>+</sup>	2462.0	100	3253.89	4 <sup>+</sup>			
5725.0	(2 <sup>+</sup> to 6 <sup>+</sup> )	2972.5	100	2752.40	4 <sup>+</sup>			
5738.0	(2 <sup>+</sup> )	3313.7	33 17	2424.15	2 <sup>+</sup>			
		4213.1	33 17	1524.71	2 <sup>+</sup>			
		5737.6	100 33	0.0	0 <sup>+</sup>			
5744.01	7 <sup>-</sup>	253.3 1	2.6 2	5490.77	6 <sup>-</sup>			
		1026.3 2	4.0 4	4717.53	6 <sup>+</sup>			
		1644.29 11	100 3	4099.65	5 <sup>-</sup>	E2(+M3)	-0.02 3	B(E2)(W.u.)=7.2 18
		2554.75 21	73 3	3189.26	6 <sup>+</sup>	E1+M2	-0.04 2	B(E1)(W.u.)=3.2×10 <sup>-5</sup> 8; B(M2)(W.u.)<0.12
5769.0	3 <sup>-</sup>	3016.5	100 11	2752.40	4 <sup>+</sup>			
		3344.7	59 11	2424.15	2 <sup>+</sup>			
5774.9	(4,5) <sup>+</sup>	2521.0	100 3	3253.89	4 <sup>+</sup>			
		2585.5	12 3	3189.26	6 <sup>+</sup>			
5797.0	(1,2) <sup>+</sup>	3372.7	100 18	2424.15	2 <sup>+</sup>			
		4272.1	72 15	1524.71	2 <sup>+</sup>			
		5796.6	85 18	0.0	0 <sup>+</sup>			

Adopted Levels, Gammas (continued)

$\gamma(^{42}\text{Ca})$  (continued)

$E_i(\text{level})$	$J_i^\pi$	$E_\gamma$ †	$I_\gamma$ †	$E_f$	$J_f^\pi$	Mult. ‡	$\delta$ ‡	Comments
5802.0	3 <sup>-</sup>	1802.3	100	3999.66	4 <sup>+</sup>			
5822.0	(1,2,3) <sup>-</sup>	3397.7	100	2424.15	2 <sup>+</sup>			
5866.0	(1,2,3) <sup>-</sup>	4028.5	122 22	1837.31	0 <sup>+</sup>			
		4341.1	100 22	1524.71	2 <sup>+</sup>			
5875.0	2 <sup>+</sup>	3122.5	41 11	2752.40	4 <sup>+</sup>			
		3450.7	100 11	2424.15	2 <sup>+</sup>			
5924.0	(3,4) <sup>-</sup>	1419.0	27 8	4505.0	(2,3,4) <sup>+</sup>			
		1570.0	32 8	4354.0	4 <sup>-</sup>			
		1824.2	100 14	4099.65	5 <sup>-</sup>			
		1969.6	57 11	3954.39	4 <sup>-</sup>			
		3171.5	54 11	2752.40	4 <sup>+</sup>			
5925.5	(5)	2736.2 4	100	3189.26	6 <sup>+</sup>			
5994.0	3 <sup>-</sup>	1023.0	20 6	4971.0	3 <sup>-</sup>			
		3569.7	100 6	2424.15	2 <sup>+</sup>			
6003.0	3 <sup>-</sup> ,4 <sup>-</sup>	3250.5	100	2752.40	4 <sup>+</sup>			
6020.0	(4 <sup>+</sup> ,5,6 <sup>-</sup> )	2065.6	23 7	3954.39	4 <sup>-</sup>			
		2830.5	100 7	3189.26	6 <sup>+</sup>			
6028.0	(3) <sup>-</sup>	2073.6	91 16	3954.39	4 <sup>-</sup>			
		3275.5	100 16	2752.40	4 <sup>+</sup>			
		4503.0	36 11	1524.71	2 <sup>+</sup>			
6038.0	(1,2,3) <sup>-</sup>	3613.7	33 8	2424.15	2 <sup>+</sup>			Additional information 7.
		4513.0	100 8	1524.71	2 <sup>+</sup>			Additional information 8.
6093.5	(3 <sup>-</sup> to 7 <sup>-</sup> )	1197.0	100 8	4897.0	5 <sup>-</sup>			
		1993.2	47 8	4099.65	5 <sup>-</sup>			
6104.0	(0 <sup>+</sup> to 4 <sup>+</sup> )	3679.7	100 14	2424.15	2 <sup>+</sup>			
		4579.0	79 14	1524.71	2 <sup>+</sup>			
6113.0	4 <sup>+</sup>	1695.0	16 5	4418.0	3 <sup>-</sup>			
		2859.0	100 5	3253.89	4 <sup>+</sup>			
6140.8	6 <sup>-</sup>	649.8	16 6	5490.77	6 <sup>-</sup>	(M1+E2)	-0.25 +25-10	B(M1)(W.u.)=0.16 +8-10; B(E2)(W.u.)<210
		1787.0	17 3	4354.0	4 <sup>-</sup>	[E2]		B(E2)(W.u.)=8 +3-4
		2041.2 @	26 5	4099.65	5 <sup>-</sup>	[M1]		B(M1)(W.u.)=0.009 +3-5 Placement possibly incorrect.
		2186.5	100 9	3954.39	4 <sup>-</sup>	E2(+M3)	≈0	B(E2)(W.u.)=13 5
6144.72	7 <sup>-</sup>	2955.42 20	100	3189.26	6 <sup>+</sup>	E1(+M2)	+0.02 2	B(E1)(W.u.)>0.00031
6182.0	(1,2,3) <sup>-</sup>	4657.0	100 13	1524.71	2 <sup>+</sup>			
		6181.5	47 13	0.0	0 <sup>+</sup>			
6212.0	3 <sup>-</sup>	3459.4	100	2752.40	4 <sup>+</sup>			
6247.9	(4 <sup>+</sup> ,5,6 <sup>-</sup> )	2293.5	74 13	3954.39	4 <sup>-</sup>			
		3058.4	100 15	3189.26	6 <sup>+</sup>			
		3495.4	82 13	2752.40	4 <sup>+</sup>			
6408.57	8 <sup>-</sup>	263.84 8	20.3 9	6144.72	7 <sup>-</sup>	M1(+E2)	0.00 2	B(M1)(W.u.)=0.0055 6
		664.6 2	5.0 7	5744.01	7 <sup>-</sup>			
		917.77 12	100 3	5490.77	6 <sup>-</sup>	E2(+M3)	+0.03 2	B(E2)(W.u.)=2.28 21

## Adopted Levels, Gammas (continued)

 $\gamma(^{42}\text{Ca})$  (continued)

$E_i(\text{level})$	$J_i^\pi$	$E_\gamma^\dagger$	$I_\gamma^\dagger$	$E_f$	$J_f^\pi$	Mult. <sup>‡</sup>	$\delta^\ddagger$	Comments
6408.57	8 <sup>-</sup>	3219.2 3	16.3 17	3189.26	6 <sup>+</sup>	M2+E3	+0.85 23	B(M2)(W.u.)=0.016 5; B(E3)(W.u.)=5.0 18 $\delta$ : weighted average of +0.8 2 in ( <sup>16</sup> O,2p $\gamma$ ) and +2.0 10 in ( $\alpha$ ,p $\gamma$ ).
6516.0		2630.9		3885.0	1 <sup>-</sup>			$E_\gamma$ : from ( <sup>14</sup> C, <sup>12</sup> C) only.
		4091.6		2424.15	2 <sup>+</sup>			$E_\gamma$ : from ( <sup>14</sup> C, <sup>12</sup> C) only.
		4991.0		1524.71	2 <sup>+</sup>			$E_\gamma$ : from ( <sup>14</sup> C, <sup>12</sup> C) only.
6541.8	5 <sup>+</sup>	1050.8	43 7	5490.77	6 <sup>-</sup>			
		2442.2	29 7	4099.65	5 <sup>-</sup>			
		3352.4	100 10	3189.26	6 <sup>+</sup>			
6553.72	9 <sup>-</sup>	145.12 10	36.8 17	6408.57	8 <sup>-</sup>	M1(+E2)	0.00 2	B(M1)(W.u.)=0.042 4 $E_\gamma$ : reported only in ( <sup>18</sup> O, $\alpha$ 2n $\gamma$ ).
		409.1 2	3.0 5	6144.72	7 <sup>-</sup>			
		809.73 10	100 2	5744.01	7 <sup>-</sup>	E2(+M3)	-0.03 2	B(E2)(W.u.)=2.96 23
		3364.4 3	11 1	3189.26	6 <sup>+</sup>	[E3]		B(E3)(W.u.)=4.1 5 $E_\gamma$ : reported only in ( <sup>18</sup> O, $\alpha$ 2n $\gamma$ ).
6584.7	(5 <sup>-</sup> to 8 <sup>-</sup> )	840.7	100 11	5744.01	7 <sup>-</sup>			
		1093.8	85 11	5490.77	6 <sup>-</sup>			
6636.30	8 <sup>+</sup>	1918.6 2	100 4	4717.53	6 <sup>+</sup>			
		3447.1 4	100 3	3189.26	6 <sup>+</sup>			
6674.8	(4 <sup>+</sup> to 8 <sup>+</sup> )	3485.4	100	3189.26	6 <sup>+</sup>			
6715.9	(4 <sup>+</sup> )	1505.0	100 13	5210.3	(2 <sup>+</sup> )			
		1999.9	83 13	4717.53	6 <sup>+</sup>			
		3525.4	68 13	3189.26	6 <sup>+</sup>			
6718.14	7	1505.1 2	100 9	5212.98	6			
		2000.4 3	64 7	4717.53	6 <sup>+</sup>			
		3528.8 5	52 5	3189.26	6 <sup>+</sup>			
6746.5	4 <sup>+</sup>	1850.0	100 18	4897.0	5 <sup>-</sup>			
		2646.2	96 18	4099.65	5 <sup>-</sup>			
6816.8	(4,5) <sup>+</sup>	3627.4	100	3189.26	6 <sup>+</sup>			
6895.8	4 <sup>+</sup>	970.5	32 6	5925.5	(5)			
		1404.8	8 3	5490.77	6 <sup>-</sup>			
		3706.4	100 6	3189.26	6 <sup>+</sup>			
6940.2	(5 <sup>-</sup> ,6,7 <sup>-</sup> )	1195.7	43 9	5744.01	7 <sup>-</sup>			
		2043.9	100 13	4897.0	5 <sup>-</sup>			
		2840.2	74 11	4099.65	5 <sup>-</sup>			
6975.5	(5 <sup>+</sup> )	1483.8	36 7	5490.77	6 <sup>-</sup>			
		2259.9	27 7	4717.53	6 <sup>+</sup>			
		2875.2	60 9	4099.65	5 <sup>-</sup>			
		3785.4	100 11	3189.26	6 <sup>+</sup>			
7129.9	4 <sup>+</sup>	3940.4	100	3189.26	6 <sup>+</sup>			
7197.9		4008.4	100	3189.26	6 <sup>+</sup>			
7282.02	9 <sup>-</sup>	728.3 1	30 3	6553.72	9 <sup>-</sup>			
		873.5 2	100 5	6408.57	8 <sup>-</sup>			
7344.7	(6 <sup>-</sup> to 10 <sup>-</sup> )	936.1	100	6408.57	8 <sup>-</sup>			
7360.6	(5 <sup>-</sup> to 9 <sup>-</sup> )	1215.9	100	6144.72	7 <sup>-</sup>			



Adopted Levels, Gammas (continued)

$\gamma(^{42}\text{Ca})$  (continued)

$E_i(\text{level})$	$J_i^\pi$	$E_\gamma^\dagger$	$I_\gamma^\dagger$	$E_f$	$J_f^\pi$	Mult. <sup>‡</sup>	$\delta^\ddagger$	Comments
7368.46	10 <sup>-</sup>	814.70 19	100 3	6553.72	9 <sup>-</sup>	M1+E2		
		959.9 2	3.5 6	6408.57	8 <sup>-</sup>	[E2]		B(E2)(W.u.)=1.4 +10-4
7388.8	4 <sup>+</sup>	4199.3	100	3189.26	6 <sup>+</sup>			
7415.87	8 <sup>+</sup>	779.6 2	35 3	6636.30	8 <sup>+</sup>			
		1723.9 3	30 5	5691.77	6 <sup>+</sup>			
		2699.9	4.0 12	4717.53	6 <sup>+</sup>			
		4225.3	100 5	3189.26	6 <sup>+</sup>			
7421.2	(4 <sup>+</sup> to 8 <sup>+</sup> )	2704.9	33 5	4717.53	6 <sup>+</sup>			
		4230.3	100 5	3189.26	6 <sup>+</sup>			
7543.1	(4 <sup>+</sup> to 7 <sup>-</sup> )	2645.9	100 19	4897.0	5 <sup>-</sup>			
		2826.9	100 19	4717.53	6 <sup>+</sup>			
		4352.3	63 19	3189.26	6 <sup>+</sup>			
7562.5	(4 <sup>+</sup> ,5 <sup>+</sup> )	2844.9	100	4717.53	6 <sup>+</sup>			
7634.03	(6,8 <sup>+</sup> )	1708.5 4	51 9	5925.5 (5)				
		1942.2 3	54 9	5691.77	6 <sup>+</sup>			
		2916.3 3	100 14	4717.53	6 <sup>+</sup>			
		4444.3	80 11	3189.26	6 <sup>+</sup>			
7696.8	4 <sup>+</sup>	4507.3	100	3189.26	6 <sup>+</sup>			
7726.5	(4 <sup>+</sup> to 8 <sup>+</sup> )	3008.9	100	4717.53	6 <sup>+</sup>			
7750.66	(11) <sup>-</sup>	382.20 8	100	7368.46	10 <sup>-</sup>	M1(+E2)	+0.02 7	
7758.0	(6 <sup>-</sup> ,7 <sup>-</sup> )	1349.1	56 9	6408.57	8 <sup>-</sup>			
		2013.6	75 13	5744.01	7 <sup>-</sup>			
		2266.7	100 13	5490.77	6 <sup>-</sup>			
		2861.9	81 13	4897.0	5 <sup>-</sup>			
7800.7	(5 <sup>-</sup> to 9 <sup>-</sup> )	1655.9	100	6144.72	7 <sup>-</sup>			
7838.9	(2 <sup>+</sup> to 6 <sup>+</sup> )	1123.0	100	6715.9 (4 <sup>+</sup> )				
7921.2	(4 <sup>+</sup> to 8 <sup>+</sup> )	3204.9	100 13	4717.53	6 <sup>+</sup>			
		4730.3	61 13	3189.26	6 <sup>+</sup>			
7939.8	(4 <sup>+</sup> to 8 <sup>+</sup> )	2248.0	75 12	5691.77	6 <sup>+</sup>			
		4750.3	100 12	3189.26	6 <sup>+</sup>			
8052.6	(4 <sup>+</sup> to 8 <sup>+</sup> )	3334.9	100	4717.53	6 <sup>+</sup>			
8059.7	(6 <sup>-</sup> to 9 <sup>-</sup> )	1651.1	100 2	6408.57	8 <sup>-</sup>			
		2315.6	6 2	5744.01	7 <sup>-</sup>			
8082.7	(7 <sup>-</sup> to 11 <sup>-</sup> )	1529.0	100	6553.72	9 <sup>-</sup>			
8103.2	(4 <sup>+</sup> to 8 <sup>+</sup> )	2410.0	49 8	5691.77	6 <sup>+</sup>			
		3386.9	100 8	4717.53	6 <sup>+</sup>			
8297.46	11 <sup>-</sup>	928.98 10	100 4	7368.46	10 <sup>-</sup>	M1+E2	-0.11 5	B(M1)(W.u.)>0.0095; B(E2)(W.u.)>0.040
		1743.8 2	67 4	6553.72	9 <sup>-</sup>	[E2]		
8364.8	(6 <sup>-</sup> ,7,8 <sup>+</sup> )	1956.1	100 18	6408.57	8 <sup>-</sup>			
		5175.2	75 18	3189.26	6 <sup>+</sup>			
8449.7	(7,8) <sup>-</sup>	1896.0	69 12	6553.72	9 <sup>-</sup>			
		2041.0	69 12	6408.57	8 <sup>-</sup>			
		2958.7	100 12	5490.77	6 <sup>-</sup>			

Adopted Levels, Gammas (continued)

$\gamma(^{42}\text{Ca})$  (continued)

$E_i(\text{level})$	$J_i^\pi$	$E_\gamma^\dagger$	$I_\gamma^\dagger$	$E_f$	$J_f^\pi$	Mult.‡	$\delta^\ddagger$
8511.7	(6 <sup>-</sup> to 9 <sup>-</sup> )	2103.0	89 13	6408.57	8 <sup>-</sup>		
		2767.6	100 13	5744.01	7 <sup>-</sup>		
8517.0	(3 to 9)	2591.4	100	5925.5	(5)		
8522.3	(10)	771.61 20	100	7750.66	(11) <sup>-</sup>	D(+Q)	0.00 4
8580.9	(2 <sup>+</sup> to 6 <sup>+</sup> )	1865.0		6715.9	(4 <sup>+</sup> )		
8611.9	(2 <sup>+</sup> to 6 <sup>+</sup> )	1896.0	100	6715.9	(4 <sup>+</sup> )		
8615.13	9	1199.3 3	34 4	7415.87	8 <sup>+</sup>		
		1896.9 2	100 8	6718.14	7		
		1978.7 3	54 7	6636.30	8 <sup>+</sup>		
		2061.1	9 2	6553.72	9 <sup>-</sup>		
8722.30	9	1306.4 2	90 9	7415.87	8 <sup>+</sup>		
		1440.3 3	30 5	7282.02	9 <sup>-</sup>		
		2004.0 3	86 15	6718.14	7		
		2085.9 2	100 10	6636.30	8 <sup>+</sup>		
		2168.6 3	36 6	6553.72	9 <sup>-</sup>		
8744.9	(8 <sup>-</sup> to 12 <sup>-</sup> )	1376.4		7368.46	10 <sup>-</sup>		
8773.7	(5,6,7)	3282.7	100 11	5490.77	6 <sup>-</sup>		
		5584.2	41 11	3189.26	6 <sup>+</sup>		
8847.97	(10 <sup>+</sup> )	2211.6 2	100	6636.30	8 <sup>+</sup>		
8951.3	(6 <sup>+</sup> to 10 <sup>+</sup> )	2314.9	100	6636.30	8 <sup>+</sup>		
9015.01	10 <sup>+</sup>	292.7 2	11 2	8722.30	9		
		399.9 1	26 2	8615.13	9		
		717.6 3	5 1	8297.46	11 <sup>-</sup>		
		1599.1 1	100 4	7415.87	8 <sup>+</sup>		
		1733.0 2	67 10	7282.02	9 <sup>-</sup>		
		2378.6 3	13 2	6636.30	8 <sup>+</sup>		
		2461.3 3	15 2	6553.72	9 <sup>-</sup>		
9036.9	(8 <sup>-</sup> to 12 <sup>-</sup> )	1668.4	100	7368.46	10 <sup>-</sup>		
9205.9	(7 <sup>-</sup> to 9 <sup>-</sup> )	1924.0	92 13	7282.02	9 <sup>-</sup>		
		3060.8	100 13	6144.72	7 <sup>-</sup>		
9241.9?		1959.9		7282.02	9 <sup>-</sup>		
9311.08	(8,10 <sup>+</sup> )	1677.0 3	90 6	7634.03	(6,8 <sup>+</sup> )		
		2674.7 3	100 12	6636.30	8 <sup>+</sup>		
9377.7	(5 <sup>-</sup> to 9 <sup>-</sup> )	3633.5	100	5744.01	7 <sup>-</sup>		
9759.7	(7 <sup>-</sup> to 11 <sup>-</sup> )	3205.9	100	6553.72	9 <sup>-</sup>		
9786.29	(9 <sup>-</sup> ,11)	475.2 1	14 1	9311.08	(8,10 <sup>+</sup> )		
		771.3 1	100 3	9015.01	10 <sup>+</sup>		
		938.3 2	16 1	8847.97	(10 <sup>+</sup> )		
		1063.9 3	24.0 14	8722.30	9		
		1171.0 2	16.0 15	8615.13	9		
		1488.8 1	44 2	8297.46	11 <sup>-</sup>		
		2417.8 2	28 2	7368.46	10 <sup>-</sup>		
9841.6	(5,6) <sup>-</sup>	3696.7	100	6144.72	7 <sup>-</sup>		

Adopted Levels, Gammas (continued)

$\gamma(^{42}\text{Ca})$  (continued)

$E_i(\text{level})$	$J_i^\pi$	$E_\gamma^\dagger$	$I_\gamma^\dagger$	$E_f$	$J_f^\pi$	Comments
10035.6	(5 <sup>-</sup> to 9 <sup>-</sup> )	3890.7	100	6144.72	7 <sup>-</sup>	
10168.69	(10,12 <sup>+</sup> )	382.4 1	100 3	9786.29	(9 <sup>-</sup> ,11)	
		1153.6 3	29 2	9015.01	10 <sup>+</sup>	
		1871.2 2	11 1	8297.46	11 <sup>-</sup>	
10450.0	(5 <sup>-</sup> )	6349.8	100	4099.65	5 <sup>-</sup>	I <sub><math>\gamma</math></sub> : represents>60% decay branching for level.
11165.7	(10,12)	2868.1 8	100	8297.46	11 <sup>-</sup>	
11361.3	(1,2 <sup>+</sup> )	9835.4		1524.71	2 <sup>+</sup>	
		11359.6		0.0	0 <sup>+</sup>	
11405.1	(12 <sup>+</sup> )	2557.0	100	8847.97	(10 <sup>+</sup> )	
(11480.64)	3 <sup>-</sup> ,4 <sup>-</sup>	6462.79 17		5017.14	4 <sup>+</sup>	
		6720.46 18		4759.71	2 <sup>+</sup>	
		6790.05 17		4690.06	3 <sup>-</sup>	
		7480.07 18		3999.66	4 <sup>+</sup>	
		7525.47 10		3954.39	4 <sup>-</sup>	
		8033.03 18		3446.94	3 <sup>-</sup>	
		8225.86 13		3253.89	4 <sup>+</sup>	
		8727.42 14		2752.40	4 <sup>+</sup>	
11644.1	(1 <sup>-</sup> ,2 <sup>+</sup> )	7194.6	6	4448.8	2 <sup>+</sup>	
		7411.4	50	4232.0	1	
		7526.4	19	4117.1	3 <sup>-</sup>	
		7596.4	19	4047.0	3 <sup>-</sup>	
		7758.3	19	3885.0	1 <sup>-</sup>	
		7989.3	19	3654.0	2 <sup>+</sup>	
		8251.2	9	3392.01	2 <sup>+</sup>	
		9218.8	16	2424.15	2 <sup>+</sup>	
		9805.6	12	1837.31	0 <sup>+</sup>	
		10118.1	100	1524.71	2 <sup>+</sup>	
		11642.4	44	0.0	0 <sup>+</sup>	
11670.9	2 <sup>+</sup>	7221.4	38	4448.8	2 <sup>+</sup>	
		7553.2	34	4117.1	3 <sup>-</sup>	
		8016.1	28	3654.0	2 <sup>+</sup>	
		8278.0	31	3392.01	2 <sup>+</sup>	
		9245.6	59	2424.15	2 <sup>+</sup>	
		9832.4	100	1837.31	0 <sup>+</sup>	
		10144.9	55	1524.71	2 <sup>+</sup>	
11674.0	(1 <sup>-</sup> ,2 <sup>+</sup> )	7556.3	100	4117.1	3 <sup>-</sup>	
		8281.1	59	3392.01	2 <sup>+</sup>	
		9248.7	48	2424.15	2 <sup>+</sup>	
		9835.5	48	1837.31	0 <sup>+</sup>	
		10148.0	90	1524.71	2 <sup>+</sup>	
11693.0	(1 <sup>-</sup> ,2 <sup>+</sup> )	6932.5	90	4759.71	2 <sup>+</sup>	
		7460.3	62	4232.0	1	
		7575.3	33	4117.1	3 <sup>-</sup>	

Adopted Levels, Gammas (continued)

$\gamma(^{42}\text{Ca})$  (continued)

$E_i(\text{level})$	$J_i^\pi$	$E_\gamma^\dagger$	$I_\gamma^\dagger$	$E_f$	$J_f^\pi$	Mult. <sup>‡</sup>	$\delta^\ddagger$	Comments		
11693.0	(1 <sup>-</sup> ,2 <sup>+</sup> )	8038.2	71	3654.0	2 <sup>+</sup>					
		8300.1	62	3392.01	2 <sup>+</sup>					
		8392.1	14	3300.0	0 <sup>+</sup>					
		9267.7	100	2424.15	2 <sup>+</sup>					
		10167.0	43	1524.71	2 <sup>+</sup>					
11707.5	2 <sup>+</sup>	6114.0	32	5593.0	3 <sup>-</sup>					
		7364.5	20	4342.3	(0 <sup>+</sup> to 4 <sup>+</sup> )					
		7474.8	36	4232.0	1					
		7821.7	20	3885.0	1 <sup>-</sup>					
		8052.7	32	3654.0	2 <sup>+</sup>					
		8314.6	24	3392.01	2 <sup>+</sup>					
		8406.6	12	3300.0	0 <sup>+</sup>					
		9282.2	32	2424.15	2 <sup>+</sup>					
		9869.0	100	1837.31	0 <sup>+</sup>					
		10181.5	56	1524.71	2 <sup>+</sup>					
		11725.7	(8 <sup>-</sup> to 11)	2483.8		9241.9?				
11727.1	2 <sup>+</sup>	4357.0		7368.46	10 <sup>-</sup>					
		6966.6	27	4759.71	2 <sup>+</sup>	D(+Q)	+0.02 4	$\delta$ : or +3.0 10.		
		7277.6	67	4448.8	2 <sup>+</sup>	(D+Q)	+0.70 10			
		7308.4	27	4418.0	3 <sup>-</sup>					
		7494.4	47	4232.0	1	(D+Q)	+0.30 15	$\delta$ : or +2.0 10.		
		7609.4	47	4117.1	3 <sup>-</sup>					
		8072.3	20	3654.0	2 <sup>+</sup>					
		8334.2	40	3392.01	2 <sup>+</sup>	D+Q	+3.7 1			
		8426.2	40	3300.0	0 <sup>+</sup>					
		9301.8	93	2424.15	2 <sup>+</sup>	D+Q	+0.65 5			
		9888.5	67	1837.31	0 <sup>+</sup>					
		10201.1	93	1524.71	2 <sup>+</sup>	D+Q	-0.20 5			
		11725.3	100	0.0	0 <sup>+</sup>					
		11738.4	1 <sup>-</sup>	6523.9	45	5214.1	(2 <sup>+</sup> )			
6833.8	82			4904.0	3 <sup>-</sup>					
7288.9	18			4448.8	2 <sup>+</sup>					
7505.7	32			4232.0	1					
7620.7	100			4117.1	3 <sup>-</sup>					
7852.6	45			3885.0	1 <sup>-</sup>					
8083.6	27			3654.0	2 <sup>+</sup>					
8345.5	50			3392.01	2 <sup>+</sup>					
9899.8	9			1837.31	0 <sup>+</sup>					
10212.4	23			1524.71	2 <sup>+</sup>					
11736.6	23			0.0	0 <sup>+</sup>					
11743.4	(1 <sup>-</sup> ,2 <sup>+</sup> )			7510.7	35	4232.0	1			
				7625.7	29	4117.1	3 <sup>-</sup>			
		8350.5	79	3392.01	2 <sup>+</sup>					

**Adopted Levels, Gammas (continued)**

γ(<sup>42</sup>Ca) (continued)

E <sub>i</sub> (level)	J <sub>i</sub> <sup>π</sup>	E <sub>γ</sub> <sup>†</sup>	I <sub>γ</sub> <sup>†</sup>	E <sub>f</sub>	J <sub>f</sub> <sup>π</sup>	E <sub>i</sub> (level)	J <sub>i</sub> <sup>π</sup>	E <sub>γ</sub> <sup>†</sup>	I <sub>γ</sub> <sup>†</sup>	E <sub>f</sub>	J <sub>f</sub> <sup>π</sup>
11743.4	(1 <sup>-</sup> ,2 <sup>+</sup> )	9904.8	26	1837.31	0 <sup>+</sup>	11843.3	(1 <sup>-</sup> ,2 <sup>+</sup> )	9418.0	29	2424.15	2 <sup>+</sup>
		10217.4	100	1524.71	2 <sup>+</sup>			10317.2	61	1524.71	2 <sup>+</sup>
		11741.6	24	0.0	0 <sup>+</sup>	11868.0	(1 <sup>-</sup> ,2 <sup>+</sup> )	6963.4	87	4904.0	3 <sup>-</sup>
11775.0	(1 <sup>-</sup> ,2 <sup>+</sup> )	7207.3	33	4566.9	(1,2 <sup>+</sup> )			7750.2	87	4117.1	3 <sup>-</sup>
		7542.3	29	4232.0	1			7820.2	87	4047.0	3 <sup>-</sup>
		7657.3	19	4117.1	3 <sup>-</sup>			8213.1	73	3654.0	2 <sup>+</sup>
		7774.6	76	3999.66	4 <sup>+</sup>			8475.1	87	3392.01	2 <sup>+</sup>
		7889.2	29	3885.0	1 <sup>-</sup>			9442.7	100	2424.15	2 <sup>+</sup>
		8327.2	100	3446.94	3 <sup>-</sup>			10029.4	33	1837.31	0 <sup>+</sup>
		8382.1	62	3392.01	2 <sup>+</sup>			10341.9	53	1524.71	2 <sup>+</sup>
		9349.7	76	2424.15	2 <sup>+</sup>			11866.2	60	0.0	0 <sup>+</sup>
		10249.0	24	1524.71	2 <sup>+</sup>	11871.5	(1 <sup>-</sup> ,2 <sup>+</sup> )	6133.0	59	5738.0	(2 <sup>+</sup> )
		11773.2	29	0.0	0 <sup>+</sup>			6513.0	59	5358.0	2 <sup>+</sup>
11795.2	(1 <sup>-</sup> ,2 <sup>+</sup> )	7677.4	50	4117.1	3 <sup>-</sup>			7753.7	82	4117.1	3 <sup>-</sup>
		8347.4	25	3446.94	3 <sup>-</sup>			7823.7	47	4047.0	3 <sup>-</sup>
		8402.3	100	3392.01	2 <sup>+</sup>			7985.7	71	3885.0	1 <sup>-</sup>
		9369.9	92	2424.15	2 <sup>+</sup>			8478.6	29	3392.01	2 <sup>+</sup>
		9956.6	46	1837.31	0 <sup>+</sup>			9446.2	100	2424.15	2 <sup>+</sup>
		10269.2	33	1524.71	2 <sup>+</sup>			10032.9	29	1837.31	0 <sup>+</sup>
		11793.4	71	0.0	0 <sup>+</sup>			10345.4	47	1524.71	2 <sup>+</sup>
11805.4	(1 <sup>-</sup> ,2 <sup>+</sup> )	6211.9	86	5593.0	3 <sup>-</sup>			11869.7	55	0.0	0 <sup>+</sup>
		7355.9	38	4448.8	2 <sup>+</sup>	11873.7	(1 <sup>-</sup> ,2 <sup>+</sup> )	7641.0	100	4232.0	1
		7386.7	52	4418.0	3 <sup>-</sup>			7755.9	28	4117.1	3 <sup>-</sup>
		7462.4	100	4342.3	(0 <sup>+</sup> to 4 <sup>+</sup> )			7825.9	28	4047.0	3 <sup>-</sup>
		7757.6	71	4047.0	3 <sup>-</sup>			7987.9	34	3885.0	1 <sup>-</sup>
		8357.6	24	3446.94	3 <sup>-</sup>			8480.8	19	3392.01	2 <sup>+</sup>
		8412.5	52	3392.01	2 <sup>+</sup>			9448.4	25	2424.15	2 <sup>+</sup>
		9380.1	14	2424.15	2 <sup>+</sup>			10035.1	16	1837.31	0 <sup>+</sup>
		10279.3	19	1524.71	2 <sup>+</sup>			10347.6	56	1524.71	2 <sup>+</sup>
		11803.6	19	0.0	0 <sup>+</sup>			11871.9	6	0.0	0 <sup>+</sup>
11821.1		1652.3 4	83 11	10168.69	(10,12 <sup>+</sup> )	11925.6	(1 <sup>-</sup> ,2 <sup>+</sup> )	8270.7	42	3654.0	2 <sup>+</sup>
		2034.6 8	100 7	9786.29	(9 <sup>-</sup> ,11)			8477.7	53	3446.94	3 <sup>-</sup>
11822.4	(1 <sup>-</sup> )	7589.7	100	4232.0	1			9500.3	40	2424.15	2 <sup>+</sup>
		8167.5	56	3654.0	2 <sup>+</sup>			10399.5	63	1524.71	2 <sup>+</sup>
		8429.5	52	3392.01	2 <sup>+</sup>			11923.8	100	0.0	0 <sup>+</sup>
		9397.1	48	2424.15	2 <sup>+</sup>	11959.2	(1 <sup>-</sup> )	8511.3	25	3446.94	3 <sup>-</sup>
		9983.8	36	1837.31	0 <sup>+</sup>			9533.9		2424.15	2 <sup>+</sup>
		10296.3	92	1524.71	2 <sup>+</sup>			10433.1	50	1524.71	2 <sup>+</sup>
		11820.6	16	0.0	0 <sup>+</sup>			11957.4	100	0.0	0 <sup>+</sup>
11843.3	(1 <sup>-</sup> ,2 <sup>+</sup> )	6871.7	68	4971.0	3 <sup>-</sup>	11980.3	1 <sup>-</sup>	7530.8	23	4448.8	2 <sup>+</sup>
		6976.7	100	4866.0	2 <sup>+</sup>			8325.4	18	3654.0	2 <sup>+</sup>
		8188.4	39	3654.0	2 <sup>+</sup>			8532.4	5	3446.94	3 <sup>-</sup>
		8542.4	26	3300.0	0 <sup>+</sup>			8587.4	8	3392.01	2 <sup>+</sup>

**Adopted Levels, Gammas (continued)**

$\gamma(^{42}\text{Ca})$  (continued)

$E_i(\text{level})$	$J_i^\pi$	$E_\gamma^\dagger$	$I_\gamma^\dagger$	$E_f$	$J_f^\pi$	$E_i(\text{level})$	$J_i^\pi$	$E_\gamma^\dagger$	$E_f$	$J_f^\pi$
11980.3	1 <sup>-</sup>	8679.3	21	3300.0	0 <sup>+</sup>	12198.1		3350.0	8847.97	(10 <sup>+</sup> )
		9555.0	21	2424.15	2 <sup>+</sup>	12701.4		880.3	11821.1	
		10454.2	100	1524.71	2 <sup>+</sup>			2533	10168.69	(10,12 <sup>+</sup> )
		11978.5	62	0.0	0 <sup>+</sup>	12814.7		2646.0	10168.69	(10,12 <sup>+</sup> )
12172.0	(1,2 <sup>+</sup> )	8779.0	72	3392.01	2 <sup>+</sup>			4517.0	8297.46	11 <sup>-</sup>
		9746.6	83	2424.15	2 <sup>+</sup>	13712.8		5415.0	8297.46	11 <sup>-</sup>
		10645.8	60	1524.71	2 <sup>+</sup>	13762.8		2037.0	11725.7	(8 <sup>-</sup> to 11)
		12170.1	100	0.0	0 <sup>+</sup>	15251.7		2436.9	12814.7	

† Primarily from ( $\alpha,\gamma$ ), ( $p,\gamma$ ), ( $p,p'\gamma$ ) and ( $^{18}\text{O},\alpha 2n\gamma$ ). Weighted averages are taken of all available values with uncertainties. Values of  $\gamma$ -energies without uncertainties are deduced from level-energy difference.

‡ From  $\gamma(\theta,\text{pol})$  in ( $\alpha,\gamma$ ), ( $p,p'\gamma$ ) and ( $^{19}\text{F},\alpha\gamma$ ). If  $T_{1/2}$  is unknown and parity is determined not by polarization measurements, evaluators use D and Q, instead of M1 and E2, or, E1 and M2.

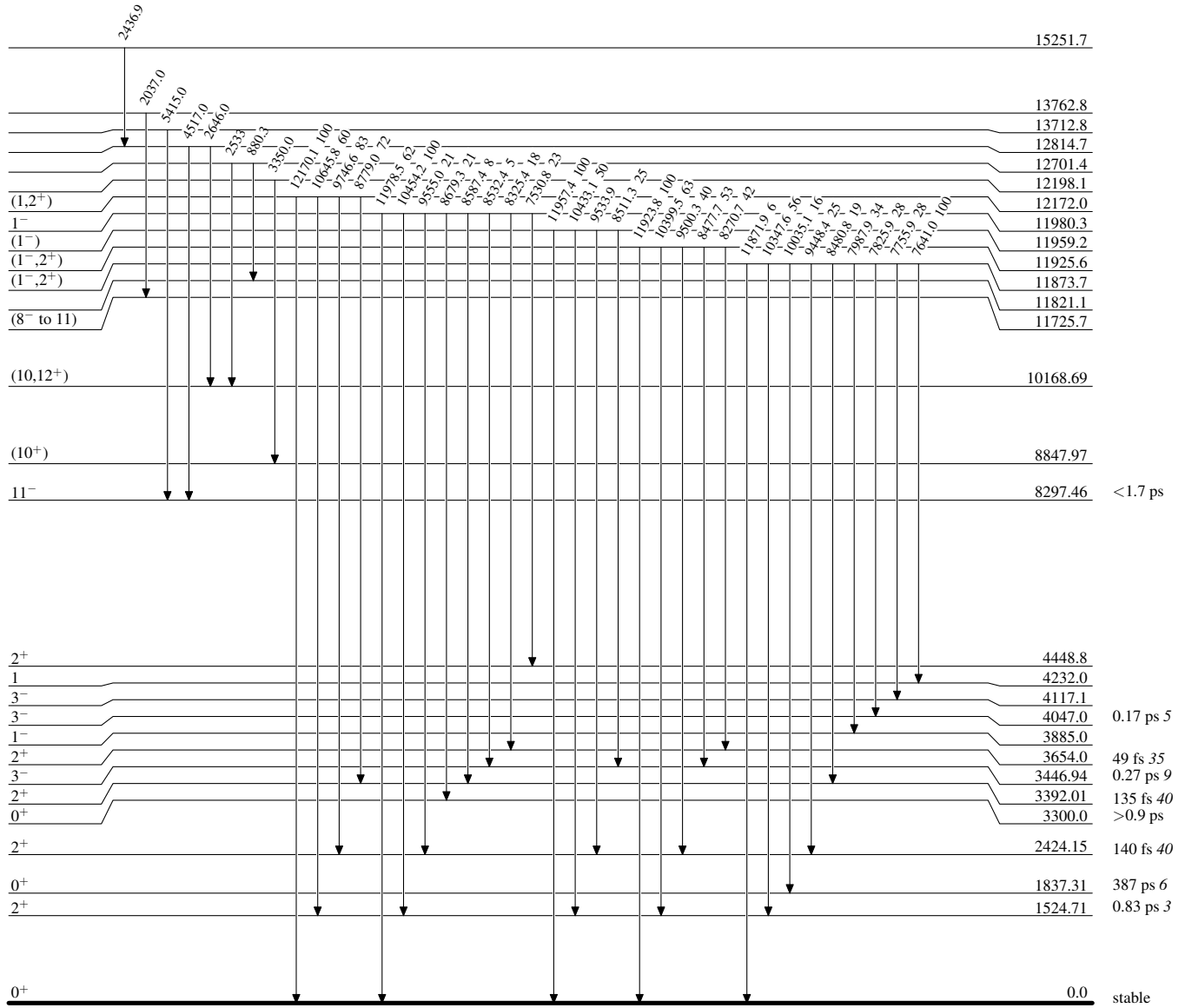
# Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on  $\gamma$ -ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.

@ Placement of transition in the level scheme is uncertain.

### Adopted Levels, Gammas

#### Level Scheme

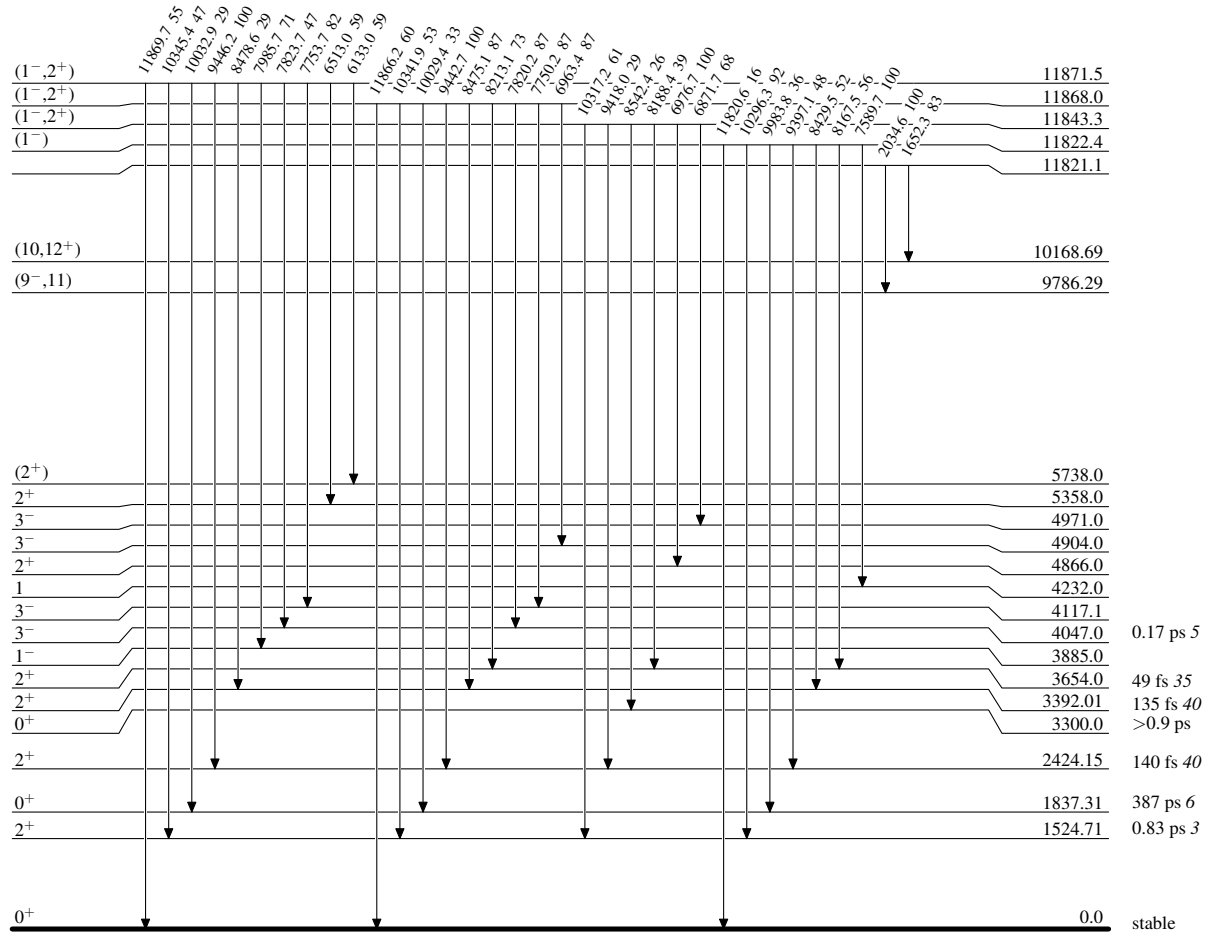
Intensities: Relative photon branching from each level



$^{42}_{20}\text{Ca}_{22}$

Adopted Levels, GammasLevel Scheme (continued)

Intensities: Relative photon branching from each level

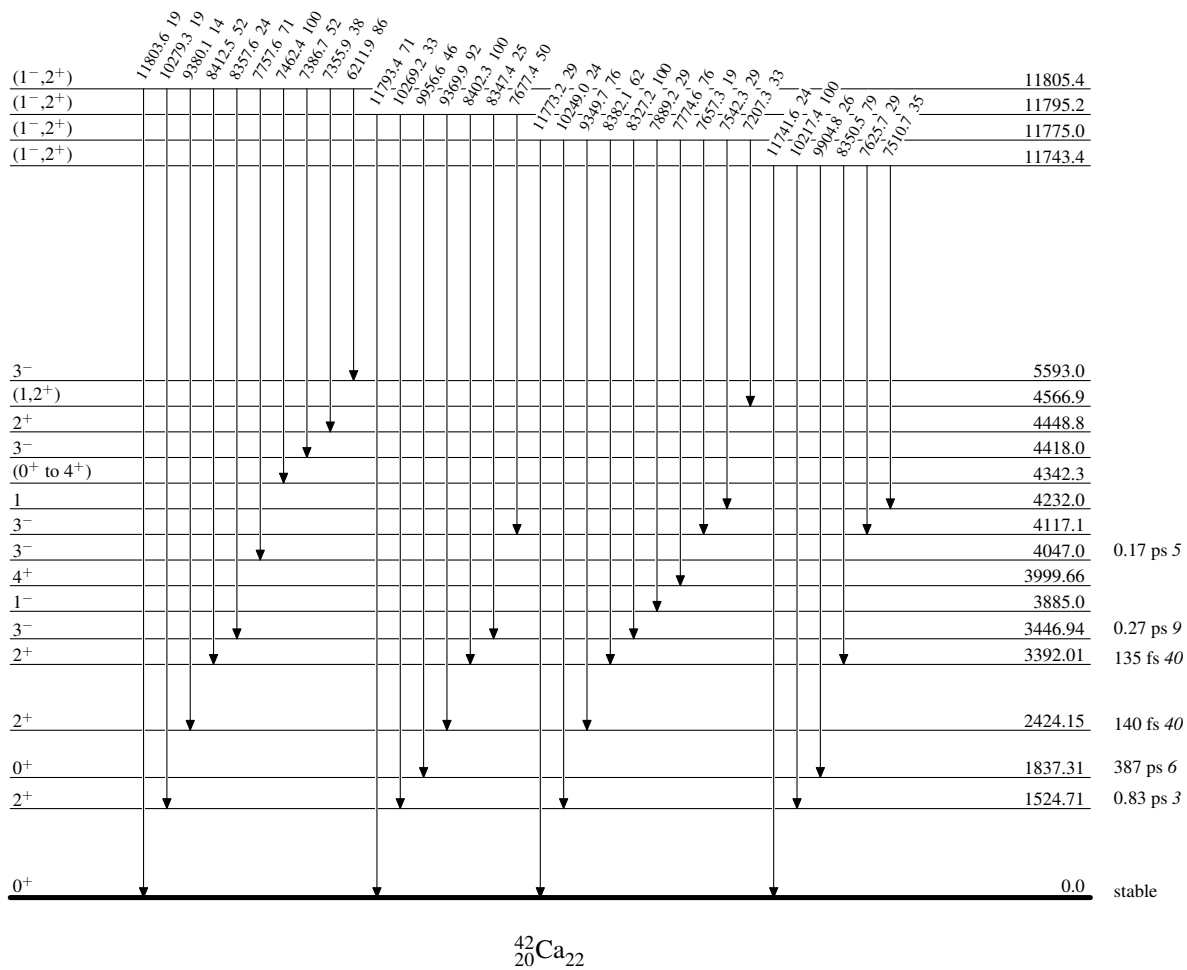
 $^{42}_{20}\text{Ca}_{22}$



**Adopted Levels, Gammas**

**Level Scheme (continued)**

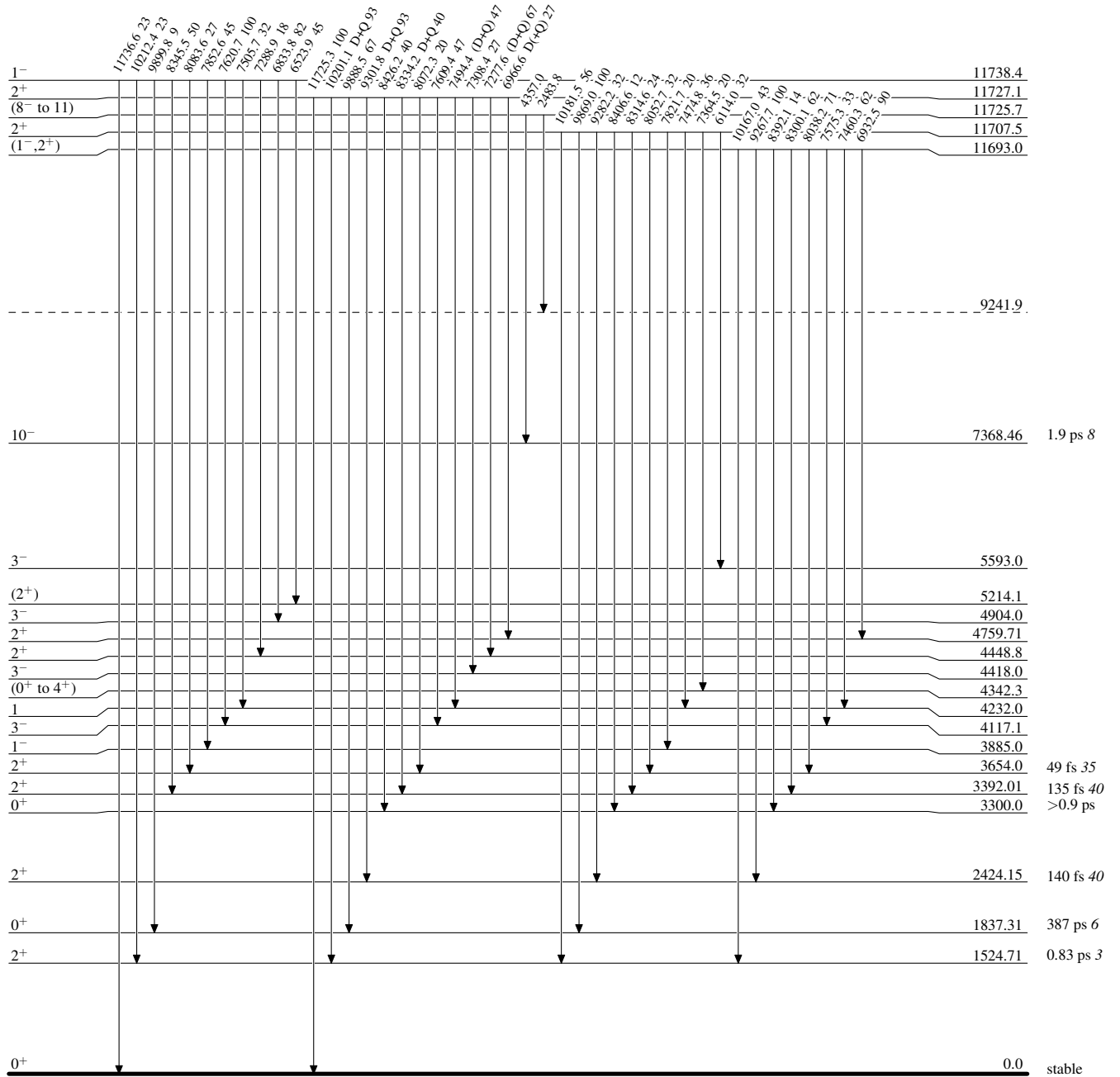
Intensities: Relative photon branching from each level



Adopted Levels, Gammas

Level Scheme (continued)

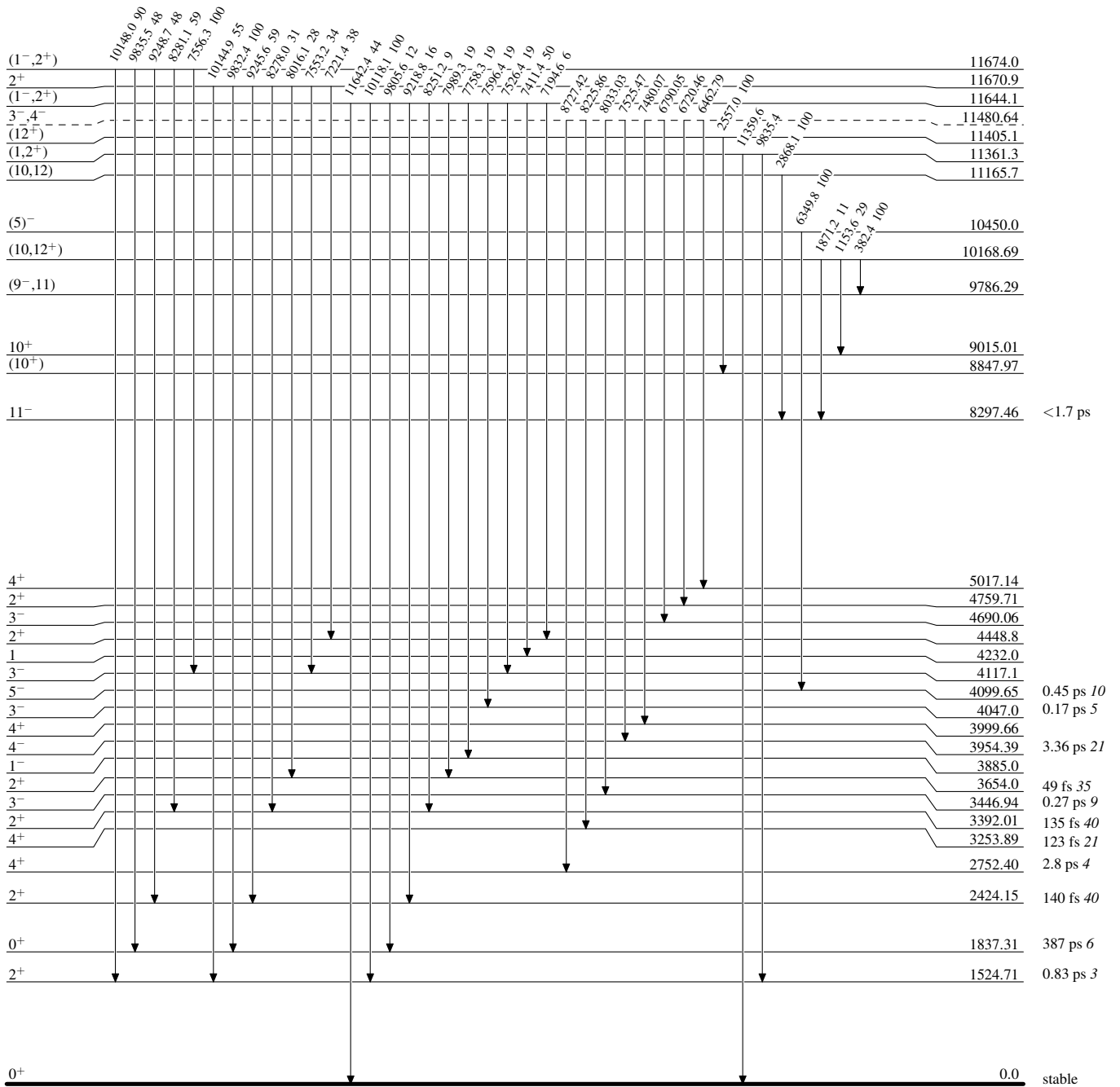
Intensities: Relative photon branching from each level



$^{42}_{20}\text{Ca}_{22}$

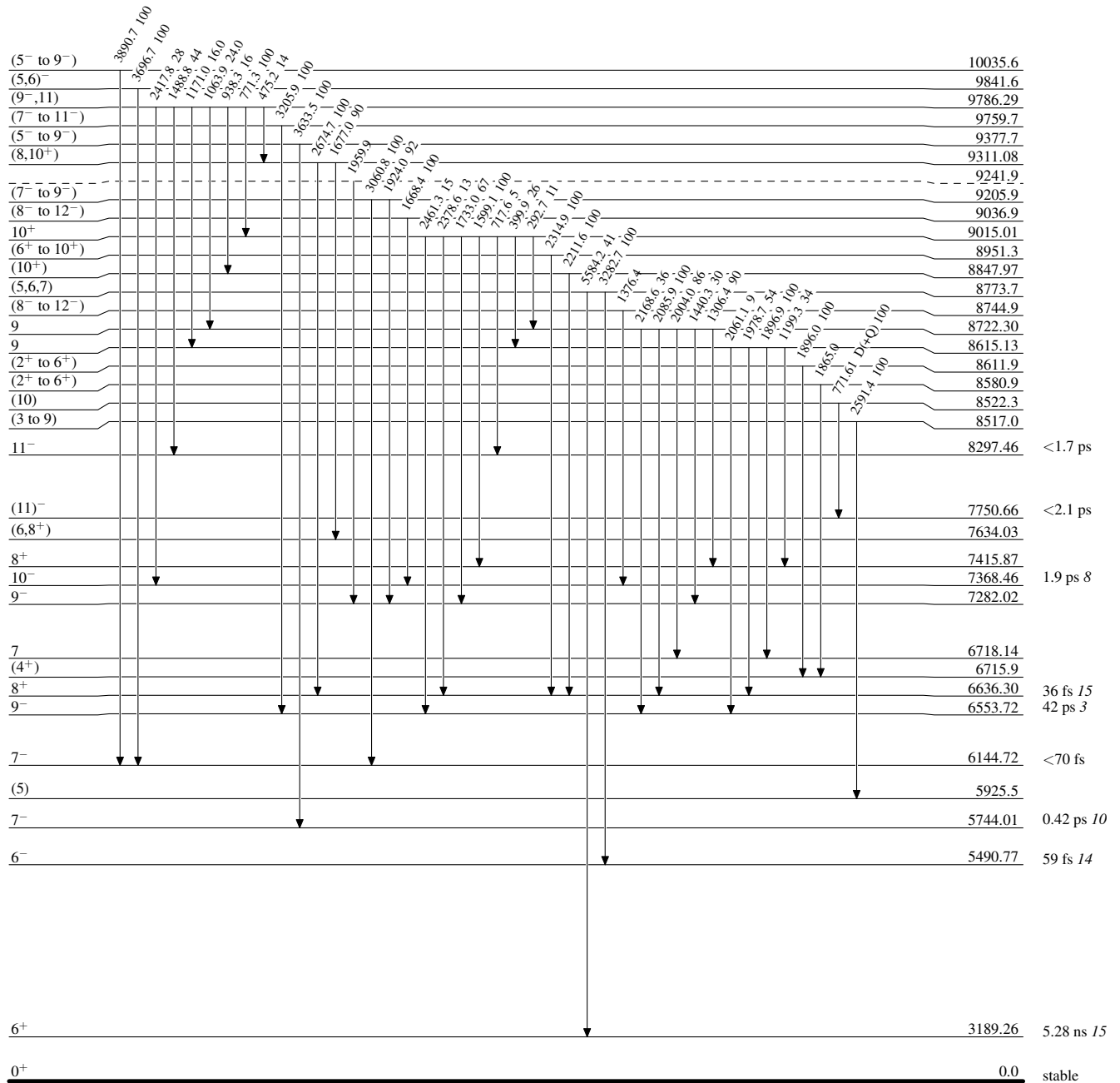
**Adopted Levels, Gammas****Level Scheme (continued)**

Intensities: Relative photon branching from each level

 $^{42}_{20}\text{Ca}_{22}$

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

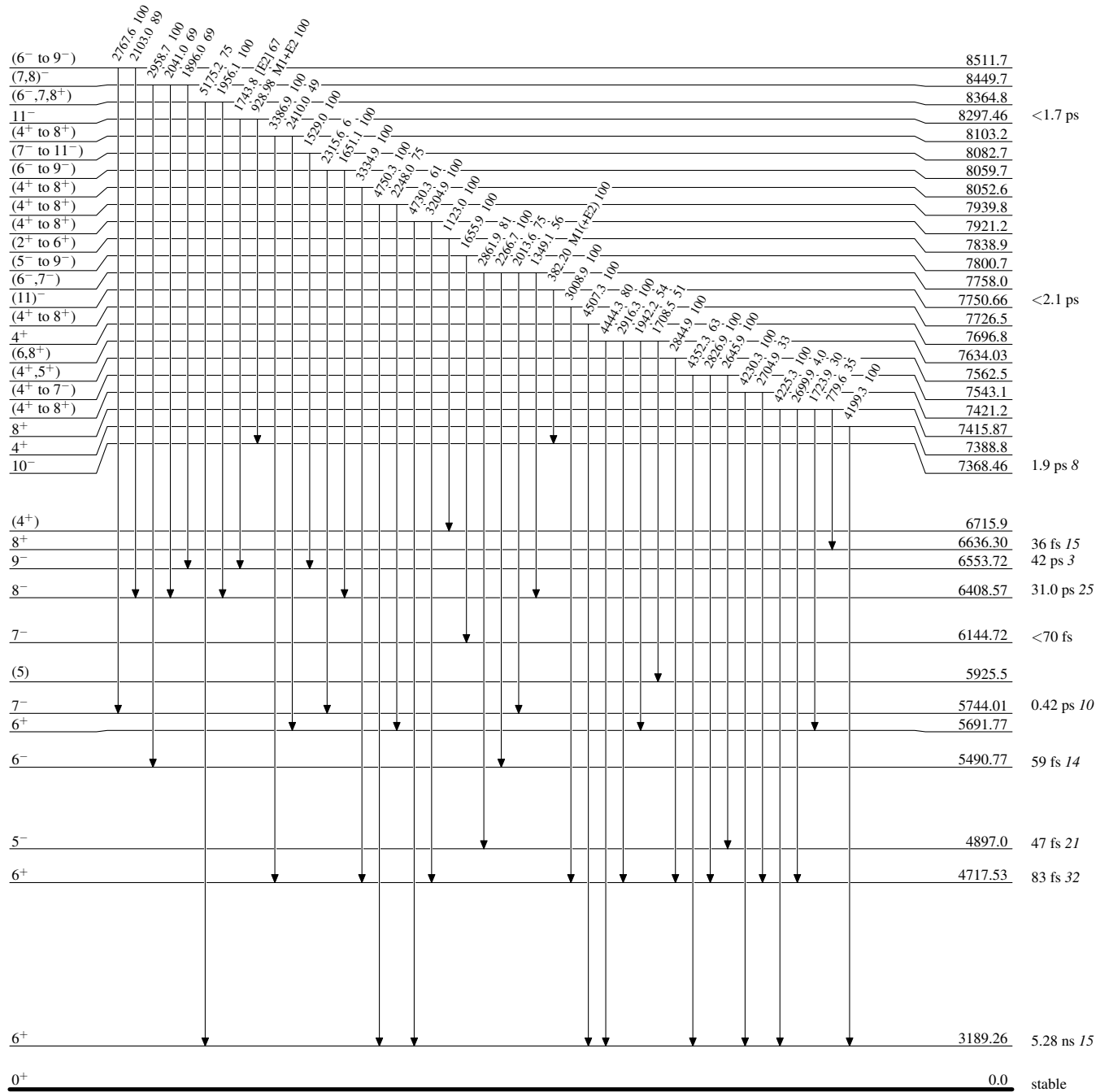
Intensities: Relative photon branching from each level



Adopted Levels, Gammas

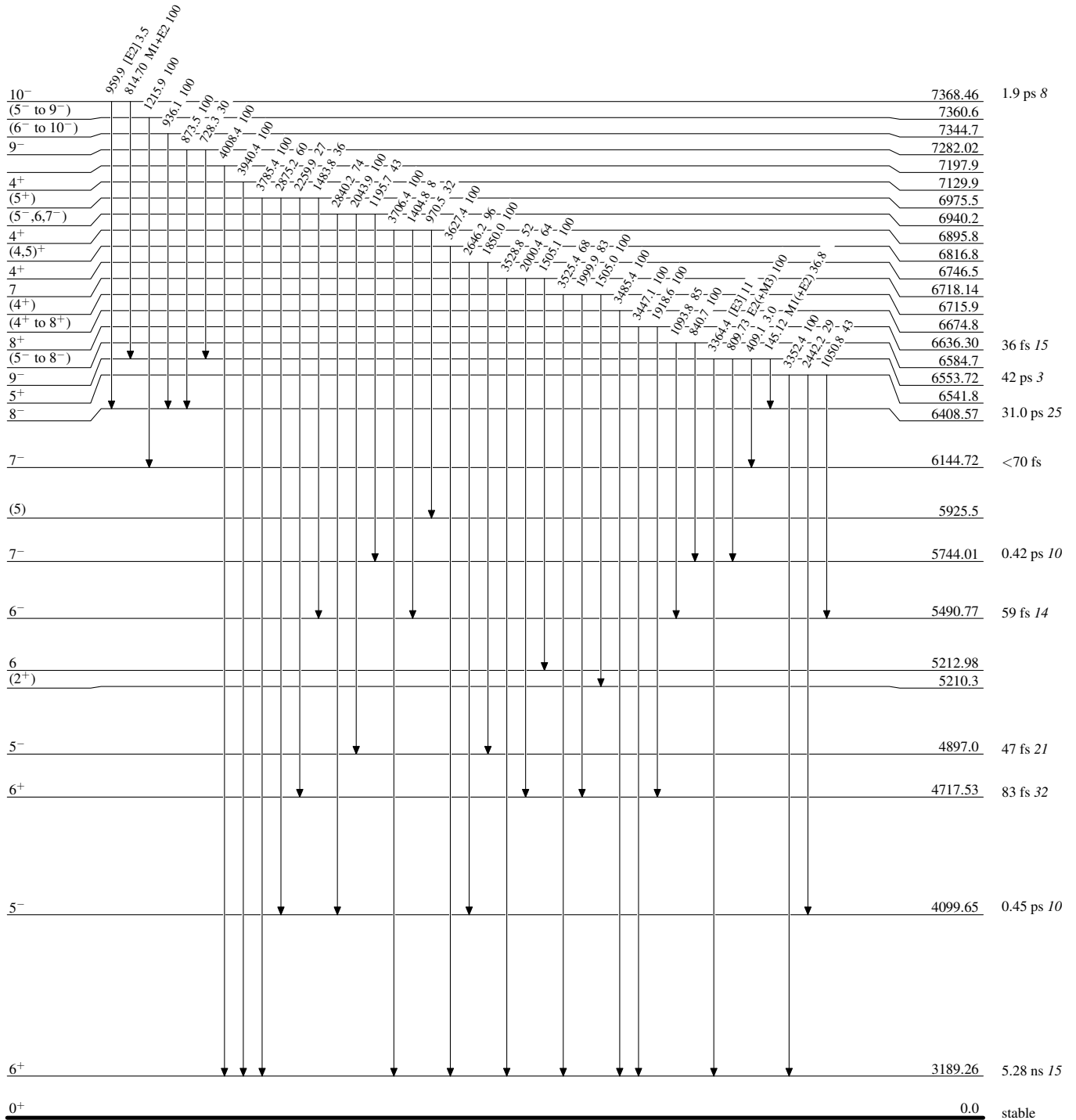
## Level Scheme (continued)

Intensities: Relative photon branching from each level



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

Intensities: Relative photon branching from each level

 $^{42}\text{Ca}_{22}$

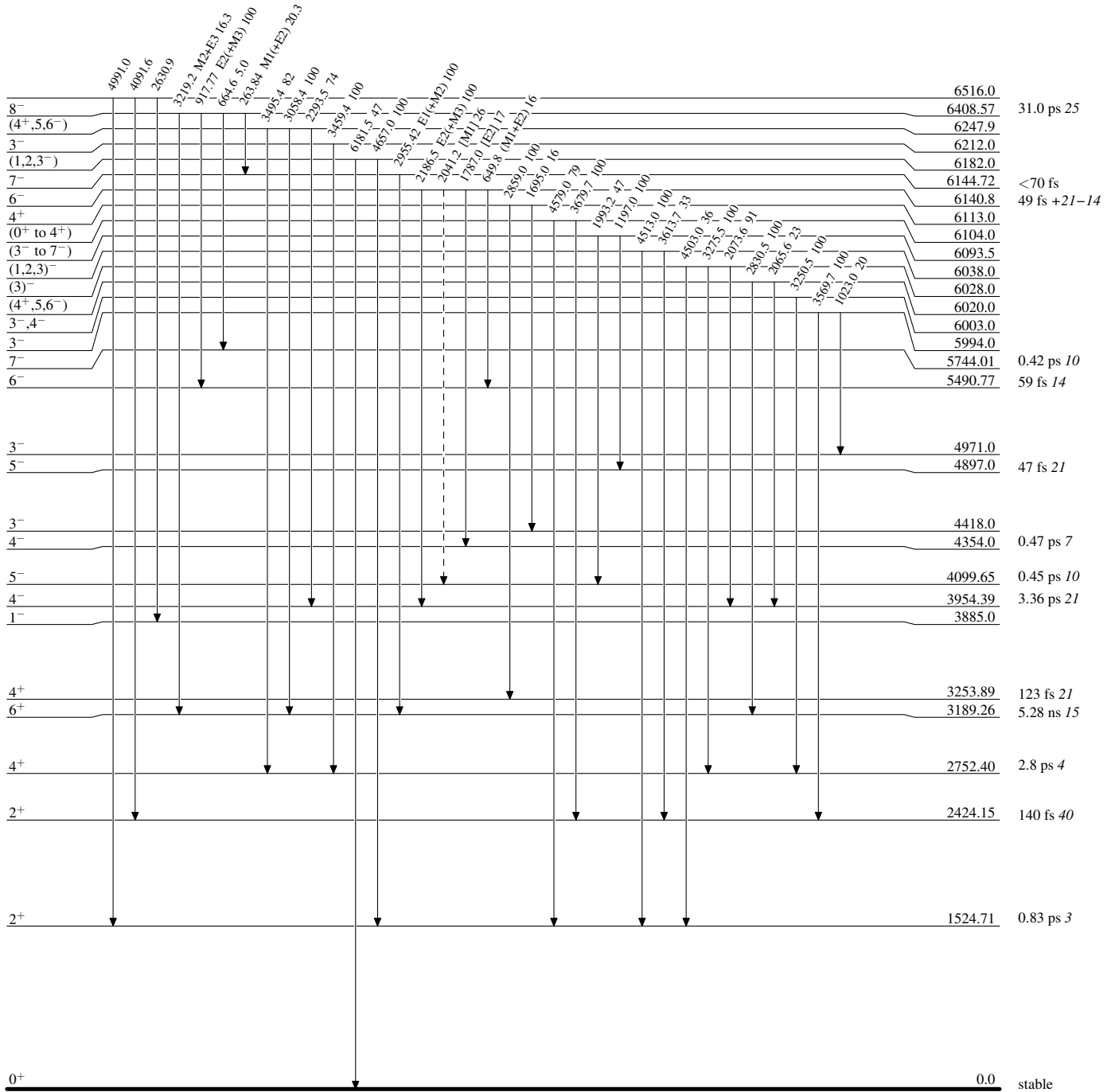
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

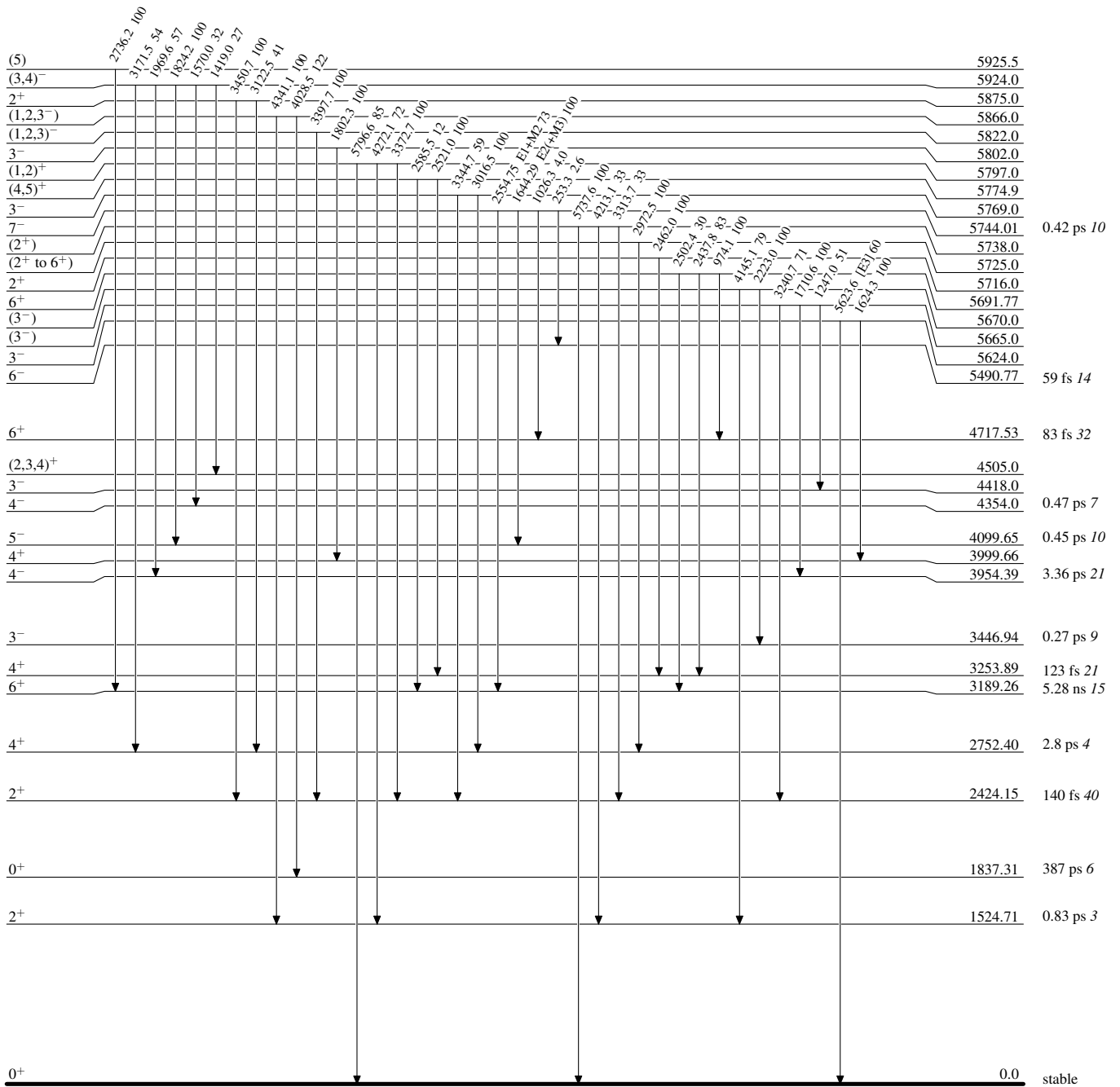
-----▶  $\gamma$  Decay (Uncertain)



<sup>42</sup>Ca<sub>22</sub>

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

Intensities: Relative photon branching from each level





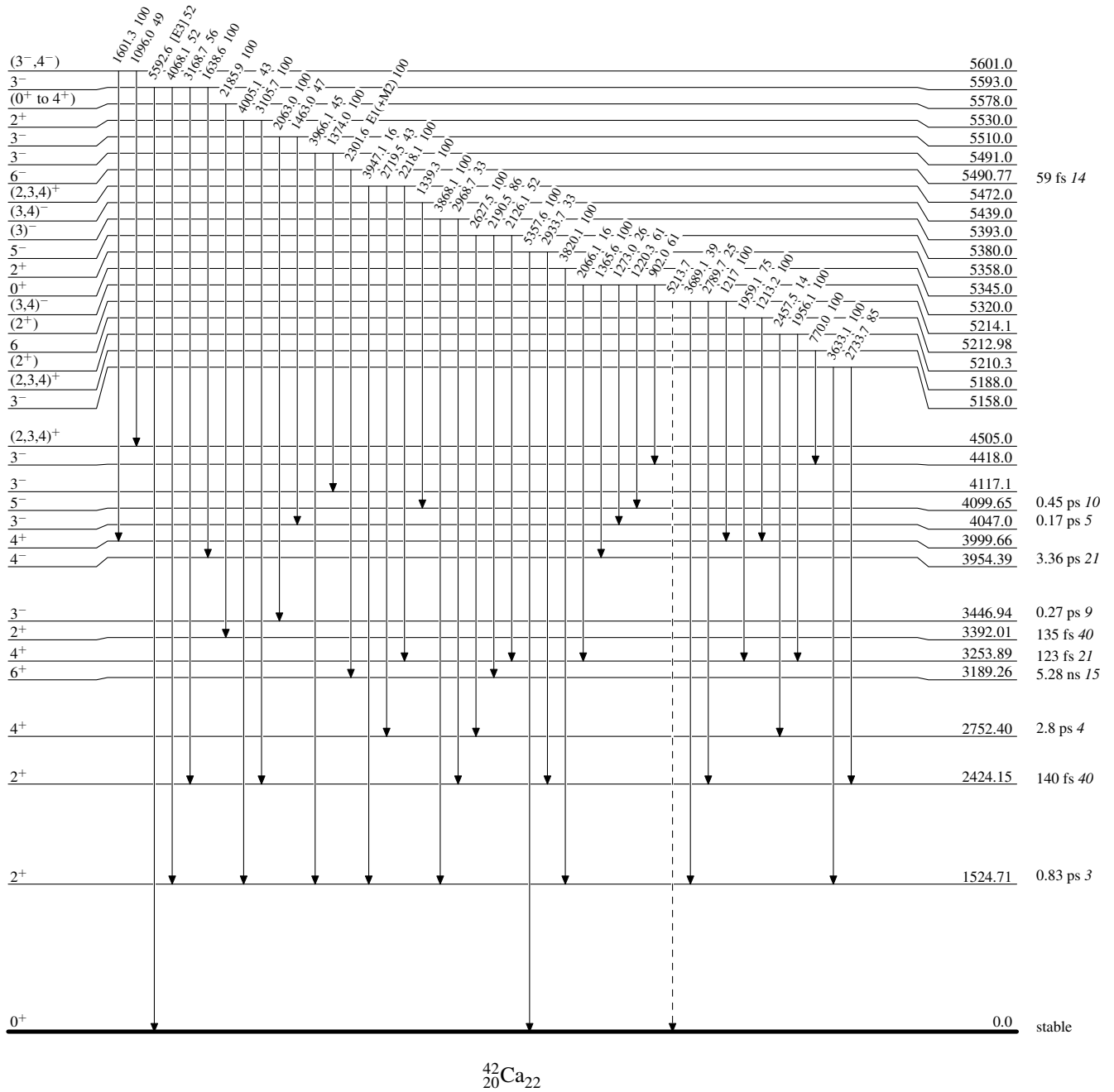
**Adopted Levels, Gammas**

Legend

**Level Scheme (continued)**

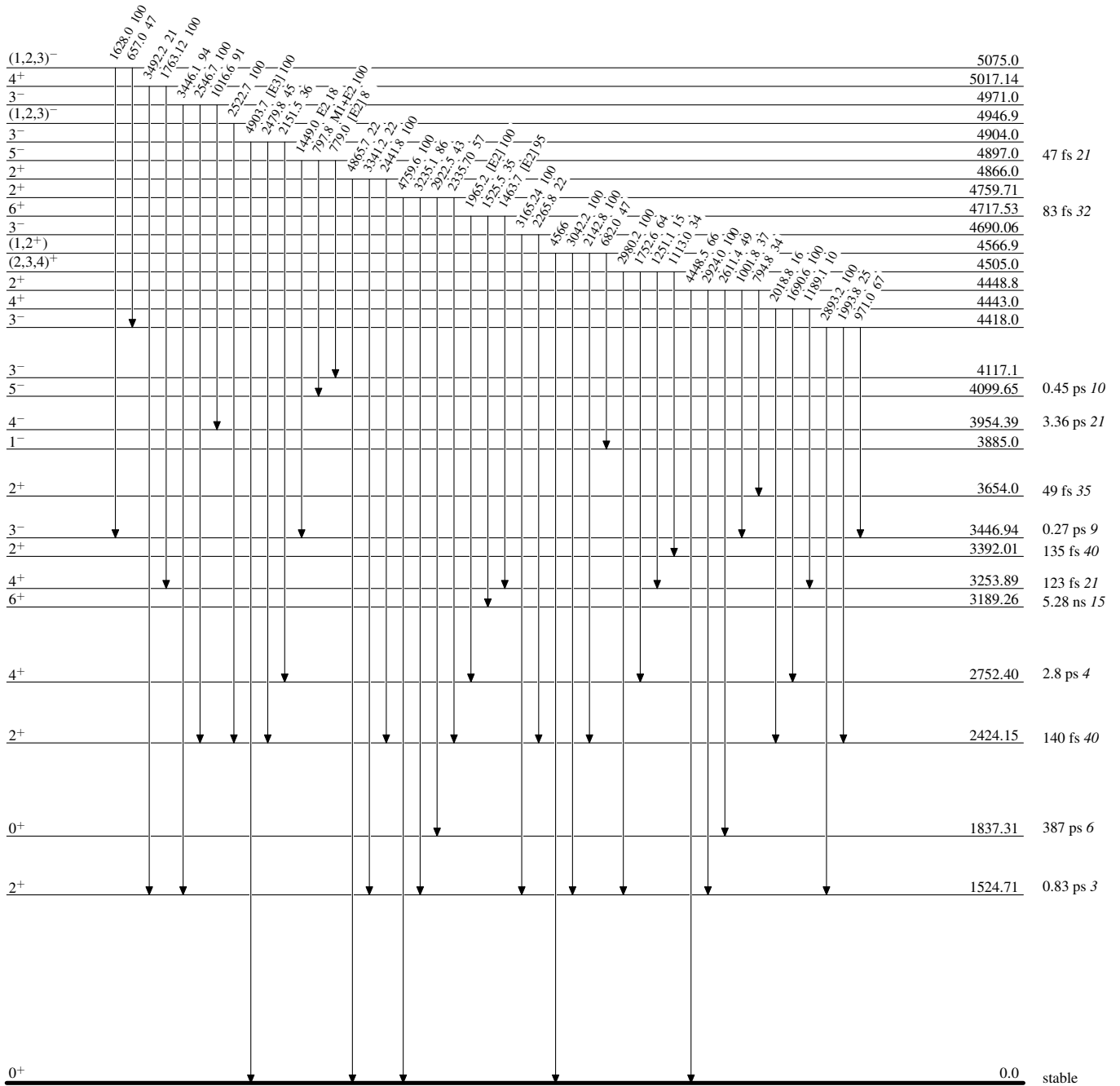
Intensities: Relative photon branching from each level

-----►  $\gamma$  Decay (Uncertain)



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

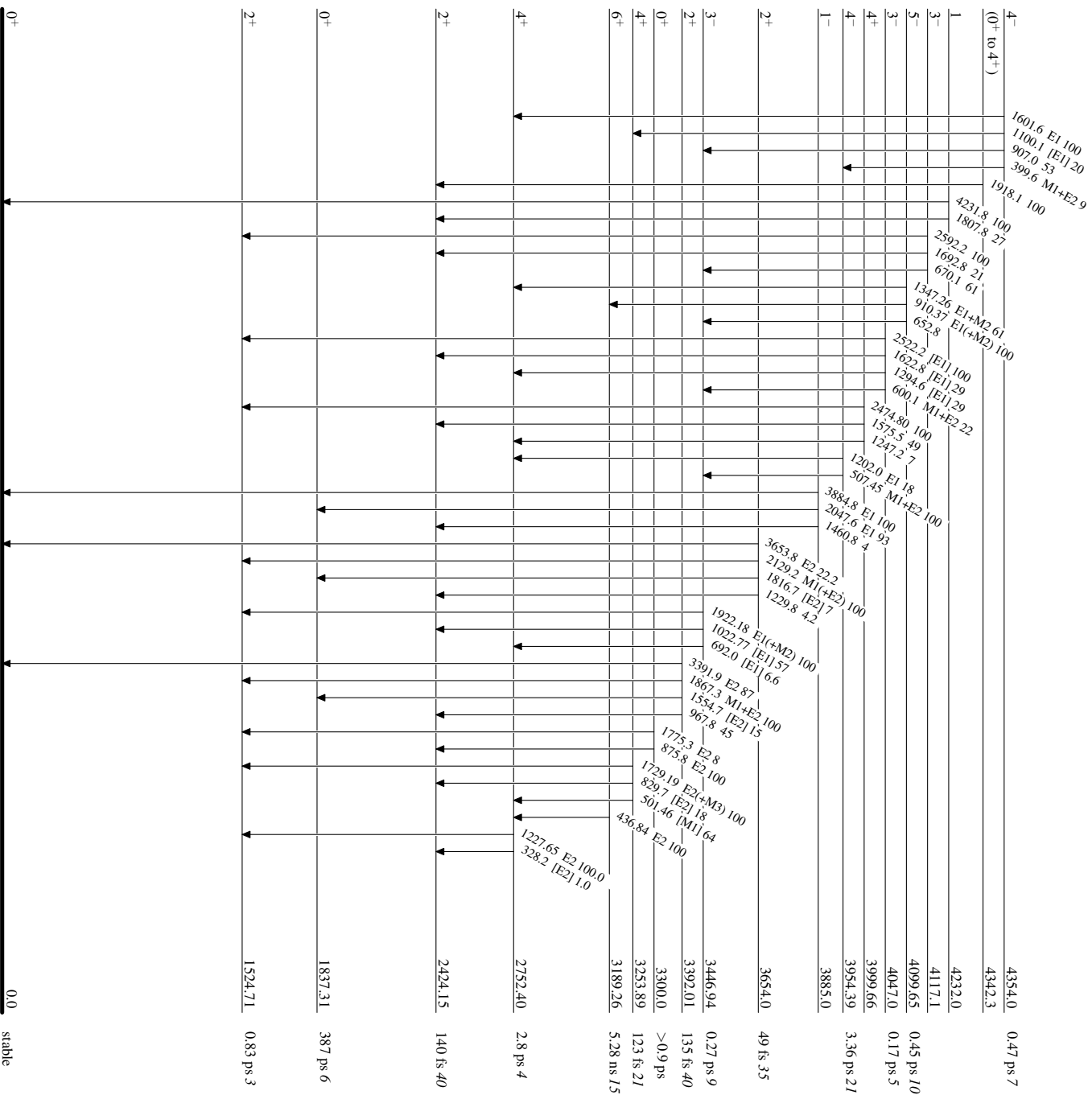
Intensities: Relative photon branching from each level

 $^{42}_{20}\text{Ca}_{22}$

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level



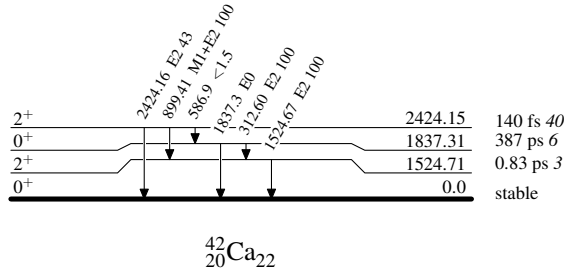
<sup>42</sup>Ca<sub>22</sub>

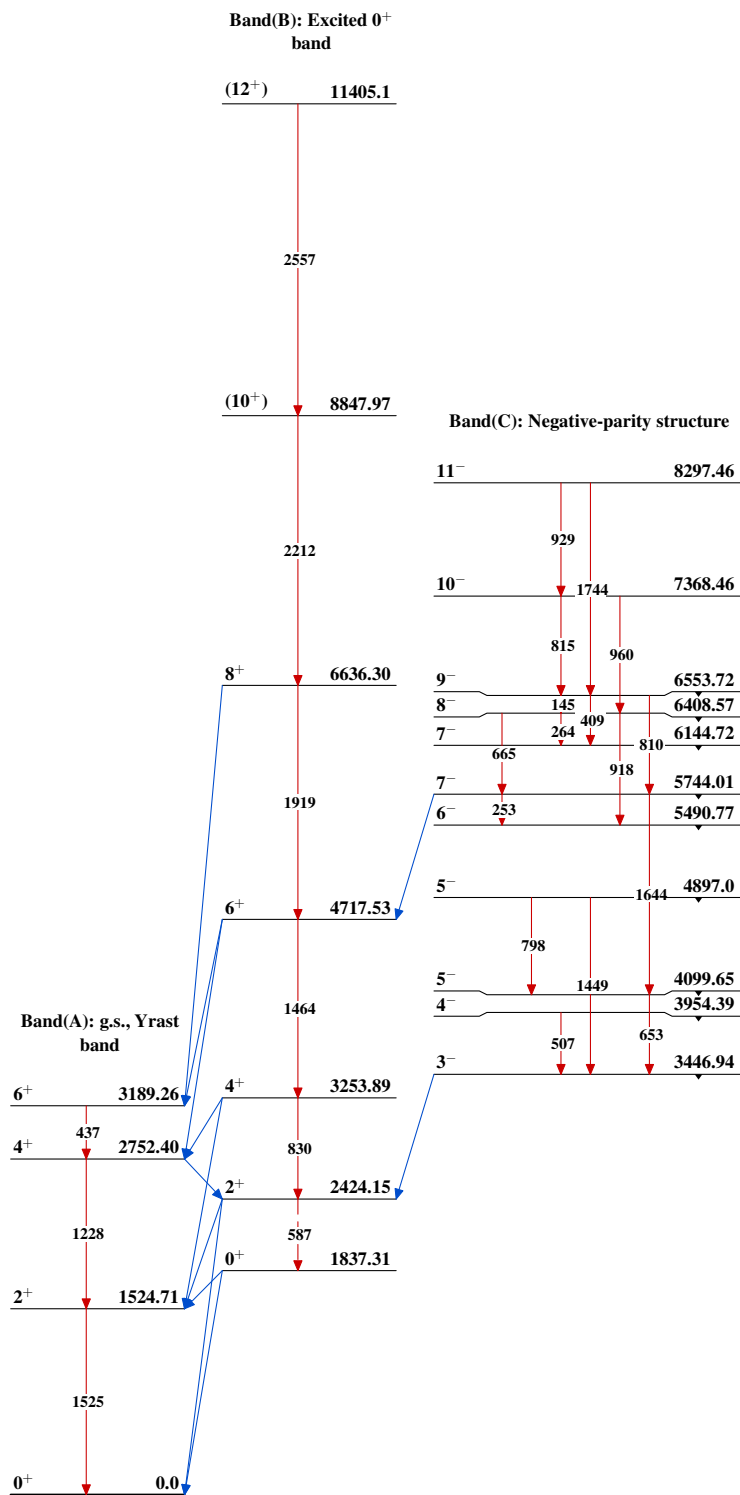
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

-----►  $\gamma$  Decay (Uncertain)

**Adopted Levels, Gammas** $^{42}_{20}\text{Ca}_{22}$