^{51}V(p,nγ) 1985Av04,1970Sa15,1971Iy03

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Wang Jimin and Huang Xiaolong	NDS 144, 1 (2017)	1-Mar-2016

Others: 1980Sa07, 1972Eg01, 1970Te02.
Target J^π=7/2$^-$.
1985Av04: E=3.5-5.0 MeV, measured Eγ, Iγ, γ(θ), DSA.
1970Sa15: E=2.3-6 MeV, measured Eγ, Iγ, nγ coin, γγ coin.
1971Iy03: E=3.9-5.5 MeV, measured σ(E; Eγ,E(n),γ(θ)), DSA.
1972Eg01: E=2.7-5 MeV, measured γ(θ).
1980Sa07: E=3.7 MeV, measured γ(t).
1980Ka10: E=3.95-4.65 MeV, measured σ(E(p),Eγ,γ(θ)), Eγ, Iγ, $T_{1/2}$.
1970Te02: E=2.4-3.3 MeV, measured Eγ, Iγ, σ(E; Eγ,γ(θ)).
1970Ha01: E=4 MeV, measured Eγ, $T_{1/2}$.

^{51}Cr Levels

E(level)[†]	J$^\pi$[‡]	$T_{1/2}$[c]	Comments
0.0	7/2$^-$[b]		
749.17 *8*	3/2$^-$#&	7.35[d] ns *3*	$T_{1/2}$: From 1970Ha01. Other: 3.3 ns *4* from γ(t) measurement and values are not corrected for feeding from the 777 level (1980Sa07).
777.31 *14*	1/2$^-$#&	5.53[d] ns *7*	$T_{1/2}$: From 1970Ha01. Other: 6.9 ns *6* (γ(t),1980Sa07).
1164.54 *9*	9/2$^-$[b]	63[e] fs *12*	$T_{1/2}$: from 57 fs *+21−18* (1971Iy03) and 65 fs *+13−15* (1985Av04).
1352.95 *12*	5/2$^-$&	>0.59 ps	$T_{1/2}$: other: >0.485 ps (1985Av04).
1480.11 *14*	11/2$^-$[b]	0.49[e] ps *+28−13*	$T_{1/2}$: from 0.60 ps *+40−20* (1971Iy03) and 0.42 ps *+35−14* (1985Av04).
1557.18 *9*	7/2$^-$&	>0.485 ps	$T_{1/2}$: other: >0.28 ps (1971Iy03).
1899.3 *3*	3/2$^-$#[a]	0.27[e] ps *+10−5*	$T_{1/2}$: from 0.26 ps *+12−6* (1971Iy03) and 0.312 ps *+173−97* (1985Av04).
2001.64 *15*	5/2$^-$[a]	17 fs *2*	$T_{1/2}$: from average of 19 fs *4* (1971Iy03) and 15.2 ps *42* (1985Av04).
2255.5 *4*	15/2$^-$#	>69 fs	
2312.52 *16*	7/2$^-$#[a]	15 fs *4*	$T_{1/2}$: other: 17 fs *14* (1971Iy03).
2379.55 *13*	9/2$^-$&	0.26 ps *11*	$T_{1/2}$: from average of 0.37 ps *+14−9* (1971Iy03) and 0.15 ps *12* (1985Av04).
2385.42 *25*	13/2$^-$[b]	59 fs *12*	
2704.37 *18*	11/2$^-$&	85 fs *3*	$T_{1/2}$: other: 39 fs *+30−20* (1971Iy03). This value is in error since the 2705γ used by the authors is a doublet (see 1978Ka32 in (α,nγ)).
2762.8 *5*	1/2$^+$@		
2767.30 *17*	9/2$^-$[a]	33 fs *10*	$T_{1/2}$: other: <21 fs (1971Iy03).
2829.2 *4*	(3/2)$^-$@		
2890.34 *20*	3/2$^-$@		
2911.15 *19*	(5/2)$^-$@		
2948.69 *15*	5/2$^-$,7/2$^-$@		
3001.7 *3*	5/2$^-$@		
3004.3 *3*	3/2$^+$@		
3020.4 *2*	11/2$^-$@		
3109.06 *16*	(7/2,9/2$^-$)@		
3135.0 *3*	(3/2$^-$)@		
3207.37 *23*	7/2$^-$,9/2$^-$@		
3261.7 *2*			
3344.17 *24*			
3722.1 *7*			
3831.25 *21*	(7/2$^-$,9/2,11/2$^-$)@		

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^{51}V(p,nγ) 1985Av04,1970Sa15,1971Iy03 (continued)

^{51}Cr Levels (continued)

E(level)†	Jπ‡	E(level)†	Jπ‡	E(level)†	Jπ‡
3902.1 *3*	5/2+@	3984.5 *13*	5/2+@	4108.2 *20*	
3927.6 *10*	5/2+@	4006.6 *9*		4155 *3*	7/2+,9/2+@
3953.8 *4*	5/2+@	4071.2 *20*	3/2+,5/2+@	4190 *3*	3/2+,5/2+@
				4273 *4*	

† From Eγ's and level scheme, using least-squares fit to data.
‡ From γ(θ) and band structure (1985Av04), except as noted.
# Based on comparison of σ(E; Eγ,θ) measurement and Hauser-Feshbach calculation (1972Eg01,1970Te02).
@ From Adopted Levels.
& K=1/2− band (1985Av04). Members: 1/2− to 11/2−. Band parameters: A=77.34, B=−0.49.
a K=3/2− band (1985Av04). Members: 3/2− to 9/2−. Band parameters: A=16.28, B=0.91.
b K=7/2− band (1985Av04). Members: 7/2− to 13/2−. Band parameters: A=127.11, B=−0.92.
c From DSA measurements (1985Av04 or 1971Iy03), except as noted.
d From γ(t) measurements (1980Sa07).
e From midpoint of overlap region.

γ(^{51}Cr)

E_i(level)	J_i^π	E_γ†	I_γ‡	E_f	J_f^π	Mult.&	δ@	Comments
749.17	3/2−	749.0 *1*	100	0.0	7/2−			
777.31	1/2−	28	>99.7	749.17	3/2−	(M1)		E_γ: seen only by 1980Sa07, value is from E(level) difference. Mult.: from an intensity balance, 1980Sa07 determine α(exp)=1.3 *4*. This is consistent with E1 or with M1+E2 with δ<0.12. From RUL one expects δ<0.026, and from the known J^π's one has Δπ=no.
		777.3	<0.3	0.0	7/2−			E_γ: not observed. Value deduced from E(level) difference. I_γ: 1970Sa15 report an upper limit on the branching with Iγ<0.3.
1164.54	9/2−	1164.5 *1*	100	0.0	7/2−	D+Q	−0.84 *+29−35*	γ(θ): A_2=−0.50 *4*; A_4=+0.01 *4* (1985Av04). Other: δ=−1.2 *9* (1972Eg01).
1352.95	5/2−	575.6 *1*	9.0 *3*	777.31	1/2−	Q		
		603.4 *4*	56.3# *12*	749.17	3/2−	D+Q	+0.07 *4*	I_γ: branching is consistent with (α,nγ). γ(θ): A_2=−0.12 *1*; A_4=+0.003 *1* (1985Av04).
		1353.3 *2*	34.6 *8*	0.0	7/2−	D+Q	+0.19 *3*	γ(θ): A_2=−0.26 *2*; A_4=+0.02 *2* (1985Av04).
1480.11	11/2−	315.6 *3*	48.1 *11*	1164.54	9/2−			
		1480.3 *2*	51.9 *15*	0.0	7/2−	Q		γ(θ): A_2=+0.09 *2*; A_4=+0.02 *2* (1985Av04). δ(M3,E2): −0.04 *5* (1971Iy03), −0.04 *3* (1985Av04).
1557.18	7/2−	204.0 *8*	5.1 *1*	1352.95	5/2−			
		807.9 *1*	79.4# *20*	749.17	3/2−	Q		
		1557.6 *2*	15.5 *3*	0.0	7/2−			γ(θ): A_2=−0.13 *2*; A_4=0.00 *3* (1985Av04). I_γ: branching consistent with (α,nγ).

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^{51}V(p,nγ) 1985Av04,1970Sa15,1971Iy03 (continued)

γ(^{51}Cr) (continued)

E_i(level)	J_i^π	E_γ †	I_γ ‡	E_f	J_f^π	Mult.&	δ@	Comments
1899.3	3/2$^-$	1899.3 *3*	100	0.0	7/2$^-$			
2001.64	5/2$^-$	2001.5 *2*	100	0.0	7/2$^-$			
2255.5	15/2$^-$	775.4 *3*	100	1480.11	11/2$^-$			
2312.52	7/2$^-$	1147.9[a] *3*	89[a] *6*	1164.54	9/2$^-$			
		2312.5 *2*	11 *3*	0.0	7/2$^-$			
2379.55	9/2$^-$	822.3 *3*	12.3 *15*	1557.18	7/2$^-$	D+Q	+1.2 *+5−8*	γ(θ): A_2=−0.024 *3*; A_4=+0.02 *4* (1985Av04).
		899.9 *5*	17.9 *24*	1480.11	11/2$^-$			
		1026.7 *2*	23.8 *15*	1352.95	5/2$^-$			
		1215.5 *5*	12.8 *9*	1164.54	9/2$^-$			
		2379.3 *2*	35.9 *20*	0.0	7/2$^-$	D+Q	−0.78 *+25−33*	γ(θ): A_2=−0.09 *3*; A_4=0.00 *4* (1985Av04).
2385.42	13/2$^-$	905.3 *2*	100	1480.11	11/2$^-$	D+Q	−0.07 *2*	δ: other value −4.3 *8* (1985Av04) is ruled out by RUL. γ(θ): A_2=−0.13 *7*; A_4=−0.10 *8* (1985Av04).
2704.37	11/2$^-$	1147.9[a] *3*	49[a] *5*	1557.18	7/2$^-$	Q		γ(θ): A_2=+0.03 *5*; A_4=−0.03 *5* (1985Av04). δ(M3,E2)=+0.32 *+75−54* (1985Av04).
		1224.7 *3*	9.9 *15*	1480.11	11/2$^-$	D+Q	−0.09 *2*	γ(θ): A_2=−0.12 *1*; A_4=+0.03 *1* (1985Av04).
		1538.8 *3*	30.1 *20*	1164.54	9/2$^-$			
		2703.6 *6*	10.9 *9*	0.0	7/2$^-$			
2762.8	1/2$^+$	2013.6 *5*	100	749.17	3/2$^-$			
2767.30	9/2$^-$	454.8 *5*	2.1	2312.52	7/2$^-$			
		1287.2 *4*	22	1480.11	11/2$^-$	D+Q	+0.09 *2*	γ(θ): A_2=+0.24 *5*; A_4=−0.10 *10* (1985Av04).
		1603.4 *5*	20	1164.54	9/2$^-$			
		2767.1 *2*	56[#]	0.0	7/2$^-$	D+Q	−0.36 *11*	I_γ: from branching in (α,nγ) one expects Iγ=44. Other δ: −0.49 *11* or −1.7 *5* (1972Eg01). γ(θ): A_2=−0.04 *2*; A_4=+0.01 *2* (1985Av04).
2829.2	(3/2)$^-$	2080.0 *4*	100	749.17	3/2$^-$			
2890.34	3/2$^-$	510.8 *3*	38	2379.55	9/2$^-$			
		888.7 *2*	62	2001.64	5/2$^-$			
2911.15	(5/2)$^-$	1747.7 *9*	40 *4*	1164.54	9/2$^-$			I_γ: from table 3 (1970Sa15).
		2910.9 *2*	60 *4*	0.0	7/2$^-$			I_γ: see Iγ notes of 1747.7γ.
2948.69	5/2$^-$,7/2$^-$	1391.3 *2*	61 *6*	1557.18	7/2$^-$			I_γ: from table 1 (1970Sa15).
		2948.8 *2*	39 *6*	0.0	7/2$^-$			I_γ: see Iγ notes of 1391.3γ.
3001.7	5/2$^-$	3001.6 *3*	100	0.0	7/2$^-$			
3004.3	3/2$^+$	1002.7 *4*	47	2001.64	5/2$^-$			
		2255.1 *3*	53	749.17	3/2$^-$			
3020.4	11/2$^-$	3020.3 *2*	100	0.0	7/2$^-$			
3109.06	(7/2,9/2$^-$)	1107.3 *2*	34	2001.64	5/2$^-$			
		1755.7 *7*	3	1352.95	5/2$^-$			
		1944.6 *2*	25	1164.54	9/2$^-$			
		3109.0 *4*	38	0.0	7/2$^-$			
3135.0	(3/2$^-$)	1782.2[a] *3*	94[a]	1352.95	5/2$^-$			
		3134.0 *7*	6	0.0	7/2$^-$			
3207.37	7/2$^-$,9/2$^-$	296.0 *7*	0.4	2911.15	(5/2)$^-$			
		1649.8 *5*	11	1557.18	7/2$^-$			
		1854.6 *3*	20	1352.95	5/2$^-$			
		2042.5 *7*	62	1164.54	9/2$^-$			
		3207.3 *7*	7	0.0	7/2$^-$			

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^{51}V(p,nγ) 1985Av04,1970Sa15,1971Iy03 (continued)

γ(^{51}Cr) (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[‡]	E_f	J_f^π
3261.7		1782.2[a] *3*	295[a] *63*	1480.11	11/2$^-$
		3261.6 *2*	100[#] *11*	0.0	7/2$^-$
3344.17		432.0 *7*	2	2911.15	(5/2)$^-$
		1787.4 *3*	92	1557.18	7/2$^-$
		3343.6 *4*	6	0.0	7/2$^-$
3722.1		2164.6 *8*	91	1557.18	7/2$^-$
		3722.7 *15*	9	0.0	7/2$^-$
3831.25	(7/2$^-$,9/2,11/2$^-$)	1453.4 *15*	4	2379.55	9/2$^-$
		2273.6 *3*	45	1557.18	7/2$^-$
		2350.5 *6*	19	1480.11	11/2$^-$
		3831.6 *3*	32	0.0	7/2$^-$
3902.1	5/2$^+$	3901.9 *3*	100	0.0	7/2$^-$
3927.6	5/2$^+$	1037.7 *11*	39	2890.34	3/2$^-$
		2448.9[ab] *10*	33[a#]	1480.11	11/2$^-$
		3926 *2*	28	0.0	7/2$^-$
3953.8	5/2$^+$	2600.4 *4*	41	1352.95	5/2$^-$
		3954.4 *6*	59	0.0	7/2$^-$
3984.5	5/2$^+$	3984.3 *13*	100	0.0	7/2$^-$
4006.6		2448.9[ab] *10*	50[a#]	1557.18	7/2$^-$
		4006.4 *9*	50	0.0	7/2$^-$
4071.2	3/2$^+$,5/2$^+$	4071 *2*	100	0.0	7/2$^-$
4108.2		4108 *2*	100	0.0	7/2$^-$
4155	7/2$^+$,9/2$^+$	4155 *3*	100	0.0	7/2$^-$
4190	3/2$^+$,5/2$^+$	4190 *3*	100	0.0	7/2$^-$
4273		4273 *4*	100	0.0	7/2$^-$

[†] From 1970Sa15.
[‡] % photon branching from each level (1970Sa15). Authors also give relative Iγ at 90°. Values without uncertainty are from Iγ(rel) at 90° and are not corrected for angular correlation effects.
[#] Also assigned to (p,p′γ); however, only a small fraction of the intensity is believed by the authors to be due to (p,p′γ).
[@] From γ(θ) measurement (1985Av04), except as noted.
[&] From δ and RUL (1985Av04), except as noted.
[a] Multiply placed with intensity suitably divided.
[b] Placement of transition in the level scheme is uncertain.

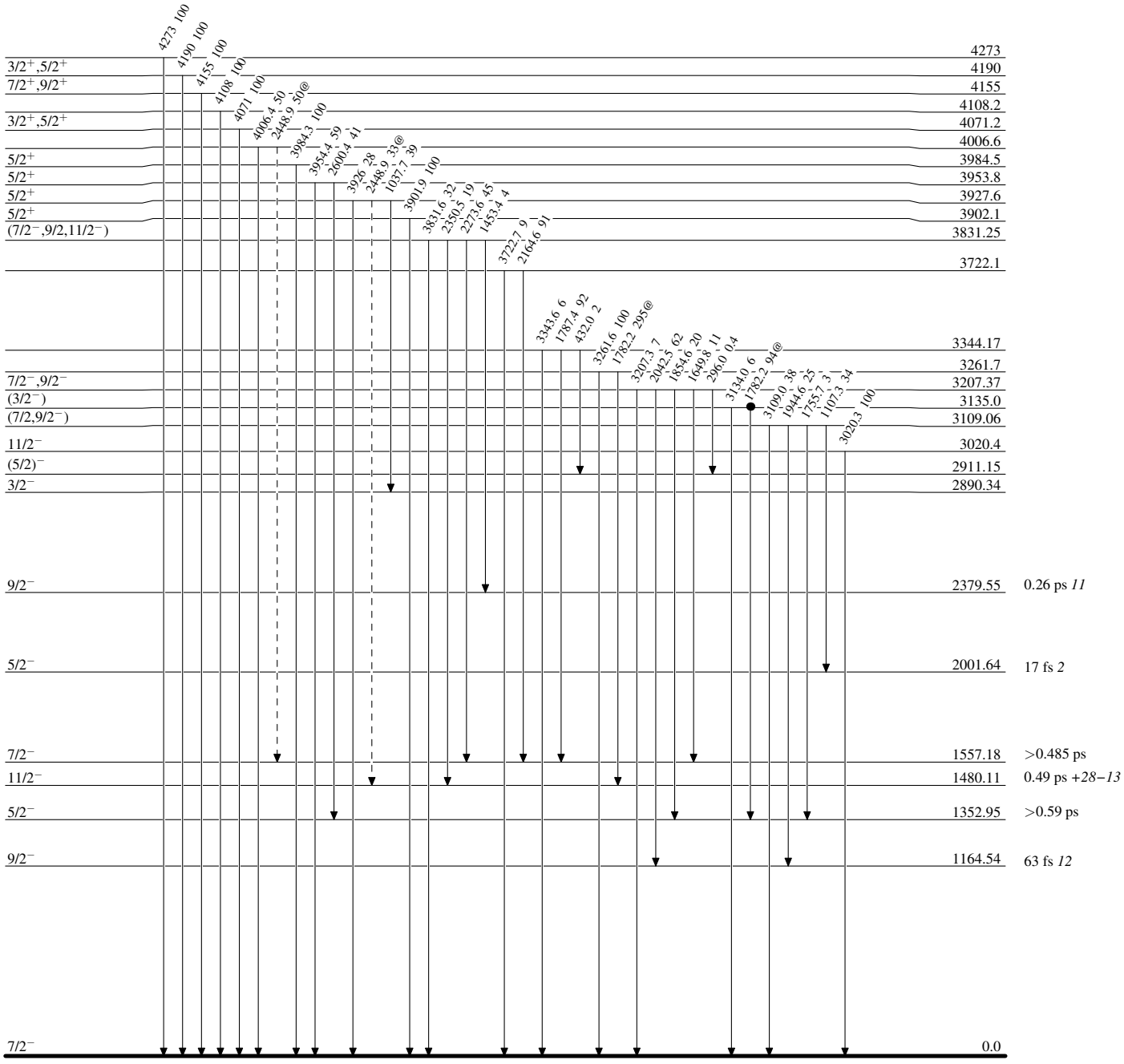
^{51}V(p,nγ) 1985Av04,1970Sa15,1971Iy03

Legend

Level Scheme

Intensities: % photon branching from each level
@ Multiply placed: intensity suitably divided

γ Decay (Uncertain)
Coincidence



$^{51}_{24}Cr_{27}$

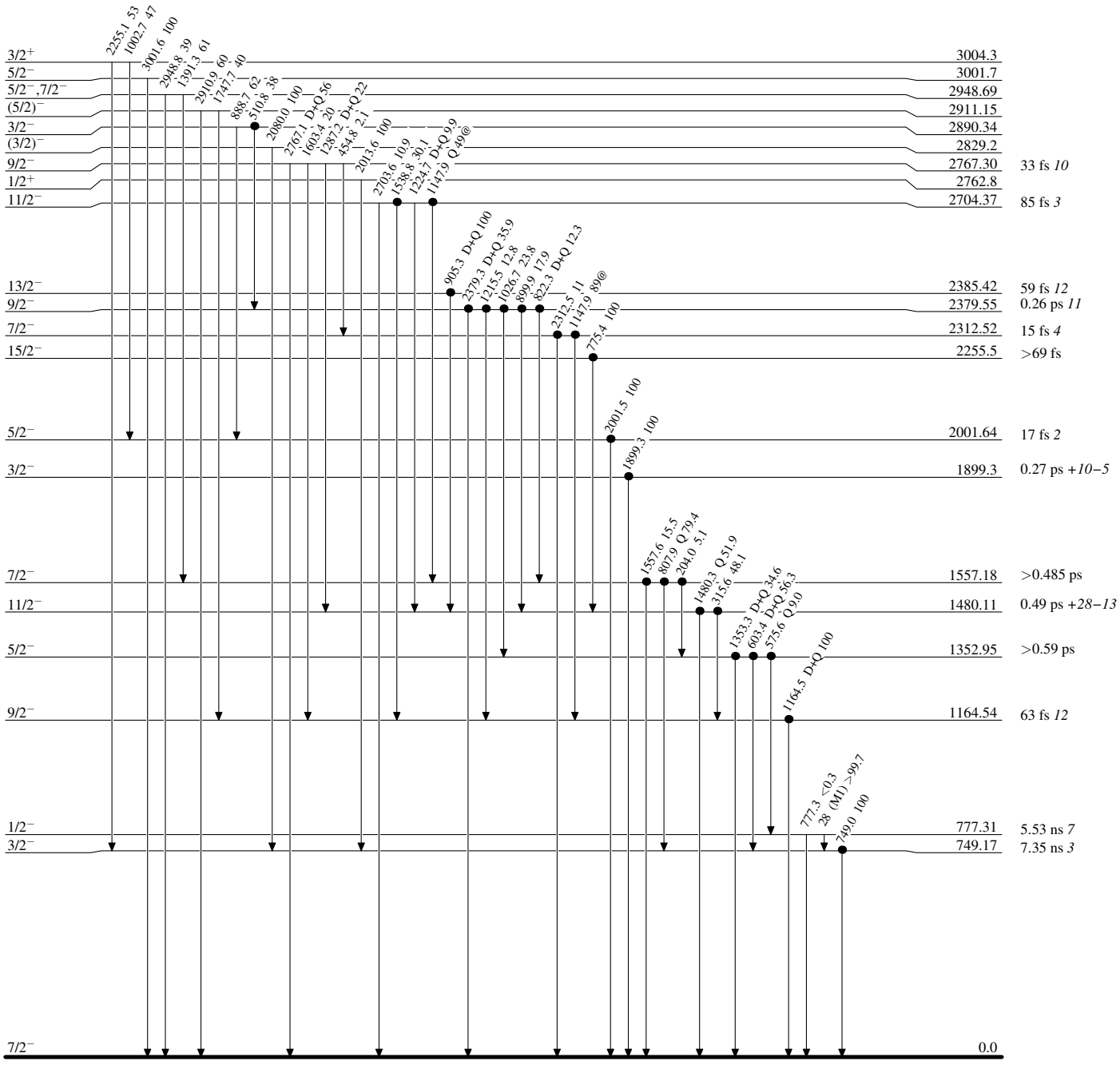
^{51}V(p,nγ) 1985Av04,1970Sa15,1971Iy03

Legend

Level Scheme (continued)

Intensities: % photon branching from each level
@ Multiply placed: intensity suitably divided

● Coincidence



$^{51}_{24}Cr_{27}$