Adopted Levels, Gammas

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Jun Chen	NDS 179, 1 (2022)	30-Nov-2021

Q(β^-)=−13525 *10*; S(n)=16330 *9*; S(p)=8103 *7*; Q(α)=−7698 *7* 2021Wa16
S(2n)=29492 *14*, S(2p)=13271 *7*, Q(ε)=1657 *7* (2021Wa16).
Resonance parameters: see 1983Zu03 (^{24}Mg(^{24}Mg,^{24}Mg) and ^{24}Mg(^{24}Mg,^{24}Mg′)), 1987Sa05 (^{24}Mg(^{24}Mg,^{20}Ne), ^{24}Mg(^{24}Mg,^{24}Mg), and ^{24}Mg(^{24}Mg,^{24}Mg′)), 1987Wu01 (^{24}Mg(^{24}Mg,^{24}Mg′)), 1990Wu03 ((^{24}Mg,^{24}Mg), (^{24}Mg,^{24}Mg′), (^{24}Mg,x)), 1993LeZY (^{24}Mg(^{24}Mg,X)), and 1994Ha03 ((^{24}Mg,^{24}Mg′) and (^{24}Mg,^{20}Ne)) and references cited by these authors. See the Nuclear Science References library for theoretical calculations. See 1992Ra06 for an interpretation of some of these resonances as hyperdeformed states.

^{48}Cr Levels

1994Ca04 in (^{40}Ca,npγ) find no evidence for super- or hyperdeformation at higher energies as speculated by I. Ragnarsson in a private communication to 1994Ca04.

Cross Reference (XREF) Flags

A	^{48}Mn β^+ decay (157.7 ms)	E	^{28}Si(^{28}Si,2$\alpha\gamma$)	I	^{46}Ti(^{3}He,nγ)
B	^{49}Fe β^+p decay	F	^{34}S(^{16}O,2nγ)	J	^{48}Ti(π^+,π^-)
C	^{10}B(^{40}Ca,pnγ),^{40}Ca(^{10}B,pnγ)	G	^{36}Ar(^{14}N,npγ)	K	^{50}Cr(p,t)
D	^{24}Mg(^{32}S,2$\alpha\gamma$),(^{32}S,^{8}Beγ)	H	^{46}Ti(^{3}He,n)		

E(level)[†]	J$^\pi$	T$_{1/2}$[#]	XREF	Comments
0.0[&]	0$^+$	21.56 h *3*	ABCDEFGHIJK	%ε+%β^+=100 T$_{1/2}$: from 1974Ts01. Others: 21.55 h *15* from 1979PrZU; 22.96 h *5* from 1963Ho17 is discrepant.
752.16[&] *13*	2$^+$	8.0 ps *5*	ABCDEFGHI K	XREF: H(800). J$^\pi$: L(p,t)=2 from 0$^+$; 752.15γ E2 to 0$^+$. T$_{1/2}$: weighted average of 8.43 ps *49* (2017Ar09), 7.3 ps *8* (1979Ek03), and 6.7 ps *18* (1973Ku10) in ^{40}Ca(^{10}B,pnγ), using RDM. Other: 11.6 ps *15* from RDM in 1975Ha04 in (^{16}O,2nγ), which is re-analyzed to be 8.7 ps *24* by 1979Ek03 after removing a restriction imposed by 1975Ha04 on normalization constants for obtaining intensity ratio in RDM.
1858.40[&] *22*	4$^+$	1.20 ps *13*	ABCDEFG I K	XREF: K(1845). J$^\pi$: L(p,t)=4 from 0$^+$; 1106.3γ E2 to 2$^+$. T$_{1/2}$: weighted average of 1.21 ps *13* from (^{32}S,2$\alpha\gamma$), 1.04 ps *35* from (^{28}Si,2$\alpha\gamma$), and 1.3 ps *4* from (^{14}N,npγ), using DSAM. Other: 1.0 ps *+14−4* from RDM in (^{10}B,pnγ), <3.5 ps from RDM in (^{16}O,2nγ).
3420? *20*	(0$^+$)		K	J$^\pi$: L(p,t)=(0) from 0$^+$.
3444.8[&] *4*	6$^+$	0.19 ps *5*	A CDE G I K	J$^\pi$: 1586.4γ E2 to 4$^+$; spin>4 from γ excitation function in (^{10}B,pnγ) (1979Ha45); band assignment. T$_{1/2}$: other: <0.7 ps from DSAM in (^{14}N,npγ) (1979Ek03).
3524.2 *10*	(0,1,2,3)		I k	XREF: k(3527). J$^\pi$: <4 from γ-ray excitation functions in (^{3}He,nγ) (2003Je06).
3533.5[a] *3*	4$^{(-)}$[@]	3.3 ns *8*	A C EFG I k	XREF: k(3527). J$^\pi$: spin=4 from γ excitation function and $\gamma\gamma(\theta)$ in (^{3}He,nγ) (2003Je06); 4$^-$ is proposed by 1998Br34 in (^{28}Si,2$\alpha\gamma$) and the authors note that $\gamma(\theta)$ of 1973Ku10 (assigning 6$^+$) in (^{10}B,npγ) and 1975Ha04 (assigning 6$^+$) and 1979Ha45 (assigning 6$^-$) in (^{16}O,2nγ),

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Adopted Levels, Gammas (continued)

^{48}Cr Levels (continued)

E(level)[†]	Jπ	$T_{1/2}$[#]	XREF	Comments
				which were interpreted as quadrupole, would also be consistent with ΔJ=0 dipole character and that negative parity is strongly suggested by systematics and 4^- is from shell-model prediction.
				$T_{1/2}$: weighted average of 4.1 ns *4* from 1675γ(t) in (^{10}B,pnγ) (1979Ha45) and 2.5 ns *7* from RDM in (^{14}N,npγ) (1979Ek03).
3632.2 *10*	$(2^+,3^-)$		I K	Jπ: (<4) from γ excitation functions in (^{3}He,nγ) (2003Je06); L(p,t)=(2,3) from 0^+.
4034.3 *10*	(0,1,2,3)		I	Jπ: <4 from γ excitation functions in (^{3}He,nγ) (2003Je06).
4064.1 *4*	$3^{(-)}$		I k	$T_{1/2}$: from (^{10}B,pnγ).
				Jπ: ≤3 from γ excitation functions and ≥3 from γγ(θ) in (^{3}He,nγ) and π=− suggested by shell-model calculations (2003Je06). L(p,t)=3 from 0^+ for an unresolved doublet at 4067 *5* (1972Sh27).
4064.2[a] *4*	$5^{(-)}$[@]	28 ps *7*	A C EFG I k	Jπ: spin=5 from γ excitation function and γγ(θ) in (^{3}He,nγ) (2003Je06); 530.77γ M1+E2 to $4^{(-)}$. L(p,t)=3 from 0^+ for an unresolved doublet at 4067 *5* (1972Sh27).
				$T_{1/2}$: from RDM in (^{10}B,pnγ) (1979Ek03).
4280 *5*	(0^+)		K	Jπ: L(p,t)=(0) from 0^+.
4428.7 *3*	4^+		A K	XREF: K(4432).
				Jπ: L(p,t)=4 from 0^+; allowed β feeding (log *ft*=4.6) from 4^+ parent.
4640 *10*	2^+		K	Jπ: L(p,t)=2 from 0^+.
4653.0 *3*	$(3,4)^+$		A	Jπ: 3900.5γ to 2^+; allowed β feeding (log *ft*=5.0) from 4^+ parent.
4765.5 *11*	(4,5)		I	Jπ: from γ excitation functions in (^{3}He,nγ) (2003Je06).
4876.0[a] *4*	(6^-)	>0.7 ps	C E I	XREF: C(?).
				Jπ: (5,6) from γ excitation functions in (^{3}He,nγ) (2003Je06); 6^- from shell-model prediction (1998Br34).
5032.5 *3*	$(3,4)^+$		A	Jπ: 4280.1γ to 2^+; allowed β feeding (log *ft*=4.6) from 4^+ parent.
5131.2 *11*			I	
5188.4[&] *5*	8^+	0.14 ps *4*	CDE G I	Jπ: spin=8 from γγ(DCO) in (^{28}Si,2αγ) (1996Ca38); 1743.5γ E2 to 6^+; band assignment.
				$T_{1/2}$: other: <0.8 ps from (^{14}N,npγ) (1979Ek03); a value of 0.52 ps *17* is from DSAM in 1979Ek03, but not adopted in their level scheme.
5294.0 *7*	$3^+,4^+,5^+$		A	Jπ: allowed β^+ feeding (log *ft*=4.9) from 4^+ parent.
5430 *30*	0^+		H	Jπ: L(^{3}He,n)=0 from 0^+.
5595.5 *11*			I	
5608.6? *5*	$(3^+,4^+)$		A	Jπ: possible allowed β^+ feeding from 4^+ parent; possible 4856.1γ to 2^+.
5649.0[a] *4*	(7^-)	0.42 ps *7*	C E I	XREF: C(?).
				Jπ: from band assignment and shell-model predictions (1998Br34).
5670 *20*	(0^+)		K	Jπ: L(p,t)=(0) from 0^+.
5784.9 *11*			I	
5792.7 *3*	4^+		A K	T=1
				E(level): IAS ^{48}V g.s.
				Jπ: L(p,t)=4 from 0^+.
5834.5 *11*			I	
5960 *10*	(0^+)		H K	XREF: H(6010).
				Jπ: L(p,t)=(0) from 0^+.
6100 *10*	2^+		K	T=1
				E(level): IAS ^{48}V 308 level.
				Jπ: L(p,t)=2 from 0^+.
6257.5? *10*			E	Jπ: (9^+) suggested by 1998Le43 in (^{28}Si,2αγ); no discussion by authors.
6278.4? *11*		0.14 ps *3*	E	E(level): this level with J=8 is proposed in 1996Ca38 only in (^{28}Si,2αγ) and could be the same level as the 9871 level proposed by 1998Br34, which has the similar deexciting gamma and nearly identical $T_{1/2}$ from DSAM.
				$T_{1/2}$: from DSAM in (^{28}Si,2αγ) (1996Ca38).
6420 *10*	(5^-)		K	Jπ: L(p,t)=(5) from 0^+.

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Adopted Levels, Gammas (continued)

^{48}Cr Levels (continued)

E(level)[†]	Jπ	$T_{1/2}$[#]	XREF	Comments
6855 *10*	0^+		K	Jπ: L(p,t)=0 from 0^+.
7064.0[&] *7*	10^+	0.125 ps *35*	CDE G	Jπ: spin>8 from γ excitation function in (^{10}B,pnγ) (1979Ha45); 1875.6γ to 8^+ is stretched (ΔJ=2) quadrupole or ΔJ=0 dipole, and can not be M2 based on RUL. $T_{1/2}$: other: <0.7 ps indicated by the width of 1878γ in (^{14}N,npγ) (1979Ek03). Evidence for spin alignment from backbending in (^{40}Ca,npγ).
7550 *10*			K	
7671.2[a] *5*	(9^-)	0.15 ps *5*	C E	Jπ: from band assignment an shell-model prediction (1998Br34).
7940 *30*			H	
8411.9[&] *8*	12^+	0.59 ps *17*	CDE	Jπ: spin from γγ(DCO) in (^{28}Si,2αγ) (1996Ca38); 1347.9γ E2 to 10^+; band assignment.
8462.6? *15*			E	
8750[‡] *15*	0^+		h jK	T=2 XREF: h(8770)j(8620). Jπ: L(p,t)=0 from 0^+.
8760[‡] *15*	0^+		h jK	T=2 XREF: h(8770)j(8620). Jπ: L(p,t)=0 from 0^+.
9040? *30*			K	
9180? *30*			K	
9530 *30*	0^+		H	E(level): IAS(^{48}V,3.70 MeV). Jπ: L(^{3}He,n)=0 from 0^+.
9871.4[a] *6*	(11^-)	0.139 ps *35*	C E	E(level): see a possible level at E=6278, which could the same level as this level based on the de-exciting gamma and $T_{1/2}$. Jπ: from band assignment and shell-model prediction (1998Br34).
9900 *30*			H	
10280.9[&] *9*	14^+	0.30 ps *6*	DE	Jπ: 1868.9γ E2 to 12^+; member of g.s. band.
11105.6? *18*			E	
11320 *30*	0^+		H	Jπ: L(^{3}He,n)=0 from 0^+.
11648.8[a] *7*	(13^-)	0.48 ps *14*	E	Jπ: from band assignment and shell-model prediction (1998Br34).
12301.5?[a] *10*			E	
13310.0[&] *9*	16^+	0.049 ps *10*	DE	Jπ: 3029.0γ E2 to 14^+; member of g.s. band.
15119.0?[a] *10*			E	
15735.2 *13*			DE	Jπ: (16^+) suggested by (1998Br34) in (^{28}Si,2αγ); no discussion by authors.
17342.1?[a] *15*			E	
17378.2?[&] *10*			E	

[†] From a least-squares fit to γ-ray energies assuming ΔEγ=1 keV where not given for levels connected by γ-ray transitions, and from particle transfer reactions in other cases, unless otherwise noted.

[‡] Identified as doublet T=2, $J^\pi=0^+$ state in (p,t).

[#] From DSAM line-shape analysis in (^{28}Si,2αγ) (1998Br34), unless otherwise noted.

[@] ^{48}Cr is a well-deformed nucleus with β≈0.3 suggesting that K is a good quantum number (1998Br34). The band head at 3533 has J=4 from excit. and the state directly above this connected by 531γ has J=5 from excit., establishing K=4. δ(1675γ) excludes an appreciable Q component and strongly favors Δπ=−. $T_{1/2}$(3533)=3.3 ns *8* and almost pure D character of 1675γ excludes twofold K-forbidden E2. However, threefold K-forbidden, isospin-forbidden E1 and twofold K-forbidden M2 are consistent with expected transition probabilities. Therefore, π=− is assigned to the 3533 and the band built on it. Note, also, that, if π(3533)=+, considerable E2 character of the 1675γ and an E2 γ to 2^+ would be expected and that no γ from the 4064, J=5, to 1854, J=4^+ was observed. Arguments from 2003Je06 in ^{46}Ti(^{3}He,nγ). See additional arguments by 1998Br34 in (^{28}Si,2αγ) supporting $J^\pi(3533)=4^-$. Note that Mult(87γ)=D,E2 from comparison to RUL is not consistent with this assignment.

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Adopted Levels, Gammas (continued)

^{48}Cr Levels (continued)

& Band(A): g.s. (yrast) band. 1994Ca04 in (^{40}Ca,npγ) reverse the order of the 1744γ and 1876γ and, therefore, place the 8^+ member of the band at 5318 keV. Data from the other studies indicate that the 8^+ is at 5188 keV and this has been adopted by the evaluator. The odd-spin members of the band have been assigned only by 1994Ca04.

[a] Band(B): Rotational-like structure based on 4^- (1998Br34,1998Le43,2003Je06). Possible $(d_{3/2})^1(f_{7/2})^9$ configuration. Members of the band for states above 11648 are from figure 1 of 1998Le43 and were not discussed by 1998Br34. 2003Je06 labeled this as a negative parity nonyrast band and only reported the first four members.

Adopted Levels, Gammas (continued)

γ(^{48}Cr)

E_i(level)	J_i^π	E_γ	I_γ	E_f	J_f^π	Mult.[&]	δ[&]	α[†]	Comments
752.16	2$^+$	752.15 *13*	100	0.0	0$^+$	E2		0.000325 *5*	B(E2)(W.u.)=28.4 *+19−17* α=0.000325 *5*; α(K)=0.000294 *4*; α(L)=2.73×10^{-5} *4*; α(M)=3.59×10^{-6} *5* α(N)=1.337×10^{-7} *19* E$_\gamma$: weighted average of 752.1 *2* from ^{48}Mn β$^+$ decay, 752.2 *2* from ^{49}Fe β$^+$p decay, 752.0 *2* from (^{10}B,pnγ), 752.2 *3* from (^{28}Si,2αγ), 752.3 *2* from (^{16}O,2nγ), 752.13 *13* from (^{14}N,npγ), and 752.4 *5* from (^{3}He,nγ).
1858.40	4$^+$	1106.3 *2*	100	752.16	2$^+$	E2		0.0001234 *17*	B(E2)(W.u.)=27.5 *+32−27* α=0.0001234 *17*; α(K)=0.0001106 *15*; α(L)=1.024×10^{-5} *14*; α(M)=1.347×10^{-6} *19* α(N)=5.05×10^{-8} *7*; α(IPF)=1.104×10^{-6} *17* E$_\gamma$: weighted average of 1106.1 *2* from ^{48}Mn β$^+$ decay, 1105.2 *6* from ^{49}Fe β$^+$p decay, 1106.3 *2* from (^{10}B,pnγ), 1106.4 *3* from (^{28}Si,2αγ), 1106.5 *2* from (^{16}O,2nγ), 1106.4 *3* from (^{14}N,npγ), and 1106.4 *5* from (^{3}He,nγ). Mult.: Q from γ(θ) data, M2 ruled out by RUL.
3444.8	6$^+$	1586.4[#] *3*	100	1858.40	4$^+$	E2		0.0001789 *25*	B(E2)(W.u.)=29 *+10−6* α=0.0001789 *25*; α(K)=5.10×10^{-5} *7*; α(L)=4.70×10^{-6} *7*; α(M)=6.19×10^{-7} *9* α(N)=2.329×10^{-8} *33*; α(IPF)=0.0001226 *17* E$_\gamma$: others: 1586.4 *6* in (^{10}B,pnγ); 1589.2 *10* from (^{14}N,npγ) (1979Ek03) is discrepant, which is a quite broad peak as mentioned in 1979Ek03.
3524.2	(0,1,2,3)	2772[@]	100	752.16	2$^+$				
3533.5	4$^{(-)}$	87[a]	10	3444.8	6$^+$	[M2]		0.447 *6*	α(K)=0.399 *6*; α(L)=0.0429 *6*; α(M)=0.00564 *8* α(N)=0.0001953 *27* E$_\gamma$: from (^{40}Ca,pnγ) (1994Ca04). I$_\gamma$: from I(87γ)/I(1675γ)=0.6/6 in (^{40}Ca,pnγ) (1994Ca04). B(M2)(W.u.)=9.2×10^3 *+38−31* exceeds RUL=1.
		1675.2 *3*	100 *7*	1858.40	4$^+$	(E1(+M2))	−0.01 *5*	0.000427 *6*	B(E1)(W.u.)=2.1×10^{-8} *+18−9*; B(M2)(W.u.)<2.3×10^{-4} α=0.000427 *6*; α(K)=2.50×10^{-5} *4*; α(L)=2.30×10^{-6} *4*; α(M)=3.02×10^{-7} *5* α(N)=1.140×10^{-8} *18*; α(IPF)=0.000399 *6* E$_\gamma$: weighted average of 1675.0 *4* from ^{48}Mn β$^+$ decay, 1675.3 *4* from (^{10}B,pnγ), 1674.9 *6* from (^{16}O,2nγ), 1675.3 *3* from (^{14}N,npγ), and 1675.3 *10* from (^{3}He,nγ). I$_\gamma$: from ^{48}Mn β$^+$ decay. Other: 100 *20* from (^{10}B,pnγ). Mult.,δ: D(+Q) from γγ(θ) in (^{3}He,nγ); Δπ=(yes) from level scheme.

Adopted Levels, Gammas (continued)

γ(^{48}Cr) (continued)

E_i(level)	J_i^π	E_γ	I_γ	E_f	J_f^π	Mult.[&]	δ[&]	α[†]	Comments
3533.5	4(−)	2780.3[a]	<80	752.16	2+				E_γ,I_γ: from (^{10}B,pnγ) (1973Ku10); not observed in (^{3}He,nγ).
3632.2	(2+,3−)	2880[@]	100	752.16	2+				
4034.3	(0,1,2,3)	3282[@]	100	752.16	2+				
4064.1	3(−)	530.75 *17*	100 *20*	3533.5	4(−)	D+Q	−0.36 *+28−61*		E_γ: weighted average of 530.8 *3* from (^{10}B,pnγ), 531.0 *3* from (^{28}Si,2αγ), 530.6 *2* from (^{16}O,2nγ), and 530.77 *17* from (^{14}N,npγ).
		2205[@]	100[@] *8*	1858.40	4+	D,Q			Mult.: from γγ(θ) in (^{3}He,nγ), with δ(Q/D)=−0.05 *5* or ≥10 (2003Je06).
		3312[@]	38[@] *4*	752.16	2+				
4064.2	5(−)	530.77 *17*	100	3533.5	4(−)	M1+E2	0.24 *3*	0.000477 *9*	B(M1)(W.u.)=0.0050 *+17−10*; B(E2)(W.u.)=2.5 *+11−7* α=0.000477 *9*; α(K)=0.000431 *8*; α(L)=4.01×10^{-5} *8*; α(M)=5.27×10^{-6} *10* α(N)=1.98×10^{-7} *4* E_γ: from (^{14}N,npγ). Others: 531.0 *5* from ^{48}Mn β$^+$ decay, 530.8 *3* from (^{10}B,pnγ), 531.0 *3* from (^{28}Si,2αγ), and 530.6 *2* from (^{16}O,2nγ). Mult.,δ: D+Q from γ(θ) in (^{10}B,pnγ), with δ(Q/D) deduced by the evaluator from 5.5% *15-10* E2 component in 1979Ha45; M2 ruled out by RUL. Others: δ(Q/D)=−0.36 *+28−61* from γ(θ) in (^{16}O,2nγ) (1975Ha04), +0.01 *5* or >7 from γγ(θ) in (^{3}He,nγ) (2003Je06), >20 for J^π=6$^-$ from γ(θ) in (^{14}N,npγ) (1979Ek03).
4428.7	4+	2570.2[‡] *5*	5.2[‡] *6*	1858.40	4+				
		3676.2[‡] *4*	100[‡] *6*	752.16	2+				
4653.0	(3,4)+	3900.5[‡] *5*	100	752.16	2+				
4765.5	(4,5)	2907[@]	100	1858.40	4+				
4876.0	(6−)	811.9[#a] *3*	37[#] *7*	4064.2	5(−)			0.00022 *4*	α=0.00022 *4*; α(K)=0.00020 *4*; α(L)=1.9×10^{-5} *4*; α(M)=2.5×10^{-6} *5*; α(N+..)=9.3×10^{-8} *17* α(N)=9.3×10^{-8} *17*
		1342.6[#] *3*	100[#] *17*	3533.5	4(−)	[E2]		0.0001185 *17*	B(E2)(W.u.)<14 α=0.0001185 *17*; α(K)=7.19×10^{-5} *10*; α(L)=6.64×10^{-6} *9*; α(M)=8.74×10^{-7} *12* α(N)=3.28×10^{-8} *5*; α(IPF)=3.90×10^{-5} *6* E_γ: other: 1343 *3* from (^{10}B,pnγ).
5032.5	(3,4)+	3174.1[‡] *5*	24.9[‡] *34*	1858.40	4+				
		4280.1[‡] *5*	100[‡] *6*	752.16	2+				
5131.2		1067[@]	100	4064.2	5(−)				

$^{48}_{24}Cr_{24}$-6

Adopted Levels, Gammas (continued)

γ(^{48}Cr) (continued)

E_i(level)	J_i^π	E_γ	I_γ	E_f	J_f^π	Mult.[&]	α[†]	Comments
5188.4	8^+	1743.5 *3*	100	3444.8	6^+	E2	0.0002385 *33*	B(E2)(W.u.)=24 *+10−6* α=0.0002385 *33*; α(K)=4.24×10^{-5} *6*; α(L)=3.91×10^{-6} *5*; α(M)=5.14×10^{-7} *7* α(N)=1.937×10^{-8} *27*; α(IPF)=0.0001917 *27* E_γ: weighted average of 1742.5 *10* from (^{10}B,pnγ), 1743.4 *3* from (^{28}Si,2αγ), and 1744.0 *5* from (^{14}N,npγ). Mult.: from γ(θ,pol) in (^{14}N,npγ) (1979Ek03), and γ anisotropy (ΔJ=0 or 2) in (^{40}Ca,pnγ) (1994Ca04).
5294.0	$3^+,4^+,5^+$	3435.5[‡] *6*	100	1858.40	4^+			
5595.5		2062[@]	100	3533.5	$4^{(-)}$			
5608.6?	$(3^+,4^+)$	3750.0[‡a]	100[‡] *18*	1858.40	4^+			
		4856.1[‡a]	50[‡] *9*	752.16	2^+			
5649.0	(7^-)	773.1[#] *3*	5.0[#] *10*	4876.0	(6^-)		0.00025 *5*	α=0.00025 *5*; α(K)=0.00023 *5*; α(L)=2.1×10^{-5} *5*; α(M)=2.8×10^{-6} *6*; α(N+..)=1.04×10^{-7} *20* α(N)=1.04×10^{-7} *20*
		1584.6[#] *3*	100[#] *10*	4064.2	$5^{(-)}$	[E2]	0.0001783 *25*	B(E2)(W.u.)=12.4 *+25−18* α=0.0001783 *25*; α(K)=5.11×10^{-5} *7*; α(L)=4.71×10^{-6} *7*; α(M)=6.20×10^{-7} *9* α(N)=2.335×10^{-8} *33*; α(IPF)=0.0001218 *17*
5784.9		2340[@]	100	3444.8	6^+			
5792.7	4^+	760.2[‡] *2*	13.6[‡] *10*	5032.5	$(3,4)^+$			
		1139.7[‡] *2*	28.6[‡] *19*	4653.0	$(3,4)^+$			
		1364.0[‡] *2*	96[‡] *5*	4428.7	4^+			
		1728.8[‡] *5*	5.6[‡] *8*	4064.2	$5^{(-)}$			
		2259.2[‡] *5*	7.0[‡] *8*	3533.5	$4^{(-)}$			
		3934.1[‡] *5*	100[‡] *7*	1858.40	4^+			
5834.5		2301[@]	100	3533.5	$4^{(-)}$			
6257.5?		1069[#a]		5188.4	8^+			
6278.4?		2214[#a]		4064.2	$5^{(-)}$			E_γ: could be the 2200γ from the 9871 level.
7064.0	10^+	1875.6 *5*	100	5188.4	8^+	E2	0.000294 *4*	B(E2)(W.u.)=19 *+7−4* α=0.000294 *4*; α(K)=3.69×10^{-5} *5*; α(L)=3.40×10^{-6} *5*; α(M)=4.47×10^{-7} *6* α(N)=1.686×10^{-8} *24*; α(IPF)=0.0002530 *35* E_γ: weighted average of 1876 *2* from (^{10}B,pnγ), 1875.4 *3* from (^{28}Si,2αγ), and 1878.2 *12* from (^{14}N,npγ). Mult.: stretched (ΔJ=2) quadrupole or ΔJ=0 dipole from angular anisotropy in (^{40}Ca,pnγ) (1994Ca04); ΔJ=0 ruled out by γ excitation function from level scheme; M2 ruled out by RUL.

$^{48}_{24}Cr_{24}$-7

Adopted Levels, Gammas (continued)

γ(^{48}Cr) (continued)

E_i(level)	J_i^π	E_γ	I_γ	E_f	J_f^π	Mult.[&]	α[†]	Comments
7671.2	(9$^-$)	2022.2[#] *3*	100	5649.0	(7$^-$)	[E2]	0.000359 *5*	B(E2)(W.u.)=11 *+5−3* α=0.000359 *5*; α(K)=3.21×10^{-5} *4*; α(L)=2.96×10^{-6} *4*; α(M)=3.89×10^{-7} *5* α(N)=1.468×10^{-8} *21*; α(IPF)=0.000324 *5*
8411.9	12$^+$	1347.9[#] *3*	100	7064.0	10$^+$	E2	0.0001192 *17*	B(E2)(W.u.)=21 *+9−5* α=0.0001192 *17*; α(K)=7.132×10^{-5} *99*; α(L)=6.59×10^{-6} *9*; α(M)=8.67×10^{-7} *12* α(N)=3.26×10^{-8} *5*; α(IPF)=4.03×10^{-5} *6* Mult.: stretched (ΔJ=2) quadrupole or ΔJ=0 dipole from angular anisotropy in (^{40}Ca,pnγ) (1994Ca04); ΔJ=0 ruled out by γγ(DCO) in (^{28}Si,2αγ) (1996Ca38); M2 ruled out by RUL.
8462.6?		2205[#a]		6257.5?				
9871.4	(11$^-$)	2200.1[#] *3*	100	7671.2	(9$^-$)	[E2]	0.000442 *6*	B(E2)(W.u.)=7.6 *+26−16* α=0.000442 *6*; α(K)=2.76×10^{-5} *4*; α(L)=2.54×10^{-6} *4*; α(M)=3.34×10^{-7} *5* α(N)=1.262×10^{-8} *18*; α(IPF)=0.000411 *6*
10280.9	14$^+$	1868.9[#] *3*	100	8411.9	12$^+$	E2	0.000291 *4*	B(E2)(W.u.)=8.0 *+20−13* α=0.000291 *4*; α(K)=3.72×10^{-5} *5*; α(L)=3.42×10^{-6} *5*; α(M)=4.50×10^{-7} *6* α(N)=1.698×10^{-8} *24*; α(IPF)=0.0002498 *35* Mult.: Q from γγ(DCO) in (^{28}Si,2αγ) (1996Ca38); M2 ruled out by RUL.
11105.6?		2643[#a]		8462.6?				
11648.8	(13$^-$)	1777.4[#] *3*	100	9871.4	(11$^-$)	[E2]	0.0002523 *35*	B(E2)(W.u.)=6.4 *+26−15* α=0.0002523 *35*; α(K)=4.09×10^{-5} *6*; α(L)=3.76×10^{-6} *5*; α(M)=4.95×10^{-7} *7* α(N)=1.867×10^{-8} *26*; α(IPF)=0.0002071 *29*
12301.5?		2430[#a]		9871.4	(11$^-$)			
13310.0	16$^+$	3029.0[#] *3*	100	10280.9	14$^+$	E2	0.000813 *11*	B(E2)(W.u.)=4.4 *+11−8* α=0.000813 *11*; α(K)=1.614×10^{-5} *23*; α(L)=1.482×10^{-6} *21*; α(M)=1.951×10^{-7} *27* α(N)=7.37×10^{-9} *10*; α(IPF)=0.000796 *11* Mult.: Q from γγ(DCO) in (^{28}Si,2αγ); M2 ruled out by RUL.
15119.0?		3470[#a]		11648.8	(13$^-$)			
15735.2		5454[#]		10280.9	14$^+$			
17342.1?		2223[#a]		15119.0?				
17378.2?		4069[#a]		13310.0	16$^+$			

[†] Additional information 1.
[‡] From ^{48}Mn β$^+$ decay.
[#] From (^{28}Si,2αγ).
[@] From (^{3}He,nγ).
[&] From γ(θ,pol) in (^{14}N,npγ), γ(θ) in (^{10}B,pnγ) and (^{16}O,2nγ), unless otherwise noted.
[a] Placement of transition in the level scheme is uncertain.

$^{48}_{24}Cr_{24}$-8

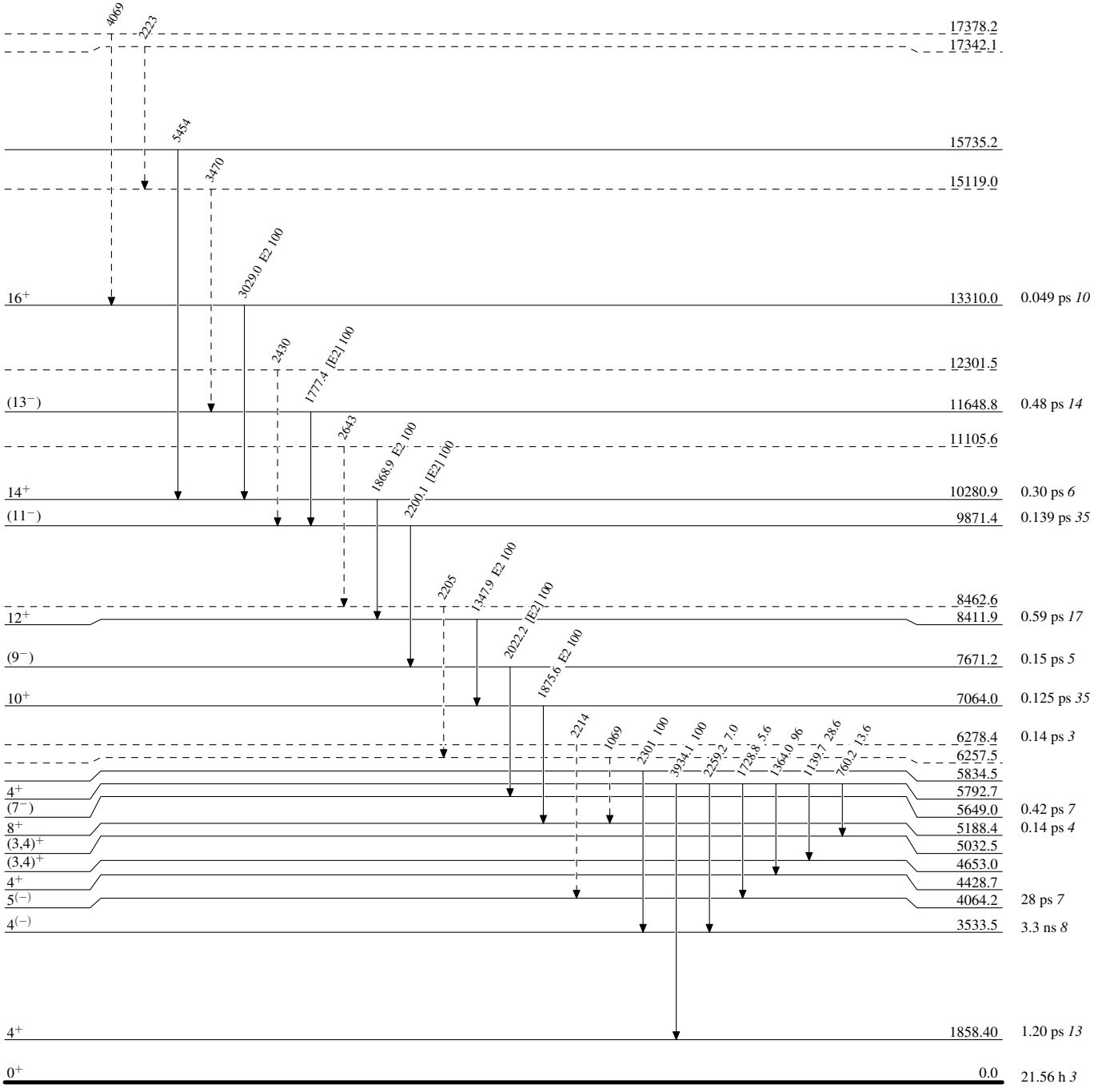
Adopted Levels, Gammas

Legend

Level Scheme

Intensities: Relative photon branching from each level

γ Decay (Uncertain)



$^{48}_{24}Cr_{24}$

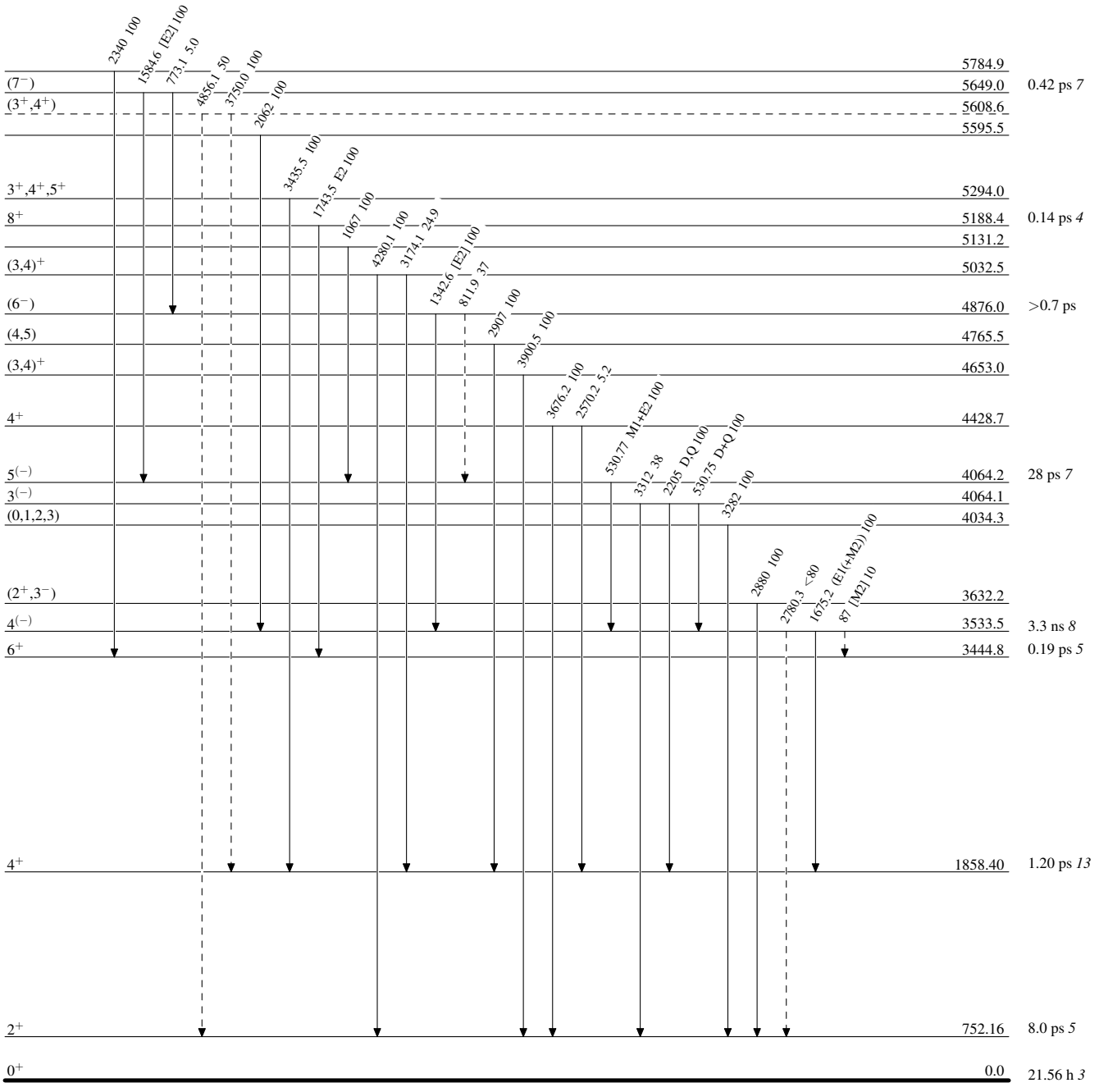
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

γ Decay (Uncertain)

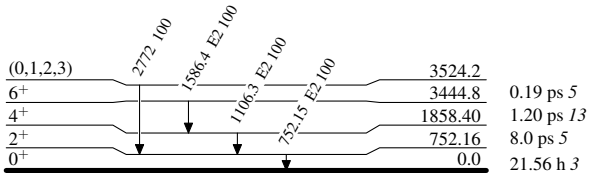


$^{48}_{24}Cr_{24}$

Adopted Levels, Gammas

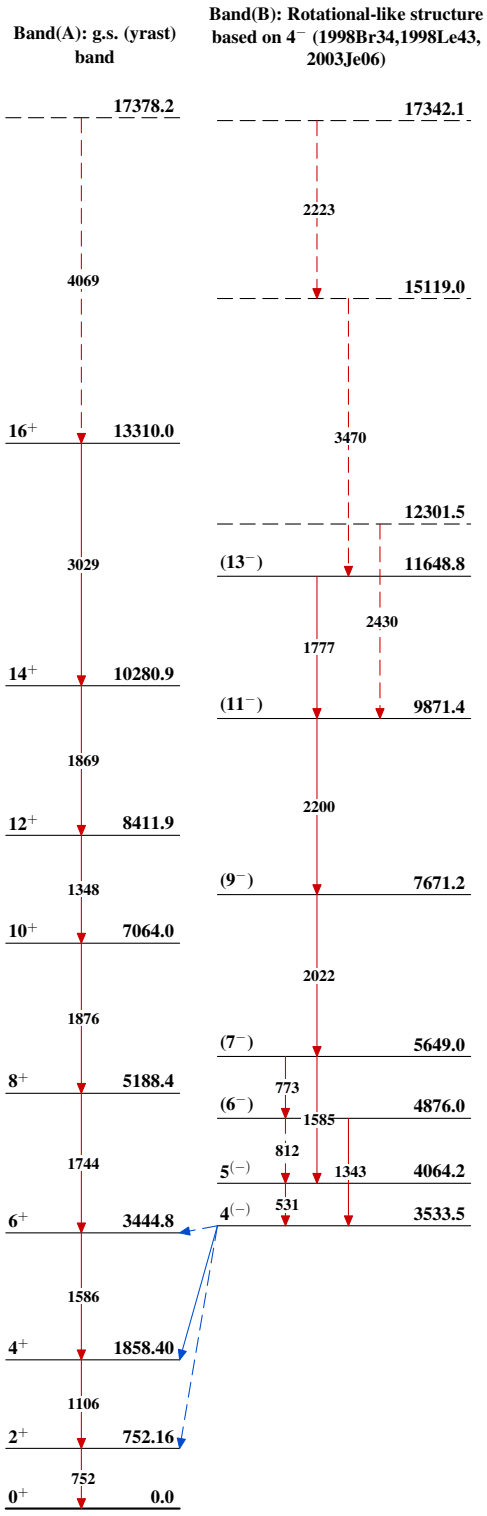
Level Scheme (continued)

Intensities: Relative photon branching from each level



$^{48}_{24}Cr_{24}$

Adopted Levels, Gammas



$^{48}_{24}Cr_{24}$