

Adopted Levels, Gammas

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

$Q(\beta^-)=6844.8$ 8; $S(n)=5168.9$ 17; $S(p)=1.645\times 10^4$ 19; $Q(\alpha)=-13187$ 5 [2012Wa38](#)

Note: Current evaluation has used the following Q record 6844.8 8 5168.9 171.683e+411-1.318E412 [2003Au03,2007Ya08](#).

$Q(\beta^-)$: From Δ' (^{45}Ar)= -29771 keV ([2003Au03](#)) and Δ' (^{45}K)= -36615.43 keV 57 ([2007Ya08](#)). See ^{45}K Adopted Levels for details).

Other: 6838 keV 10 ([2003Au03](#)).

 ^{45}Ar LevelsCross Reference (XREF) Flags

A	^{45}Cl β^- decay	D	$^9\text{Be}(^{46}\text{Ar},\text{X}\gamma)$: E=70 MeV/A
B	^{46}Cl β^-n decay	E	$^9\text{Be}(^{48}\text{Ca},\text{X}\gamma)$: E=60.3 MeV/A
C	$^2\text{H}(^{44}\text{Ar},\text{P})$ E=440 MeV	F	$^{48}\text{Ca}(\alpha,^7\text{Be})$ E=78 MeV

E(level) [†]	J^π [‡]	$T_{1/2}$	XREF	Comments
0.0	$5/2^-, 7/2^-$	21.48 s 15	ABCDEF	$\% \beta^- = 100$ J^π : $J^\pi=7/2^-$ from shell-model syst, syst of other odd-A Ar, and from comparison of branching ratios and log ft 's for the decay of ^{43}Ar and ^{45}Ar discrepant with $J^\pi=1/2, 3/2, 5/2^-$ from log $ft=7.6$ 2 (log $f^{lu}t=9.6$ 2) to $1/2^+$. $T_{1/2}$: from 1980Hu01 . Others: 20.8 s 5 (1978Pe04) and 21 s 1 (1974TiZW). See ^{45}Ar β^- decay for details.
542.1 6	$1/2^-, 3/2^-$	0.34 ns +32-15	ABCDE	J^π : Ne $1/2^-$ from $\Delta J=0$ d or $\Delta J=2$ Q to g.s. if $J^\pi(\text{g.s.})=7/2^-$. $T_{1/2}$: from line-shape analysis in ($^{48}\text{Ca},\text{X}\gamma$).
1339.9 8			AB DE	
1416.1 12	$1/2^-, 3/2^-$		ABCD	
1660?# 50			F	
1734.7 9			A D	
1770.3 8			AB DE	
1876@	$1/2^-, 3/2^-$		C	
1911 5			DE	J^π : $3/2, 7/2, 11/2$ from $\Delta J=0$ d or $\Delta J=2$ Q to g.s. if $J^\pi(\text{g.s.})=7/2^-$. Ne $3/2$ since not populated in β^- decay.
2420# 50			F	
2510@	$1/2^-, 3/2^-$		C	
2757.0? 12			A	
3230@			C f	XREF: f(3250).
3294.8 8			A f	XREF: f(3250).
3718@			C	
3949.7? 12			A	
4280@			C	
4326.1 9			A	
4800@	&		C	
5773@	&		C	

[†] From least-squares fit to $E\gamma$'s assuming $\Delta E(\gamma)=1$ keV when not given, except as noted.

[‡] From angular momentum transfer in ($^{44}\text{Ar},\text{p}$). Additional arguments dependent on $J^\pi(\text{g.s.})=7/2^-$ given as the comments or footnotes.

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued) ^{45}Ar Levels (continued)# From (α , ^7Be).@ From ($^{44}\text{Ar,p}$).& L=3,4 in ($^{44}\text{Ar,p}$). $\gamma(^{45}\text{Ar})$ See β^- decay, β^-n decay, and ($^{46}\text{Ar,x}\gamma$) for unplaced gammas.

$E_i(\text{level})$	J_i^π	$E_\gamma^\dagger$	$I_\gamma^\dagger$	E_f	J_f^π	Mult.	α^b	Comments
542.1	$1/2^-, 3/2^-$	541.7 7	100	0.0	$5/2^-, 7/2^-$	(E2) ‡	3.84×10^{-4} 5	B(E2)(W.u.)=3.8 +17-36 $\alpha(K)=0.000352$ 6; $\alpha(L)=2.90 \times 10^{-5}$ 5; $\alpha(M)=2.82 \times 10^{-6}$ 5
1339.9		797.7	100	542.1	$1/2^-, 3/2^-$			
		1340	85	0.0	$5/2^-, 7/2^-$			
1416.1	$1/2^-, 3/2^-$	874.0	100 $^\#$ 22	542.1	$1/2^-, 3/2^-$			
		1416.1 c	$\leq 43^\#$	0.0	$5/2^-, 7/2^-$			
1734.7		1192.6 7	100	542.1	$1/2^-, 3/2^-$			
1770.3		1228.1 7	100	542.1	$1/2^-, 3/2^-$			
1911		1911 $^\circ$ 5	100 $^\&$	0.0	$5/2^-, 7/2^-$	D,Q a		
2757.0?		2214.8 c	100	542.1	$1/2^-, 3/2^-$			
3294.8		1524.4 7	61	1770.3				
		1560.2 c	5.7	1734.7				
		1955.1 c	7.5	1339.9				
		2751 2	100	542.1	$1/2^-, 3/2^-$			
		3295.2	43	0.0	$5/2^-, 7/2^-$			
3949.7?		3407.5 c	100	542.1	$1/2^-, 3/2^-$			
4326.1		2986.2	83	1339.9				
		3783.8	100	542.1	$1/2^-, 3/2^-$			

 † From β^- decay, except as noted. ‡ $\Delta J=0$ d or $\Delta J=2$ Q from angular anisotropy ratio in ($^{48}\text{Ca,X}\gamma$); Ne M2 from comparison to RUL. $1 \leq \Delta J \leq 3$ from level scheme (L=3 to g.s. and L=1 to 542) excludes $\Delta J=0$ d. $^\#$ From ($^{46}\text{Ar,x}\gamma$). $^\circ$ Weighted average of 1908 6 from ($^{46}\text{Ar,x}\gamma$) and 1914 6 from ($^{48}\text{Ca,X}\gamma$). $^\&$ From ($^{48}\text{Ca,X}\gamma$). a $\Delta J=0$ d or $\Delta J=2$ Q from angular anisotropy ratio in ($^{48}\text{Ca,X}\gamma$). b Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on γ -ray energies, assigned multiplicities, and mixing ratios, unless otherwise specified. c Placement of transition in the level scheme is uncertain.

Adopted Levels, Gammas

Legend

Level Scheme

Intensities: Relative photon branching from each level

-----► γ Decay (Uncertain)