Adopted Levels, Gammas

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	T. W. Burrows	NDS 108,923 (2007)	20-Feb-2007

Q(β^-)=−1.200×10^4 *4*; S(n)=13159 *22*; S(p)=4775 *7*; Q(α)=−7665 *10* 2012Wa38
Note: Current evaluation has used the following Q record −12300 syst 13156 *24* 4774 14 −7662 *16* 2003Au03.
Q(β^-): Estimated uncertainty=160 keV.
Other: 2000HaZY.
The level scheme of 1998Be69 in ^{10}B(^{40}Ca,p2nγ) and that of 1994Ca04 in ^{10}B(^{40}Ca,p2nγ) are consistent through the 5903, 23/2$^-$ state. 1998Be69 did not observe the 1823γ assigned as 27/2−→23/2$^-$ by 1994Ca04 and assigned the 2112γ to the 10019, 31/2$^-$, level instead of the 9841.
The work of 1998Be69 in ^{24}Mg(^{28}Si,αnγ) showed no evidence for the 1823γ assigned as 27/2−→23/2$^-$ by 1994Ca04 in ^{40}Ca(^{12}C,n$\alpha\gamma$) and, therefore, this has not been adopted by the evaluator.

^{47}Cr Levels

Cross Reference (XREF) Flags

A	^{47}Mn β^+ decay	D	^{24}Mg(^{28}Si,αnγ),^{28}Si(^{28}Si,2αnγ)
B	^{48}Fe β^+p decay	E	^{50}Cr(^{3}He,^{6}He)
C	^{10}B(^{40}Ca,p2nγ), ^{40}Ca(^{12}C,n$\alpha\gamma$),		

E(level)[†]	J$^\pi$	T$_{1/2}$[‡]	XREF	Comments
0.0	3/2$^-$	500[#] ms *15*	ABCDE	%ε+%β^+=100 J$^\pi$: from super-allowed β^+ decay to 3/2$^-$, ^{47}V g.s.
99.1	(5/2$^-$)	≤2.1 ns	CDE	J$^\pi$: 1/2, 5/2 from stretched D γ to 3/2$^-$. (5/2,7/2,9/2) from D γ from (7/2$^-$); deexcitation patterns and similarity with the mirror nucleus ^{47}V.
174.2[@]	(7/2$^-$)	≤2.1 ns	CDE	J$^\pi$: ≤7/2$^-$ from D,E2 γ to 3/2$^-$. 7/2$^-$ from the comparison of the γ-ray spectrum and level scheme in ^{24}Mg(^{28}Si,αnγ) with the corresponding spectrum and level scheme for ^{47}V; similarity of $\sigma(\theta)$ to the (^{3}He,^{6}He) $\sigma(\theta)$ to 2.79-MeV, 7/2$^-$, state in ^{39}Ca.
471.7[a]	(3/2$^+$)		C E	J$^\pi$: (3/2,7/2) from stretched D γ from 1/2,5/2. *3/2*$^+$ from deexcitation patterns and similarity with the mirror nucleus ^{47}V; similarity of $\sigma(\theta)$ to the (^{3}He,^{6}He) $\sigma(\theta)$ to g.s., 3/2$^+$, state in ^{39}Ca.
870.1[a]	(5/2$^+$)		C E	J$^\pi$: 1/2,5/2 from stretched D γ to 3/2$^-$. 5/2$^+$ from deexcitation patterns and similarity with the mirror nucleus ^{47}V.
1332.1[@]	(11/2$^-$)[b]		CDe	
1345.5[a]	(7/2$^+$)[c]		C e	
1451 *9*			E	
1541 *15*			E	
1831 *8*	(1/2$^+$)		E	J$^\pi$: from analogy to 1661, 1/2$^+$, state in ^{47}V (ΔE(Coul)=8397 *13*) and similarity of $\sigma(\theta)$ to the (^{3}He,^{6}He) $\sigma(\theta)$ to 2.47-MeV, 1/2$^+$, state in ^{39}Ca.
1956.3[a]	(9/2$^+$)[d]		C	
2131 *9*			E	
2406 *10*			E	
2557 *10*			E	
2618.3[a]	(11/2$^+$)[d]		C E	
2653.8[@]	(15/2$^-$)[b]	0.583[e] ps *83*	CDE	
2848 *10*			E	
3430 *10*			E	
3470.5[a]	(13/2$^+$)[d]		C	

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Adopted Levels, Gammas (continued)

^{47}Cr Levels (continued)

E(level)[†]	J$^\pi$	T$_{1/2}$[‡]	XREF	Comments
3504 *11*			E	
3747 *11*			E	
3766.4[&]	(17/2$^-$)		C	J$^\pi$: (13/2,17/2) from stretched D γ to (15/2$^-$). 17/2$^-$ from membership in band.
4139.0[@]	(19/2$^-$)[b]	0.305[e] ps *42*	CD	
4169 *12*			E	
4214.9[a]	(15/2$^+$)[c]		C	
4295 *12*			E	
5375.0			C	
5409 *15*			E	
5905.0[@]	(23/2$^-$)[b]	<0.444[e] ps	CD	
7379.0[&]	(25/2$^-$)		D	J$^\pi$: mirror of the 7397 keV, 25/2$^-$ state in ^{47}V.
7911.0[@]	(27/2$^-$)[f]		D	
10022[@]	(31/2$^-$)[f]		D	

[†] From least-squares fit to Eγ, assuming ΔE_γ=1 keV, except for states observed only in ^{50}Cr(^{3}He,^{6}He).

[‡] From $\gamma\gamma$(t) in ^{10}B(^{40}Ca,p2nγ), ^{40}Ca(^{12}C,n$\alpha\gamma$),..., except as noted to possible contamination from ^{46}V (see discussion in 1985Bu07).

[#] Unweighted av of 472.0 ms *63* (1988HaZB. $\beta^{+\prime}$s; ΔE/E scin telescope, tape transport, ms), 508 ms *10* (1985Bu07. 88γ,$\gamma^\pm$; low-energy photon system, Ge(Li)), and 520 ms *40* (1985HoZS. $\beta\gamma$(t); He-jet). The discrepancy between the γ and β^+ measurements is unexplained; 1988HaZB excluded the possibility of contamination by ^{46}V. Others: 452 ms *18* (1977Ho25. Eβ+>4.8 MeV; scin) and 460 ms *15* (1977Ed01. 1 MeV≤Eβ+≤4 MeV; He-jet chopper, scin) excluded due.

[@] Band(A): K^π=7/2$^-$ band, α=−1/2 (1998Be69,1994Ca04). 1998Be69 confirmed the α=−1/2 states of the yrast band proposed by 1994Ca04 through the 5905, 23/2$^-$ state. 1998Be69 did not observe the 1823γ assigned as 27/2−→23/2$^-$ by 1994Ca04 and assigned the 2112γ to the 10019, 31/2$^-$, level instead of the 9841.

[&] Band(B): K^π=7/2$^-$ band, α=+1/2 (1994Ca04). 25/2$^-$ state added by 1998Be69.

[a] Band(C): positive-parity side band (1994Ca04).

[b] J→J or J→J-2 d,Q or D,E2 cascade to (7/2$^-$). Comparison of the γ-ray spectrum and level scheme in ^{24}Mg(^{28}Si,αnγ) with the corresponding spectrum and level scheme for ^{47}V.

[c] From deexcitation patterns and similarity with the mirror nucleus ^{47}V.

[d] From J→J or J→J-2 γ cascade to (5/2$^+$) and deexcitation patterns and similarity with the mirror nucleus ^{47}V.

[e] From DSAM in ^{24}Mg(^{28}Si,αnγ),^{28}Si(^{28}Si,2αnγ).

[f] From the comparison of the γ-ray spectrum and level scheme in ^{24}Mg(^{28}Si,αnγ) with the corresponding spectrum and level scheme for ^{47}V.

γ(^{47}Cr)

E$_i$(level)	J$^\pi_i$	E$_\gamma$[†]	I$_\gamma$[‡]	E$_f$	J$^\pi_f$	Mult.[#]	α[g]	Comments
99.1	(5/2$^-$)	98.7	100	0.0	3/2$^-$	(M1)[@]	0.0269	B(M1)(W.u.)>0.010 α(K)=0.0242 *4*; α(L)=0.00232 *4*; α(M)=0.000306 *5*; α(N+..)=1.120×10^{-5} *16* α(N)=1.120×10^{-5} *16*
174.2	(7/2$^-$)	74.7	≈100	99.1	(5/2$^-$)	(M1)[&]	0.0566	B(M1)(W.u.)>0.023 α(K)=0.0510 *8*; α(L)=0.00492 *7*; α(M)=0.000647 *9*; α(N+..)=2.36×10^{-5} *4* α(N)=2.36×10^{-5} *4*
		173.4	1.4	0.0	3/2$^-$	(E2)[a]	0.0494	B(E2)(W.u.)>2.2 α(K)=0.0445 *7*; α(L)=0.00430 *6*; α(M)=0.000561 *8*;

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Adopted Levels, Gammas (continued)

$\gamma(^{47}Cr)$ (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[‡]	E_f	J_f^π	Mult.[#]	α[g]	Comments
								α(N+..)=1.96×10^{-5} *3* α(N)=1.96×10^{-5} *3*
471.7	(3/2$^+$)	372.2[‡]	17	99.1	(5/2$^-$)			
		472[‡]	100	0.0	3/2$^-$			
870.1	(5/2$^+$)	399[‡]	30	471.7	(3/2$^+$)	D[b]		
		770[‡]	10	99.1	(5/2$^-$)			
		871[‡]	100	0.0	3/2$^-$	D[b]		
1332.1	(11/2$^-$)	1157.7	100	174.2	(7/2$^-$)	D,Q[c]		
1345.5	(7/2$^+$)	474[‡]	100	870.1	(5/2$^+$)			
		873[‡]	75	471.7	(3/2$^+$)			
		1248[‡]	25	99.1	(5/2$^-$)			
1956.3	(9/2$^+$)	610	8	1345.5	(7/2$^+$)			
		1088[‡]	100	870.1	(5/2$^+$)	D,Q[c]		
		1781[‡]	42	174.2	(7/2$^-$)			
2618.3	(11/2$^+$)	662[‡]	5	1956.3	(9/2$^+$)			
		1273[‡]	100	1345.5	(7/2$^+$)	D,Q[c]		
		1286	30	1332.1	(11/2$^-$)			
2653.8	(15/2$^-$)	1321.7	100	1332.1	(11/2$^-$)	(E2)[cd]	0.0001160 *17*	B(E2)(W.u.)=24 *4* α(K)=7.44×10^{-5} *11*; α(L)=6.87×10^{-6} *10*; α(M)=9.04×10^{-7} *13*; α(N+..)=3.39×10^{-5} *5* α(N)=3.40×10^{-8} *5*; α(IPF)=3.39×10^{-5} *5*
3470.5	(13/2$^+$)	852[‡]	5	2618.3	(11/2$^+$)			
		1514[‡]	100	1956.3	(9/2$^+$)	D,Q[c]		
3766.4	(17/2$^-$)	1112[‡]	100	2653.8	(15/2$^-$)	D[b]		
4139.0	(19/2$^-$)	372[‡]	5	3766.4	(17/2$^-$)	(M1)[&]	0.001000 *14*	B(M1)(W.u.)=0.067 *10* α(K)=0.000907 *13*; α(L)=8.47×10^{-5} *12*; α(M)=1.114×10^{-5} *16* α(N+..)=4.17×10^{-7} *6* α(N)=4.17×10^{-7} *6*
		1485.7	100	2653.8	(15/2$^-$)	(E2)[cd]	0.0001470 *21*	B(E2)↓=24 *4* α(K)=5.82×10^{-5} *9*; α(L)=5.37×10^{-6} *8*; α(M)=7.07×10^{-7} *10*; α(N+..)=8.24×10^{-5} *12* α(N)=2.66×10^{-8} *4*; α(IPF)=8.24×10^{-5} *12*
4214.9	(15/2$^+$)	744[‡]	25	3470.5	(13/2$^+$)			
		1597[‡]	100	2618.3	(11/2$^+$)			
5375.0		1236	100	4139.0	(19/2$^-$)	D[b]		
5905.0	(23/2$^-$)	530[‡]	13	5375.0		(M1)[&]	0.000453 *7*	B(M1)(W.u.)>0.038 α(K)=0.000410 *6*; α(L)=3.81×10^{-5} *6*; α(M)=5.01×10^{-6} *7*; α(N+..)=1.88×10^{-7} *3* α(N)=1.88×10^{-7} *3*
		1766.0	100	4139.0	(19/2$^-$)	(E2)[cd]	0.000248 *4*	B(E2)(W.u.)>6.5 α(K)=4.14×10^{-5} *6*; α(L)=3.81×10^{-6} *6*; α(M)=5.01×10^{-7} *7*; α(N+..)=0.000202 *3* α(N)=1.89×10^{-8} *3*; α(IPF)=0.000202 *3*
7379.0	(25/2$^-$)	1474[e]		5905.0	(23/2$^-$)			

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Adopted Levels, Gammas (continued)

$\gamma(^{47}Cr)$ (continued)

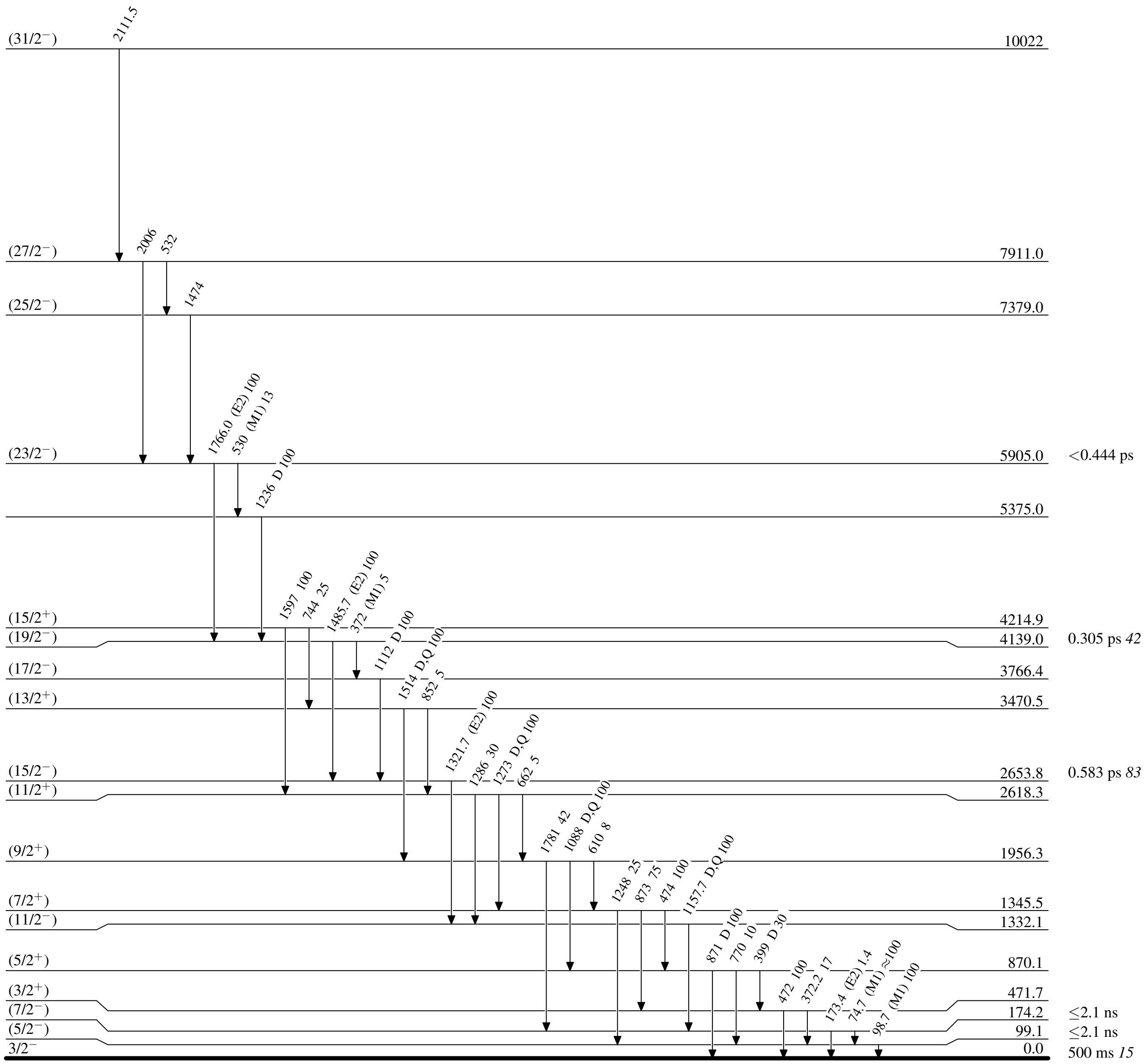
E_i(level)	J^π_i	E_γ[†]	E_f	J^π_f
7911.0	(27/2⁻)	532[e]	7379.0	(25/2⁻)
		2006[e]	5905.0	(23/2⁻)
10022	(31/2⁻)	2111.5[f]	7911.0	(27/2⁻)

† Mean of Eγ's from $^{10}B(^{40}Ca,p2n\gamma)$ and $^{24}Mg(^{28}Si,\alpha n\gamma)$,$^{28}Si(^{28}Si,2\alpha n\gamma)$, except as noted.
‡ From $^{10}B(^{40}Ca,p2n\gamma)$.
# From angular anisotropy in $^{10}B(^{40}Ca,p2n\gamma)$, except as noted.
@ Stretched dipole. $\Delta\pi$=no from level scheme.
& D from comparison to RUL. $\Delta\pi$=no from level scheme.
a D,E2 from comparison to RUL. ΔJ^π=2,no from level scheme.
b Stretched dipole.
c J→J or J→J-2 transition.
d D,Q from angular isotropy in $^{10}B(^{40}Ca,p2n\gamma)$. Ne M2 from comparison to RUL. ΔJ^π=2,no from level scheme.
e From $^{24}Mg(^{28}Si,\alpha n\gamma)$.
f Placed from 9841, 31/2⁻, in $^{10}B(^{40}Ca,p2n\gamma)$.
g 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.

Adopted Levels, Gammas

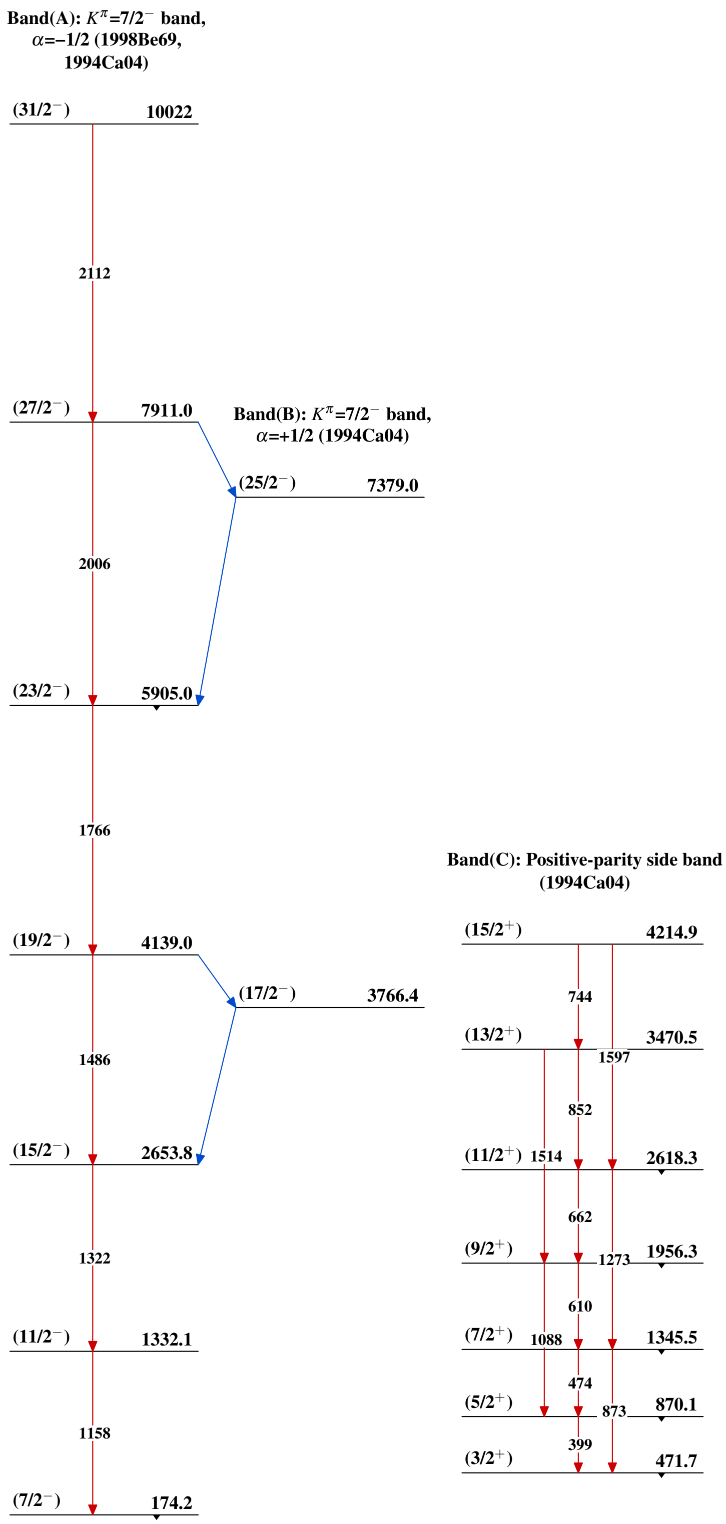
Level Scheme

Intensities: Relative photon branching from each level



$^{47}_{24}Cr_{23}$

Adopted Levels, Gammas



$^{47}_{24}Cr_{23}$