Adopted Levels, Gammas

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	T. W. Burrows	NDS 109, 171 (2008)	30-Oct-2007

Q(β^-)=259.0 *8*; S(n)=7414.81 *17*; S(p)=12319.6 *6*; Q(α)=−10169.6 *5* 2012Wa38
Note: Current evaluation has used the following Q record.
Q(β^-)=255.8 *8*; S(n)=7414.79 *17*; S(p)=12290 *40*; Q(α)=−10169.4 *5* 2003Au03

^{45}Ca Levels

Resonance properties: see 2006MuZX.

Cross Reference (XREF) Flags

A	^{45}K β^- decay	F	^{44}Ca(d,pγ)
B	^{36}S(^{14}C,n$\alpha\gamma$)	G	^{46}Ca(d,t),(^{3}He,α)
C	^{44}Ca(pol n,γ),(n,γ) E=thermal	H	^{48}Ca(^{3}He,^{6}He)
D	^{44}Ca(n,γ) E=10-60 keV res	I	^{48}Ti(n,$\alpha\gamma$)
E	^{44}Ca(d,p)		

E(level)[†]	J$^\pi$[‡]	T$_{1/2}$[#]	XREF	Comments
0.0	7/2$^-$[@]	162.61 d *9*	ABCDEFGHI	%β^-=100 μ=−1.3274 *14* (2005St24,1983Ar25,1980Be13) Q=+0.046 *14* (2005St24,1983Ar25,1981Ar15,1980Be13) J$^\pi$: J=7/2 from ABLDF (1979Be47). π=− from L(d,p)=3. T$_{1/2}$: weighted ave. (INT.) of 162.67 d *25* (1994Lo04. Liquid scin; inorganic and organic samples. 3 T$_{1/2}$'s) and 162.6 d *1* (1965An07; 4$\pi\beta$ pc, 5.8 T$_{1/2}$'s). Others: see 1992Bu01. μ,Q: ABLDF; ^{43}Ca standard; Sternheimer correction applied for Q. Other μ=−1.316 *16* (1982An15).
174.25[&] *4*	5/2$^-$[@]	0.40 ns *4*	A CDEFGHI	J$^\pi$: D γ to 7/2$^-$; D,E2 γ from 1/2$^-$. T$_{1/2}$: from pγ(t) In (d,pγ).
1434.77[&] *6*	3/2$^-$[@][a]	1.10 ps *+22−16*	A CDEFGH	
1554.37[&] *8*	(11/2$^-$)[b]	>2.1[c] ps	B H	XREF: H(1562).
1558 *10*			E	this state which is observed In (d,p) At 7 MeV is probably not the same As the 1554-keV state observed In (^{14}C,n$\alpha\gamma$) and (^{3}He,^{6}He) since the (d,p) reaction At 7 MeV is unlikely to populate an 11/2$^-$ state (L=5 required).
1584 *6*			E	
1879.89[d] *16*	3/2$^+$[e]	0.05 ps *3*	A C eFg	XREF: e(1886)g(1886). J$^\pi$: 1/2$^+$,3/2$^+$,5/2$^+$ from log *ft*=5.7 *via* 3/2$^+$. D γ from 1/2$^+$; D,Q γ to 7/2$^-$.
1884.4[d] *4*	[e]		C e gh	XREF: e(1886)g(1886)h(1895).
1899.92 *6*	3/2$^-$[@][a]	1.12 ps *+11−9*	A CDEFGh	XREF: h(1895).
1940.19? *7*		[f]	B	
1973 *6*	5/2$^-$,7/2$^-$		E	
2249.10 *7*	1/2$^-$[@][g]	0.43 ps *+7−6*	A CDEF	
2353.81 *16*	1/2$^+$,3/2$^+$,5/2$^+$[h]	4.7 ns *11*	A E	T$_{1/2}$: from $\gamma\gamma$(t) In β^- decay.
2392.29 *14*	1/2$^+$	0.19 ps *4*	A C EFGH	Configuration=(((ν f$_{7/2}$)$^{-2}$(ν s$_{1/2}$)$^{-1}$)1/2$^+$ (1976Na21)
2523.1? *4*	(3/2,5/2,7/2)		A	J$^\pi$: γ?'s to 3/2$^-$ and 7/2$^-$.
2599 *6*			E	
2675.1 *10*	(3/2,5/2)		C EF	J$^\pi$: γ to 7/2$^-$; D γ? from 3/2$^-$.

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Adopted Levels, Gammas (continued)

^{45}Ca Levels (continued)

E(level)[†]	Jπ[‡]	$T_{1/2}$[#]	XREF	Comments
2771.10 *15*	1/2+,3/2+,5/2+[h]		A E	
2786? *12*			H	May Be the same As the previous state; however, the large L transfer noted In (^{3}He,^{6}He) would indicate that it is not.
2842.05 *16*	3/2−[g]	22 fs *6*	A CDEFG	
2877.99[&] *12*	(15/2−)[b]	>2.1[c] ps	B H	
2953 *6*			E	
2976.8 *5*	5/2−	42 fs *19*	A EF	Jπ: L(d,p)=3. log *ft*=6.6 *via* 3/2+.
3023.6 *4*	1/2,3/2,5/2[i]		A	
3035? *6*			E H	May Be the same As the 3024 state.
3151 *6*			E	
3241.27 *24*	3/2−[g]	36 fs *12*	CDEF	
3278 *6*			E	
3294.5 *3*	(3/2+,5/2+)		A E	
3322 *6*	5/2−,7/2−		E	
3348 *12*			H	
3418.46 *14*	1/2−[g]	35 fs *7*	CD F	
3442 *10*	1/2−,3/2−		E	
3463 *10*			E	
3490.7 *5*	3/2−,5/2+[l]		A H	
3556.01? *10*			B	
3560 *10*	(1/2+)[j]		G	
3654.0? *5*	1/2,3/2,5/2[i]		A	
3675? *12*			H	
3705.0 *6*	1/2,3/2,5/2[i]		A E	
3753 *10*			E	
3783.22 *22*	1/2−,3/2−	<26 fs	CDEF	
3838.00 *20*	(1/2)−[k]	<15 fs	CDEF H	
3941.83 *14*		[f]	B	
3993 *10*	5/2−,7/2−		E G	
4048 *10*			E	
4115 *10*			E	
4177 *10*	5/2−,7/2−		E	
4258 *10*			E	
4286 *10*			E H	
4312 *10*	(1/2−,3/2−)		E	
4388 *10*			E	
4421 *10*			E	
4467.7 *10*	1/2−,3/2−		C E	
4511 *10*	(1/2−,3/2−)		E	
4559 *10*			E	
4615.72 *15*	1/2−[g]	<12 fs	C EF	
4695 *10*	(5/2−,7/2,9/2+)		E	
4750 *10*	3/2+,5/2+		E	
4762 *10*	1/2+		E	
4810 *10*	1/2−,3/2−		E	
4837 *10*	3/2+,5/2+		E	
4885 *10*	(5/2−,7/2−)		E	
4919 *10*	1/2+		E	
4981 *10*	1/2+		E	
4999.74 *19*	(1/2)−[k]	<9.7 fs	C EF	
5047 *10*	1/2+		E	
5079 *10*			E	
5128 *10*	(1/2+)		E	
5164 *10*			E	

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Adopted Levels, Gammas (continued)

^{45}Ca Levels (continued)

E(level)†	Jπ‡	XREF	E(level)†	Jπ‡	XREF	E(level)†	XREF
5201 *10*	$1/2^+$	E	5551 *10*		E	5915 *10*	E
5237 *3*	$1/2^-$,$3/2^-$	C E	5569 *10*		E	5948 *10*	E
5285 *10*		E	5598 *10*		E	5967 *10*	E
5309 *10*		E	5629 *10*		E	5990 *10*	E
5324 *10*	$3/2^+$,$5/2^+$	E	5687 *10*		E	6018 *10*	E
5352 *10*	$1/2^+$	E	5716 *10*		E	6051 *10*	E
5373 *10*	$1/2^-$,$3/2^-$	E	5742 *10*	$(3/2^+,5/2^+)$	E	6077 *10*	E
5390 *10*	$7/2^+$,$9/2^+$	E	5764 *10*	$5/2^-$,$7/2^-$	E	6106 *10*	E
5417 *10*	$3/2^+$,$5/2^+$	E	5792 *10*		E	6234 *10*	E
5440 *10*	$1/2^-$,$3/2^-$	E	5818 *10*	$1/2^+$	E	6301 *10*	E
5479 *10*	$1/2^+$	E	5846 *10*	$1/2^-$,$3/2^-$	E		
5521 *10*	$7/2^+$,$9/2^+$	E	5892 *10*	$3/2^+$,$5/2^+$	E		

† For states connected by gammas from least-squares fit to Eγ′s assuming ΔE(γ)=1 keV; capture-state energy held fixed In the fit. Other excitation energies are from (d,p) except As indicated In the XREF column.

‡ From angular momentum transfer In (d,p), except As noted.

From DSAM In (d,pγ), except As noted.

@ Main components of the wave functions are $(\nu\ 1f_{7/2})^5$ and $((\nu\ 1f_{7/2})^4\ (\nu\ 2p_{3/2}))$ (1969Gr21).

& Band(A): $(\nu\ f_{7/2})^{-3}$ multiplet. Probable member of a $(\nu\ f_{7/2})^{-3}$ multiplet (1976Na21).

[a] L(d,p)=1. D,E2 γ to $7/2^-$.

[b] Stretched quadrupole cascade In (^{14}C,nαγ). Large angular momentum transfer In (^{3}He,^{6}He).

[c] From DSAM In (^{14}C,nαγ).

[d] Identified As the same state In β^- decay, (n,γ), and (d,pγ); however, based on the large discrepancy In the Eγ to the $5/2^-$ between β^- decay and (d,pγ) and (n,γ), the evaluator proposes two states.

[e] L(d,p)=2 for doublet.

[f] >2.1 ps from DSAM (386γ; multiply placed).

[g] From circular polarization In (pol n,γ).

[h] log *ft*=5.8 *via* $3/2^+$ parent.

[i] log *ft*=6.3-7.3 *via* $3/2^+$ parent.

[j] L(d,t)=(0).

[k] L(d,p)=1. $(1/2^-)$ from circular polarization In (pol n,γ).

[l] γ′s to $1/2^+$ and $7/2^-$.

Adopted Levels, Gammas (continued)

γ(^{45}Ca)

See β^- decay and (pol n,γ),(n,γ) for unplaced γ′s.

E_i(level)	J_i^π	E_γ[†]	I_γ[‡]	E_f	J_f^π	Mult.	δ	α[j]	Comments
174.25	5/2$^-$	174.259[#] *47*	100	0.0	7/2$^-$	(M1)[@]		0.00326 *5*	B(M1)(W.u.)=0.0104 *11* α=0.00326 *5*; α(K)=0.00297 *5*; α(L)=0.000259 *4*; α(M)=3.08×10^{-5} *5* α(N+..)=1.727×10^{-6} *25* α(N)=1.727×10^{-6} *25*
1434.77	3/2$^-$	1260.58[&] *7*	100 *3*	174.25	5/2$^-$	M1+E2		6.6×10^{-5} *8*	α=6.6×10^{-5} *8*; α(K)=4.4×10^{-5} *5*; α(L)=3.8×10^{-6} *4*; α(M)=4.5×10^{-7} *5*; α(N+..)=1.7×10^{-5} *4* α(N)=2.6×10^{-8} *3*; α(IPF)=1.7×10^{-5} *4* Mult.: D+Q from γγ(θ). ≠ E1+M2 from δ′s and comparison to RUL. δ: −0.26 *8* or −2.0 *4* from γγ(θ) In (n,γ).
		1434.72[&] *13*	49 *3*	0.0	7/2$^-$	(E2)[a]		0.0001060 *15*	B(E2)(W.u.)=2.9 *+5−7* α=0.0001060 *15*; α(K)=3.70×10^{-5} *6*; α(L)=3.18×10^{-6} *5*; α(M)=3.77×10^{-7} *6* α(N+..)=6.53×10^{-5} *10* α(N)=2.14×10^{-8} *3*; α(IPF)=6.53×10^{-5} *10*
1554.37	(11/2$^-$)	1554.34[b] *8*	100[b]	0.0	7/2$^-$	(E2(+M3))[c]	0.00[c] *6*	0.0001440 *21*	B(E2)(W.u.)<3.1 α=0.0001440 *21*; α(K)=3.14×10^{-5} *5*; α(L)=2.70×10^{-6} *5*; α(M)=3.20×10^{-7} *5* α(N+..)=0.0001097 *16* α(N)=1.82×10^{-8} *3*; α(IPF)=0.0001097 *16*
1879.89	3/2$^+$	1705.6[#d] *2*	100.000 *30*	174.25	5/2$^-$	(E1)[e]		0.000441 *7*	B(E1)(W.u.)=0.0022 *13* α=0.000441 *7*; α(K)=1.457×10^{-5} *21*; α(L)=1.247×10^{-6} *18*; α(M)=1.481×10^{-7} *21* α(N+..)=0.000425 *6* α(N)=8.42×10^{-9} *12*; α(IPF)=0.000425 *6*
		1879.9 *3*	0.0371 *30*	0.0	7/2$^-$	(M2)		0.0001380 *20*	B(M2)(W.u.)=0.8 *5* α=0.0001380 *20*; α(K)=3.35×10^{-5} *5*; α(L)=2.88×10^{-6} *4*; α(M)=3.42×10^{-7} *5* α(N+..)=0.0001011 *15* α(N)=1.94×10^{-8} *3*; α(IPF)=0.0001011 *15* Mult.: D,Q from comparison to RUL. M2 from ΔJ$^\pi$=2,yes.
1884.4		1710.1[&d] *4*	100	174.25	5/2$^-$				
1899.92	3/2$^-$	464.96[&] *12*	9.4 *12*	1434.77	3/2$^-$	(M1+E2)		0.0006 *3*	α=0.0006 *3*; α(K)=0.00054 *24*;

Adopted Levels, Gammas (continued)

$\gamma(^{45}Ca)$ (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[‡]	E_f	J_f^π	Mult.	δ	α[j]	Comments
									α(L)=4.6×10^{-5} *21*; α(M)=5.5×10^{-6} *25* α(N+..)=3.1×10^{-7} *14* α(N)=3.1×10^{-7} *14* I_γ: weighted ave. (EXT.) from (n,γ) E=thermal and β^- decay branching ratios In Table IV of 1980Hu10. Mult.: D+Q from $\gamma(\theta)$ In (n,γ). M1+E2 from $\Delta\pi$=No. δ: −0.01 *4* or +4.0 *7* from (pol n,γ) and (n,γ).
1899.92	3/2$^-$	1725.68[&] *7*	100 *3*	174.25	5/2$^-$	M1+E2	+0.34 *4*	1.70×10^{-4} *3*	B(M1)(W.u.)=0.00234 *+25−28*; B(E2)(W.u.)=0.25 *6* α=1.70×10^{-4} *3*; α(K)=2.31×10^{-5} *4*; α(L)=1.98×10^{-6} *3*; α(M)=2.35×10^{-7} *4* α(N+..)=0.0001449 *23* α(N)=1.338×10^{-8} *19*; α(IPF)=0.0001448 *23* I_γ: weighted ave. (INT.) from (n,γ) E=thermal and β^- decay branching ratios In Table IV of 1980Hu10. Mult.: D+Q from $\gamma\gamma(\theta)$. ≠ E1+M2 from δ and comparison to RUL. δ: weighted av from (pol N,γ), (n,γ) and (d,pγ). Others: weighted av of +8 *3* from (n,γ) and (d,pγ) ruled out by CP(pol n,γ).
		1900.13[#] *18*	36.9 *75*	0.0	7/2$^-$	(E2)[a]		0.000289 *5*	B(E2)(W.u.)=0.54 *13* α=0.000289 *5*; α(K)=2.13×10^{-5} *3*; α(L)=1.82×10^{-6} *3*; α(M)=2.17×10^{-7} *3* α(N+..)=0.000265 *4* α(N)=1.232×10^{-8} *18*; α(IPF)=0.000265 *4* I_γ: weighted ave. (EXT.) from (n,γ) E=thermal and β^- decay branching ratios In Table IV of 1980Hu10.
1940.19?		385.74[kbl] *8*	100[kb]	1554.37	(11/2$^-$)				
2249.10	1/2$^-$	349.11[&] *10*	53.2[&] *76*	1899.92	3/2$^-$	(M1)[@]		0.000626 *9*	B(M1)(W.u.)=0.30 *7* α=0.000626 *9*; α(K)=0.000570 *8*; α(L)=4.94×10^{-5} *7*; α(M)=5.86×10^{-6} *9* α(N+..)=3.31×10^{-7} *5* α(N)=3.31×10^{-7} *5*
		814.51[&] *10*	60.8[&] *89*	1434.77	3/2$^-$	(M1)[f]		0.0001020 *15*	B(M1)(W.u.)=0.027 *6* α=0.0001020 *15*; α(K)=9.26×10^{-5} *13*; α(L)=7.96×10^{-6} *12*; α(M)=9.45×10^{-7} *14* α(N+..)=5.37×10^{-8} *8* α(N)=5.37×10^{-8} *8*

$^{45}_{20}Ca_{25}$-5

Adopted Levels, Gammas (continued)

γ(^{45}Ca) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[‡]	E_f	J_f^π	Mult.	α[j]	Comments
2249.10	1/2$^-$	2074.71[&] *9*	100.0[&] *16*	174.25	5/2$^-$	(E2)[a]	0.000371 *6*	B(E2)(W.u.)=1.7 *3* α=0.000371 *6*; α(K)=1.81×10^{-5} *3*; α(L)=1.553×10^{-6} *22*; α(M)=1.84×10^{-7} *3* α(N+..)=0.000351 *5* α(N)=1.049×10^{-8} *15*; α(IPF)=0.000351 *5*
2353.81	1/2$^+$,3/2$^+$,5/2$^+$	453.9 *3*	0.30 *6*	1899.92	3/2$^-$	(M2)	0.001160 *17*	B(M2)(W.u.)=0.072 *22* α=0.001160 *17*; α(K)=0.001060 *15*; α(L)=9.27×10^{-5} *13*; α(M)=1.100×10^{-5} *16* α(N+..)=6.19×10^{-7} *9* α(N)=6.19×10^{-7} *9* Mult.: D,Q from comparison to RUL. E1,M2 from Δπ=yes. Probably not E1 since B(E1)↓(W.u.)=3.2×10^{-9} *10* is≈1 order of magnitude less than values previously compiled (*Cf.* Fig. 1 of 1979En04).
		919.3 *3*	6.14 *45*	1434.77	3/2$^-$	(E1,M2)	0.00011 *7*	B(E1)(W.u.)<7.9×10^{-9} *20*; B(M2)(W.u.)<0.043 *11* α=0.00011 *7*; α(K)=0.00010 *7*; α(L)=9.E−6 *6*; α(M)=1.1×10^{-6} *7* α(N+..)=6.E−8 *4* α(N)=6.E−8 *4* Mult.: D,Q from comparison to RUL. E1,M2 from Δπ=yes.
		2179.4 *3*	6.93 *57*	174.25	5/2$^-$	(M2)	0.000214 *3*	B(M2)(W.u.)=0.00065 *17* α=0.000214 *3*; α(K)=2.49×10^{-5} *4*; α(L)=2.14×10^{-6} *3*; α(M)=2.54×10^{-7} *4* α(N+..)=0.000187 *3* α(N)=1.446×10^{-8} *21*; α(IPF)=0.000187 *3* Mult.: D,Q,E3 from comparison to RUL. E1,M2 from ΔJ$^\pi$≤2,yes. Probably not E1 since B(E1)↓(W.u.)=6.7×10^{-10} *17* is≈1 order of magnitude less than values previously compiled (*Cf.* Fig. 1 of 1979En04).
		2353.6 *5*	100.0 *11*	0.0	7/2$^-$	(E1,M2,E3)	0.0006 *4*	B(E1)(W.u.)<7.7×10^{-9} *18*; B(M2)(W.u.)<0.0064 *15*; B(E3)(W.u.)<4.7 *12* α=0.0006 *4*; α(K)=1.5×10^{-5} *7*; α(L)=1.3×10^{-6} *6*; α(M)=1.6×10^{-7} *7* α(N+..)=0.0006 *4* α(N)=9.E−9 *4*; α(IPF)=0.0006 *4* Mult.: D,Q,E3 from comparison to RUL. Δπ=yes.
2392.29	1/2$^+$	492.5 *2*	17.3 *13*	1899.92	3/2$^-$	(E1)	0.000198 *3*	B(E1)(W.u.)=0.0030 *7* α=0.000198 *3*; α(K)=0.000180 *3*; α(L)=1.549×10^{-5} *22*; α(M)=1.84×10^{-6} *3* α(N+..)=1.039×10^{-7} *15* α(N)=1.039×10^{-7} *15* Mult.: D from comparison to RUL. E1 from Δπ=yes.

Adopted Levels, Gammas (continued)

γ(^{45}Ca) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[‡]	E_f	J_f^π	Mult.	α[j]	Comments
2392.29	1/2$^+$	512 *1*	16.0 *53*	1879.89	3/2$^+$	(M1)[@]	0.000267 *4*	B(M1)(W.u.)=0.10 *4* α=0.000267 *4*; α(K)=0.000244 *4*; α(L)=2.10×10^{-5} *3*; α(M)=2.49×10^{-6} *4* α(N+..)=1.413×10^{-7} *21* α(N)=1.413×10^{-7} *21*
		957.5 *2*	100.0 *53*	1434.77	3/2$^-$	(E1)[e]	4.37×10^{-5} *7*	B(E1)(W.u.)=0.0024 *6* α=4.37×10^{-5} *7*; α(K)=3.98×10^{-5} *6*; α(L)=3.41×10^{-6} *5*; α(M)=4.05×10^{-7} *6*; α(N+..)=2.30×10^{-8} *4* α(N)=2.30×10^{-8} *4*
		2217.3 *6*	0.27 *13*	174.25	5/2$^-$	(M2)	0.000225 *4*	B(M2)(W.u.)=0.5 *3* α=0.000225 *4*; α(K)=2.41×10^{-5} *4*; α(L)=2.07×10^{-6} *3*; α(M)=2.46×10^{-7} *4* α(N+..)=0.000198 *3* α(N)=1.398×10^{-8} *20*; α(IPF)=0.000198 *3* Mult.: D,Q from comparison to RUL. M2 from $\Delta\pi$=2,yes.
		2392.0 *4*	0.13 *13*	0.0	7/2$^-$	[E3]	0.000336 *5*	B(E3)(W.u.)≤2.4×10^2 α=0.000336 *5*; α(K)=2.14×10^{-5} *3*; α(L)=1.84×10^{-6} *3*; α(M)=2.18×10^{-7} *3* α(N+..)=0.000313 *5* α(N)=1.240×10^{-8} *18*; α(IPF)=0.000313 *5*
2523.1?	(3/2,5/2,7/2)	623.4[l] *6*	10.8 *41*	1899.92	3/2$^-$			
		2349[l] *1*	100 *11*	174.25	5/2$^-$			
		2522.7[l] *6*	24.3 *14*	0.0	7/2$^-$			
2675.1	(3/2,5/2)	2675[g]		0.0	7/2$^-$			
2771.10	1/2$^+$,3/2$^+$,5/2$^+$	417.4 *3*	13.6 *17*	2353.81	1/2$^+$,3/2$^+$,5/2$^+$			
		522.4 *8*	0.17 *14*	2249.10	1/2$^-$			
		871.3 *5*	4.767 *17*	1899.92	3/2$^-$			
		891.3 *4*	21.4 *24*	1879.89	3/2$^+$			
		1336.4 *8*	98 *17*	1434.77	3/2$^-$			
		2596.7 *2*	100 *12*	174.25	5/2$^-$			
		2769.9 *10*	0.71 *24*	0.0	7/2$^-$			
2842.05	3/2$^-$	942.7[&l] *10*	9.1[&] *61*	1899.92	3/2$^-$	D,E2[h]		
		957.8[&l] *3*	30[&] *16*	1884.4		(E1)[e]	4.36×10^{-5} *7*	B(E1)(W.u.)=0.0037 *23* α=4.36×10^{-5} *7*; α(K)=3.98×10^{-5} *6*; α(L)=3.41×10^{-6} *5*; α(M)=4.05×10^{-7} *6*; α(N+..)=2.30×10^{-8} *4* α(N)=2.30×10^{-8} *4*
		2667.7[&] *2*	100[&] *15*	174.25	5/2$^-$	D,E2[h]		

Adopted Levels, Gammas (continued)

γ(^{45}Ca) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[‡]	E_f	J_f^π	Mult.	δ	α[j]	Comments
2842.05	3/2⁻	2842.2[&] *3*	84[&] *11*	0.0	7/2⁻	(E2)[a]		0.000726 *11*	B(E2)(W.u.)=5.5 *18* α=0.000726 *11*; α(K)=1.061×10^{-5} *15*; α(L)=9.07×10^{-7} *13*; α(M)=1.078×10^{-7} *15* α(N+..)=0.000714 *10* α(N)=6.14×10^{-9} *9*; α(IPF)=0.000714 *10*
2877.99	(15/2⁻)	1323.60[b] *9*	100[b]	1554.37	(11/2⁻)	(E2(+M3))[c]	0.00[c] *6*	8.28×10^{-5} *12*	B(E2)(W.u.)<7.0 α=8.28×10^{-5} *12*; α(K)=4.40×10^{-5} *7*; α(L)=3.77×10^{-6} *6*; α(M)=4.48×10^{-7} *7*; α(N+..)=3.47×10^{-5} *5* α(N)=2.54×10^{-8} *4*; α(IPF)=3.46×10^{-5} *5*
2976.8	5/2⁻	2802.4 *6*	100.0 *26*	174.25	5/2⁻	D,E2[h]			
		2976.7 *6*	28.28 *26*	0.0	7/2⁻	(E2)[a]		0.000785 *11*	B(E2)(W.u.)=1.3 *6* α=0.000785 *11*; α(K)=9.85×10^{-6} *14*; α(L)=8.42×10^{-7} *12*; α(M)=1.001×10^{-7} *14* α(N+..)=0.000774 *11* α(N)=5.70×10^{-9} *8*; α(IPF)=0.000774 *11*
3023.6	1/2,3/2,5/2	2849.3 *4*	100	174.25	5/2⁻				
3241.27	3/2⁻	565.6[&l] *10*	23[&] *15*	2675.1	(3/2,5/2)	D[h]			
		992[gl]		2249.10	1/2⁻				
		3066.9[&] *4*	100[&] *15*	174.25	5/2⁻	D,E2[h]			
		3241[gl]		0.0	7/2⁻				
3294.5	(3/2⁺,5/2⁺)	771.4[l] *8*	35.6 *44*	2523.1?	(3/2,5/2,7/2)				
		1860.4 *12*	15.6 *22*	1434.77	3/2⁻				
		3120.2 *4*	100.0 *44*	174.25	5/2⁻				
		3294.3 *4*	68.9 *44*	0.0	7/2⁻				
3418.46	1/2⁻	576.4[&] *5*	18[&] *10*	2842.05	3/2⁻	(M1)[@]		0.000207 *3*	B(M1)(W.u.)=0.28 *17* α=0.000207 *3*; α(K)=0.000189 *3*; α(L)=1.628×10^{-5} *23*; α(M)=1.93×10^{-6} *3* α(N+..)=1.096×10^{-7} *16* α(N)=1.096×10^{-7} *16*
		1026.0[&l] *6*	10[&] *5*	2392.29	1/2⁺	(E1)[e]		3.82×10^{-5} *6*	B(E1)(W.u.)=0.0007 *4* α=3.82×10^{-5} *6*; α(K)=3.48×10^{-5} *5*; α(L)=2.99×10^{-6} *5*;

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Adopted Levels, Gammas (continued)

γ(^{45}Ca) (continued)

E_i(level)	J_i^π	E_γ [†]	I_γ [‡]	E_f	J_f^π	Mult.	α [j]	Comments
								α(M)=3.54×10^{-7} *5*; α(N+..)=2.01×10^{-8} *3* α(N)=2.01×10^{-8} *3*
3418.46	1/2$^-$	1169.66[&] *24*	100[&] *15*	2249.10	1/2$^-$	(M1)[f]	5.40×10^{-5} *8*	B(M1)(W.u.)=0.18 *5* α=5.40×10^{-5} *8*; α(K)=4.59×10^{-5} *7*; α(L)=3.94×10^{-6} *6*; α(M)=4.68×10^{-7} *7*; α(N+..)=3.63×10^{-6} *6* α(N)=2.66×10^{-8} *4*; α(IPF)=3.61×10^{-6} *6*
		1983.7[&] *4*	25[&] *8*	1434.77	3/2$^-$	(M1)[f]	0.000262 *4*	B(M1)(W.u.)=0.009 *4* α=0.000262 *4*; α(K)=1.80×10^{-5} *3*; α(L)=1.542×10^{-6} *22*; α(M)=1.83×10^{-7} *3* α(N+..)=0.000242 *4* α(N)=1.043×10^{-8} *15*; α(IPF)=0.000242 *4*
		3243.5[&] *3*	60[&] *10*	174.25	5/2$^-$	(E2)[a]	0.000895 *13*	B(E2)(W.u.)=1.3 *4* α=0.000895 *13*; α(K)=8.60×10^{-6} *12*; α(L)=7.36×10^{-7} *11*; α(M)=8.74×10^{-8} *13* α(N+..)=0.000886 *13* α(N)=4.98×10^{-9} *7*; α(IPF)=0.000886 *13*
3490.7	3/2$^-$,5/2$^+$	1098.0 *6*	100 *9*	2392.29	1/2$^+$			
		3491.0 *6*	85 *9*	0.0	7/2$^-$			
3556.01?		2001.48[kbl] *10*	100[kb]	1554.37	(11/2$^-$)			
3654.0?	1/2,3/2,5/2	3479.9[l] *8*	100 *5*	174.25	5/2$^-$			
		3653.8[l] *6*	28 *5*	0.0	7/2$^-$			
3705.0	1/2,3/2,5/2	3704.8 *6*	100	0.0	7/2$^-$			
3783.22	1/2$^-$,3/2$^-$	3609.3[&] *3*	100[&]	174.25	5/2$^-$	D,E2[h]		
3838.00	(1/2)$^-$	1938.1[&] *5*	50[&] *10*	1899.92	3/2$^-$	(M1)[i]	0.000244 *4*	B(M1)(W.u.)>0.067 α=0.000244 *4*; α(K)=1.87×10^{-5} *3*; α(L)=1.604×10^{-6} *23*; α(M)=1.91×10^{-7} *3* α(N+..)=0.000223 *4* α(N)=1.085×10^{-8} *16*; α(IPF)=0.000223 *4*
		2403.3[&] *3*	100[&] *20*	1434.77	3/2$^-$	(M1)[i]	0.000434 *7*	B(M1)(W.u.)>0.070 α=0.000434 *7*; α(K)=1.316×10^{-5} *19*; α(L)=1.126×10^{-6} *16*; α(M)=1.337×10^{-7} *19* α(N+..)=0.000419 *6* α(N)=7.62×10^{-9} *11*; α(IPF)=0.000419 *6*
3941.83		385.74[kbl] *8*	83[kb] *43*	3556.01?				
		1063.83[b] *6*	100[b] *50*	2877.99	(15/2$^-$)			
		2001.48[kbl] *10*	83[kb] *25*	1940.19?				
4615.72	1/2$^-$	2716.0[&] *3*	100[&] *19*	1899.92	3/2$^-$	(M1)[i]	0.000564 *8*	B(M1)(W.u.)>0.064 α=0.000564 *8*; α(K)=1.084×10^{-5} *16*; α(L)=9.27×10^{-7}

Adopted Levels, Gammas (continued)

$\gamma(^{45}Ca)$ (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[‡]	E_f	J_f^π	Mult.	α[j]	Comments
								13; α(M)=1.102×10^{-7} *16* α(N+..)=0.000553 *8* α(N)=6.28×10^{-9} *9*; α(IPF)=0.000553 *8*
4615.72	1/2$^-$	3180.8[&] *3*	44[&] *13*	1434.77	3/2$^-$	(M1)[i]	0.000749 *11*	B(M1)(W.u.)>0.017 α=0.000749 *11*; α(K)=8.51×10^{-6} *12*; α(L)=7.28×10^{-7} *11*; α(M)=8.64×10^{-8} *13* α(N+..)=0.000739 *11* α(N)=4.92×10^{-9} *7*; α(IPF)=0.000739 *11*
4999.74	(1/2)$^-$	2608.2[&] *15*	100[&] *55*	2392.29	1/2$^+$	[E1]	0.001030 *15*	B(E1)(W.u.)>0.0015 α=0.001030 *15*; α(K)=7.92×10^{-6} *12*; α(L)=6.77×10^{-7} *10*; α(M)=8.04×10^{-8} *12* α(N+..)=0.001025 *15* α(N)=4.58×10^{-9} *7*; α(IPF)=0.001025 *15*
		3099.7[&] *4*	82[&] *18*	1899.92	3/2$^-$	[M1]	0.000717 *11*	B(M1)(W.u.)>0.030 α=0.000717 *11*; α(K)=8.85×10^{-6} *13*; α(L)=7.57×10^{-7} *11*; α(M)=8.99×10^{-8} *13* α(N+..)=0.000708 *10* α(N)=5.12×10^{-9} *8*; α(IPF)=0.000708 *10*
		3565.0[&] *3*	27[&] *18*	1434.77	3/2$^-$	[M1]	0.000892 *13*	B(M1)(W.u.)>0.0065 α=0.000892 *13*; α(K)=7.18×10^{-6} *10*; α(L)=6.14×10^{-7} *9*; α(M)=7.29×10^{-8} *11* α(N+..)=0.000884 *13* α(N)=4.16×10^{-9} *6*; α(IPF)=0.000884 *13*

[†] From β^- decay, except As noted.
[‡] From β^- decay branching ratios In Table IV of 1980Hu10, except As noted.
[#] Weighted ave. (EXT.) of 174.24 *4* (1971BiZH) and 174.01 *9* (2003ChZS) from (n,γ) E=thermal and 174.28 *3* from β^- decay, 1704.01 *24* from (n,γ) E=thermal and 1705.6 *3* from β^- decay, and 1900.20 *12* from (n,γ) E=thermal and 1899.7 *3* from β^- decay.
[@] D from comparison to RUL. M1 from $\Delta\pi$=No.
[&] From (n,γ).
[a] D,E2 from comparison to RUL. E2 from ΔJ=2.
[b] From (^{14}C,n$\alpha\gamma$).
[c] Q(+O) from $\gamma(\theta)$ In (^{14}C,n$\alpha\gamma$); stretched quadrupole cascade. E2(+M3) from $\Delta J^\pi=^{2,}$No
[d] See footnote on associated state.
[e] D,E2 from comparison to RUL. E1 from $\Delta\pi$=yes.
[f] D,E2 from comparison to RUL. M1 from $\Delta J^\pi\leq^{1,}$Noinvolving 1/2 state.
[g] From (d,pγ).

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Adopted Levels, Gammas (continued)

$\gamma(^{45}Ca)$ (continued)

[h] From comparison to RUL.
[i] D,E2 from comparison to RUL. M1 from (1/2)-→$3/2^-$.
[j] Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on γ-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.
[k] Multiply placed with undivided intensity.
[l] Placement of transition in the level scheme is uncertain.

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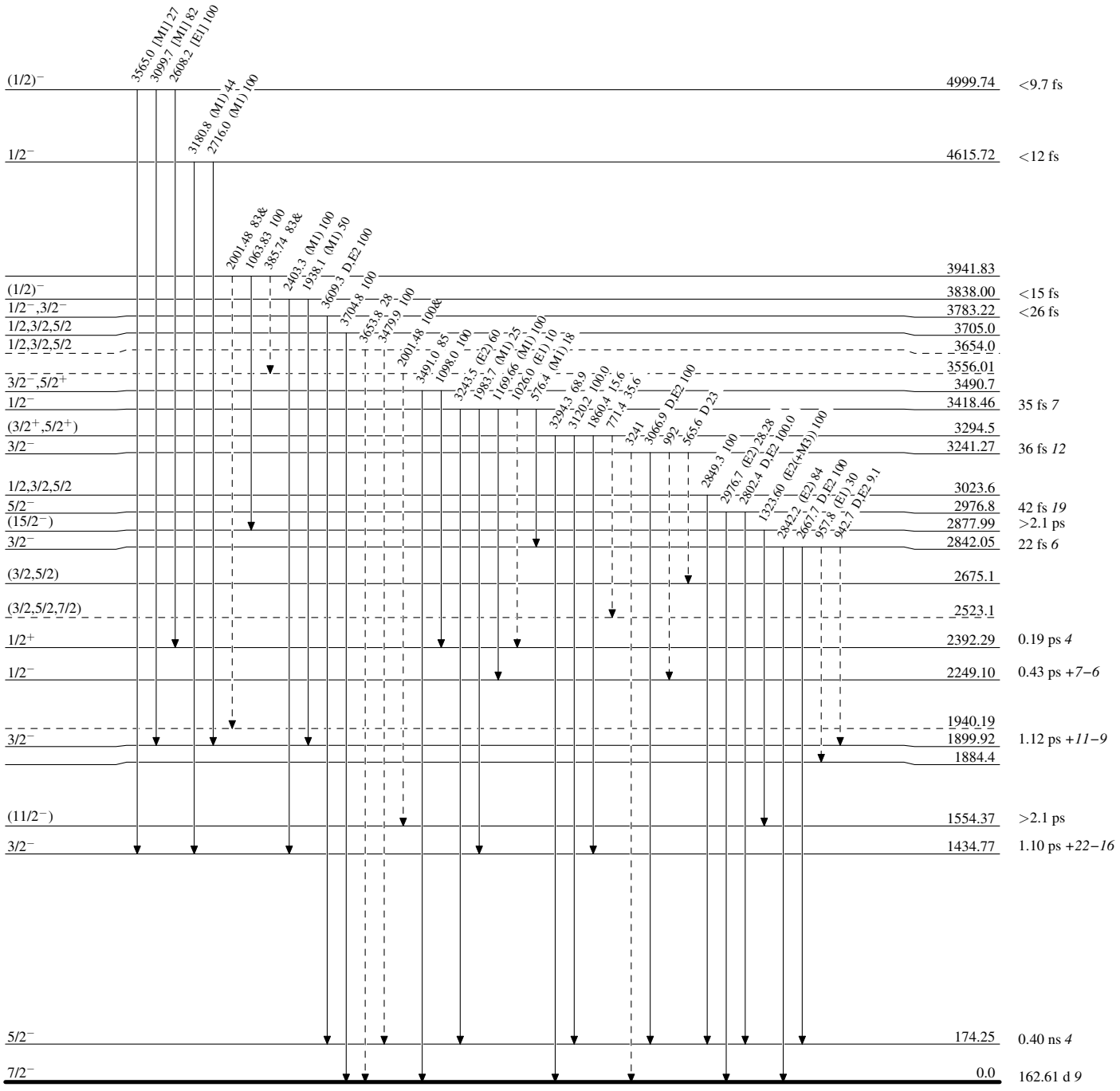
Adopted Levels, Gammas

Legend

Level Scheme

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given

γ Decay (Uncertain)



$^{45}_{20}Ca_{25}$

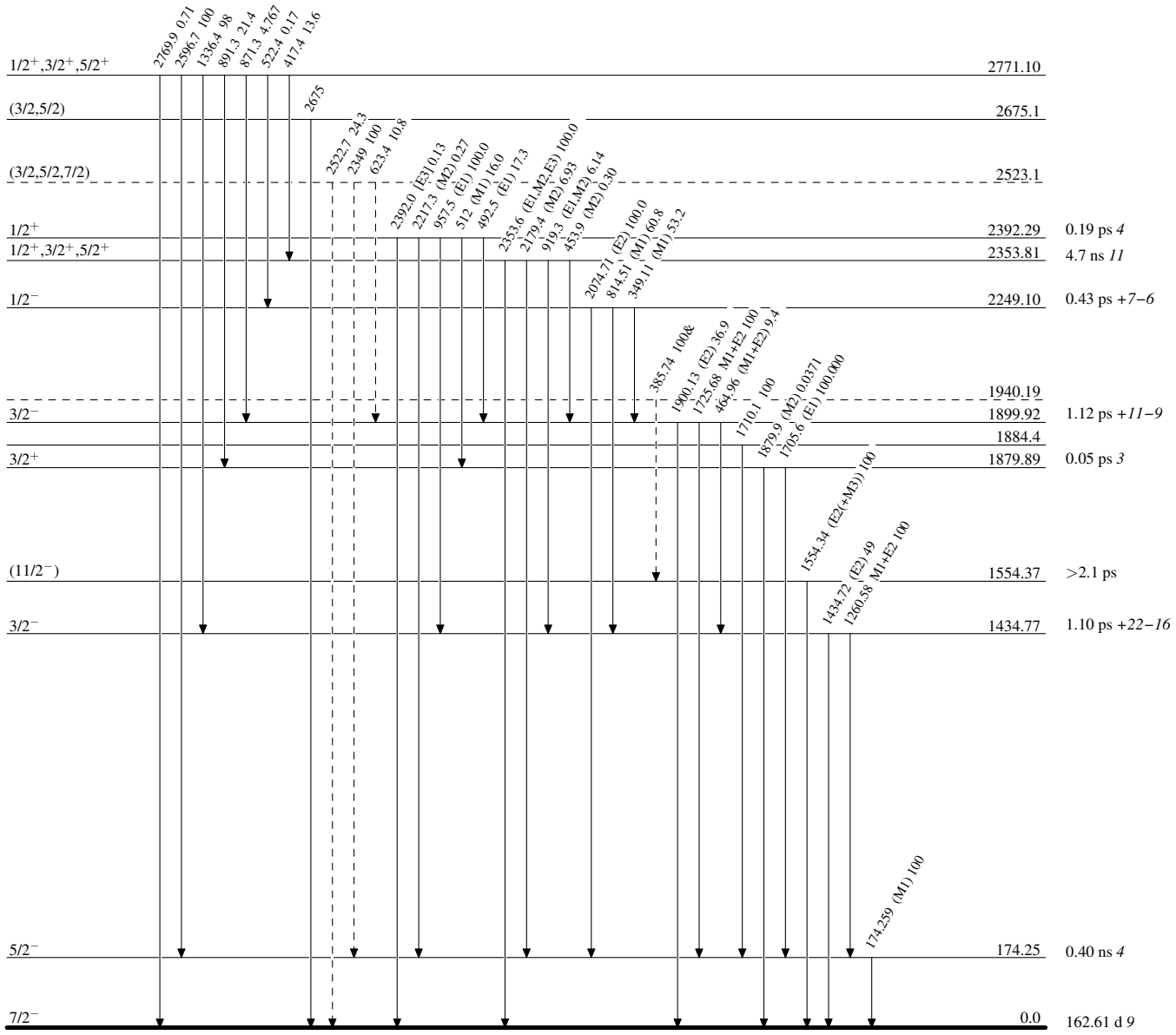
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given

γ Decay (Uncertain)



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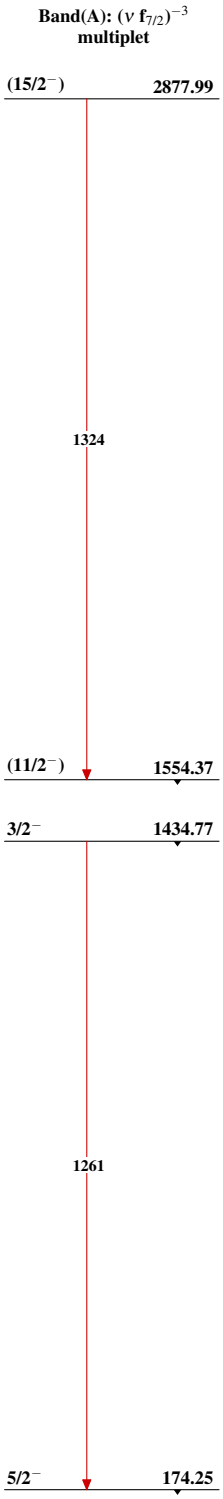
Adopted Levels, Gammas



$^{45}_{20}Ca_{25}$