^{49}Cr β^+ decay 1975Ja17,1974Ta11

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	T. W. Burrows[a]	NDS 109, 1879 (2008)	14-Jul-2008

Parent: ^{49}Cr: E=0.0; J$^\pi$=5/2$^-$; $T_{1/2}$=42.3 min *1*; Q(β^+)=2626.5 *26*; %β^+ decay=100.0
^{49}Cr-E,J$^\pi$,$T_{1/2}$: From ^{49}Cr Adopted Levels.
^{49}Cr-Q(β^+): From 2003Au03.
^{49}Cr-%β^+ decay: From ^{49}Cr Adopted Levels.
Produced by ^{50}Cr(n,2n) At 14 MeV (1973Ok01, 1975Ja17), ^{46}Ti(A,N) At 19 MeV (1973Ok01) and 15 MeV (1974Ta11), and Ti(α,xn) At 20 MeV (1953Cr18).
1973Ok01 measured γ's and $\gamma\gamma$'s, $\gamma\gamma$(t) (NaI), and β^+'s (scin). $\gamma\gamma$'s failed to confirm any of the high energy lines.
Others: see 1995Bu23.

^{49}V Levels

E(level)[†]	J$^\pi$[‡]	$T_{1/2}$	Comments
0.0	7/2$^-$	330[‡] d *15*	%ε+%β^+=100 %ε+%β^+: from the Adopted Levels.
90.6391 *17*	5/2$^-$	0.43 ns *2*	$T_{1/2}$: from $\gamma\gamma$(t) (1971Ch46). Other: 0.33 ns *2* (1973Ok01). See discussion In (p,nγ).
152.9282 *17*	3/2$^-$	20.6 ns *6*	$T_{1/2}$: from $\gamma\gamma$(t) (1963Cu03, NaI).
748.27[‡] *9*	3/2$^+$		
1021.62?[‡] *11*	11/2$^-$		
(1155.32[‡] *10*)	9/2$^-$		
1514.49 *7*	5/2$^-$		
1661.26 *15*	3/2$^-$		
2182.3 *6*	7/2$^-$		
2234.9 *6*	5/2		
2309.4 *7*	3/2$^-$		

† Calculated by the evaluator using least-squares adjustment procedures, except As noted.
‡ From the Adopted Levels. J$^\pi$ arguments based on log *ft*'s and data from (α,pγ) are consistent (1974Ta11). E(level)'s held fixed In least-squares adjustment procedures.

ε,β^+ radiations

Iβ normalization: see comments on Iγ normalization and Δ(γ-normalization).
See 1987Mi18 for calculations of GT matrix elements.
Iβ,Iε,I(γ+ce) from Σ Iγ(1+α)(In)-Σ Iγ(1+α)(out) for each state and theoretical ε/β^+, except for g.s. feeding which is from 0.5Iγ(g$^\pm$)-Σ (Iε+Iβ)(to first 2 excited states) and theoretical ε/β^+.
Additional information 1.

E(decay)	E(level)	Iβ^+[#]	Iε[#]	Log *ft*[†]	I($\varepsilon+\beta^+$)[#]	Comments
(317 *3*)	2309.4		0.0086 *16*	6.95 *9*	0.0086 *16*	εK=0.8902; εL=0.09416 *3*; εM+=0.015691 *5*
(392 *3*)	2234.9		0.022 *3*	6.73 *7*	0.022 *3*	εK=0.8907; εL=0.09367 *2*; εM+=0.015599 *3*
(444 *3*)	2182.3		0.0100 *17*	7.18 *8*	0.0100 *17*	εK=0.8910; εL=0.09342 *2*; εM+=0.015552 *2*
(965 *3*)	1661.26		0.52 *9*	6.15 *8*	0.52 *9*	εK=0.8922; εL=0.09244; εM+=0.01537
(1112 *3*)	1514.49		1.53 *12*	5.80 *4*	1.53 *12*	εK=0.8919; εL=0.09229; εM+=0.01534
(1878[@] *3*)	748.27	<0.007	<0.003	>8.9	<0.01	av Eβ=360.7 *12*; εK=0.2826 *20*; εL=0.02915 *20*; εM+=0.00484 *4*
2.41×10^3[‡] *2*	152.9282	872 *6*	74 *1*	4.81 *2*	946 *6*	av Eβ=624.8 *12*; εK=0.0702 *4*; εL=0.00723 *4*; εM+=0.001201 *7*

Continued on next page (footnotes at end of table)

^{49}Cr β^+ decay 1975Ja17,1974Ta11 (continued)

ϵ,β^+ radiations (continued)

E(decay)	E(level)	$I\beta^+$[#]	$I\varepsilon$[#]	Log *ft*[†]	$I(\varepsilon+\beta^+)$[#]	Comments
2.47×10^3 *4*	90.6391	652 *6*	49 *1*	5.02 *2*	701 *6*	av Eβ=653.1 *12*; εK=0.0621 *4*; εL=0.00640 *4*; εM+=0.001063 *6* E(decay): from 1973Ok01.
2.56×10^3[‡] *1*	0.0	2.2×10^2 *3*	13.7 *19*	5.60 *7*	2.3×10^2 *3*	av Eβ=694.3 *12*; εK=0.05246 *25*; εL=0.00540 *3*; εM+=0.000897 *5*

[†] Additional information 2.
[‡] From 1953Cr18 (mag spect). Other: Eβ+=1.39 MeV *5* and 1.54 MeV *3*, respectively (1973Ok01).
[#] For absolute intensity per 100 decays, multiply by 0.0532 *19*.
[@] Existence of this branch is questionable.

$\gamma(^{49}V)$

Iγ normalization: from Iγ($\gamma^\pm$)=3480 *70* relative to Iγ(90.6γ)=1000 *2* (1975Ja17), theoretical ε/β^+ to g.s. and first two excited states, and Σ I(γ+ce)+Iε+Iβ (to g.s.)=100.
Overall γ efficiency curve uncertainty of 2% added In quadrature.
1974Ta11 and 1975Ja17 measured γ′s with tantalum and lead absorbers, respectively.
Iγ(G$^\pm$)=3480 *70* (1975Ja17), 3270 *160* (1974Ta11), and 3340 *340* (1973Ok01) relative to Iγ(90.6γ)=1000 *2*.
Coincidences on drawing from 1973Ok01 and 1954Nu07 (NaI).
Additional information 3.

E_γ[†]	I_γ[‡b]	E_i(level)	J^π_i	E_f	J^π_f	Mult.[#]	δ	α[#]	Comments
62.289 *2*	308 *4*	152.9282	3/2⁻	90.6391	5/2⁻	(M1)		0.0787	α(K)=0.0710 *10*; α(L)=0.00676 *10*; α(M)=0.000885 *13*; α(N+..)=4.47×10⁻⁵ *7* α(N)=4.47×10⁻⁵ *7*
90.639 *2*	1000 *2*	90.6391	5/2⁻	0.0	7/2⁻	M1		0.0287	α(K)=0.0259 *4*; α(L)=0.00245 *4*; α(M)=0.000320 *5*; α(N+..)=1.629×10⁻⁵ *23* α(N)=1.629×10⁻⁵ *23*
(133.80[&] *17*)	5.90×10⁻⁶[&] *20*	(1155.32)	9/2⁻	1021.62?	11/2⁻	(M1(+E2))	−0.15 *15*	0.013 *7*	α(K)=0.012 *6*; α(L)=0.0011 *6*; α(M)=0.00014 *8*; α(N+..)=7.E−6 *4* α(N)=7.E−6 *4*
152.928 *2*	570 *2*	152.9282	3/2⁻	0.0	7/2⁻	E2		0.0725	α(K)=0.0654 *10*; α(L)=0.00623 *9*; α(M)=0.000808 *12*; α(N+..)=3.91×10⁻⁵ *6* α(N)=3.91×10⁻⁵ *6*
595.3[c]	≤0.005[@]	748.27	3/2⁺	152.9282	3/2⁻				
657.5[c]	≤0.005[@]	748.27	3/2⁺	90.6391	5/2⁻				
1021.3[c]	<0.02[@]	1021.62?	11/2⁻	0.0	7/2⁻				
(1027.8[&] *7*)	0.0024[&] *6*	2182.3	7/2⁻	1155.32?	9/2⁻				
(1064.63[&] *17*)	5×10⁻⁴[&] *1*	(1155.32)	9/2⁻	90.6391	5/2⁻				
(1155.33[&] *17*)	0.0015[&] *4*	(1155.32)	9/2⁻	0.0	7/2⁻				
1361.61 *7*	0.85 *8*	1514.49	5/2⁻	152.9282	3/2⁻				
ˣ1384[ac]									
1423.3 *3*	0.19 *6*	1514.49	5/2⁻	90.6391	5/2⁻				
ˣ1433[ac]									
ˣ1449[ac]									
1508.3 *2*	0.15 *6*	1661.26	3/2⁻	152.9282	3/2⁻				
1514.1 *2*	0.49 *6*	1514.49	5/2⁻	0.0	7/2⁻				
1570.6 *2*	0.37 *6*	1661.26	3/2⁻	90.6391	5/2⁻				
2091.1 *7*	0.0075 *16*	2182.3	7/2⁻	90.6391	5/2⁻				
2143.7 *6*	0.0173 *26*	2234.9	5/2	90.6391	5/2⁻				
(2155.7[&] *12*)	0.0031[&] *10*	2309.4	3/2⁻	152.9282	3/2⁻				
(2181.6[&] *11*)	0.0006[&] *4*	2182.3	7/2⁻	0.0	7/2⁻				

From ENSDF

γ(^{49}V) (continued)

E_γ[†]	I_γ[‡b]	E_i(level)	J_i^π	E_f	J_f^π
2218.6 *10*	0.0036 *11*	2309.4	3/2$^-$	90.6391	5/2$^-$
2236.2 *10*	0.0042 *12*	2234.9	5/2	0.0	7/2$^-$
(2310.6[&] *14*)	0.0019[&] *6*	2309.4	3/2$^-$	0.0	7/2$^-$

[†] From 1975Ja17 for Eγ<1500 and from 1974Ta11 for Eγ>1500, except As noted.

[‡] Relative photon intensity. From 1975Ja17 for Eγ<2 MeV and from 1974Ta11 for Eγ>2 MeV (upper limits cited by 1975Ja17 consistent), except As noted.

[#] From the Adopted Gammas. Others: α(exp)(63γ)≈0.14, α(exp)(91γ)≈0.06 and α(exp)(153γ)≈0.16 (1954Nu07; NaI, mag spect).

[@] 1975Ja17 and 1974Ta11 suggest that the 601 and 663 peaks observed by 1973Ok01 resulted from pileup of $\gamma^\pm$ pulses with 91γ and 153γ pulses while the 1021γ resulted from pileup of two $\gamma^\pm$ pulses.

[&] From the Adopted Gammas; not observed In β^+ decay. Iγ obtained from adopted branching ratios and present decay scheme.

[a] These gammas were observed to have the same $T_{1/2}$ As for ^{49}Cr β^+ decay (1975AvZV; ^{46}Ti(α,n)).

[b] For absolute intensity per 100 decays, multiply by 0.0532 *19*.

[c] Placement of transition in the level scheme is uncertain.

[x] γ ray not placed in level scheme.

$^{49}_{23}$V$_{26}$-4

^{49}Cr β^+ decay 1975Ja17,1974Ta11

Decay Scheme

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays