^{43}Ar β^- decay (5.37 min) 1978Hu10

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh and Jun Chen[#]	NDS 126, 1 (2015)	31-Mar-2015

Parent: ^{43}Ar: E=0; $J^\pi=5/2^{(-)}$; $T_{1/2}$=5.37 min *6*; Q(β^-)=4566 *5*; %β^- decay=100.0

^{43}Ar-J^π,$T_{1/2}$: From Adopted Levels of ^{43}Ar.

^{43}Ar-Q(β^-): From 2012Wa38.

1978Hu10: ^{43}Ar isotopes were produced in the spallation reaction ^{50}V(p,6pxn) with the proton beam from the 600 MeV external beam of the CERN synchrocyclotron bombarding a vanadium carbide target. Argon nuclides were separated in the ISOLDE on-line mass separator. γ-rays were detected in Ge(Li) detectors. Measured Eγ, Iγ, $\gamma\gamma$. Deduced levels, branching ratios. See also 1970Hu11.

Others:

1969La16: Eγ, $T_{1/2}$.

1969Ha03: $T_{1/2}$.

All data from 1978Hu10 unless otherwise noted.

The decay scheme is considered incomplete in view of no uncertainties available on γ-ray intensities. Thus all β feedings and log *ft* values are considered as approximate. In Adopted dataset, log *ft* have been used but the J^π based on these are considered as tentative.

^{43}K Levels

No evidence was found by 1978Hu10 for a 2892.7 level proposed by 1970Hu11.

E(level)[†]	J^π[‡]	E(level)[†]	J^π[‡]	E(level)[†]	J^π[‡]
0	$3/2^+$	1549.90 *9*	$3/2^+,5/2^+$	3264.18 *10*	$(3/2,5/2)^+$
561.32 *7*	$1/2^+$	1865.73 *7*	$(3/2,5/2^+)$	3310.11 *9*	$(3/2,5/2)^+$[@]
738.03 *8*	$7/2^-$	2048.5?[#] *1*	(9/2)	3393.14 *20*	$(3/2,5/2,7/2)^+$
975.31 *6*	$3/2^-$	2177.72 *8*	$5/2^{(+)}$	3455.49 *9*	$(3/2^-)$
1109.96 *7*	$3/2^+$	2189.32 *11*	(3/2,5/2,7/2)	3608.50 *12*	$(5/2^-,7/2^-)$
1206.94 *10*	$(5/2,7/2)^+$	2345.02 *7*	$(3/2^-)$	3646.1 *4*	$(3/2,5/2,7/2^+)$
1509.85 *9*	$7/2^+$	3057.00 *22*	$(5/2)^+$	3714.29 *17*	$(3/2^+,5/2^+)$

[†] From least-squares fit to Eγ data. Since the quoted Δ(Eγ) result in a poor fit, these were increased to 0.2 keV for strong γ-rays and 0.3 keV for weak γ-rays (Iγ<1%) in the least-squares adjustment.

[‡] From Adopted Levels.

[#] Level proposed (evaluators) based on (α,pγ) and 1560-1311 coin in 1978Hu10. But the adopted J^π=(9/2) is inconsistent with the log *ft*=7.8 from $5/2^{(-)}$ parent.

[@] log *ft*=5.1 allowed decay from $5/2^{(-)}$ parent is inconsistent with parity=+.

β^- radiations

E(decay)	E(level)	Iβ^-[‡]	Log *ft*	Comments
(852 *5*)	3714.29	0.47	5.5	av Eβ=309.4 *21*
(920 *5*)	3646.1	0.28	5.8	av Eβ=338.3 *22*
(958 *5*)	3608.50	1.5	5.2	av Eβ=354.4 *22*
(1111 *5*)	3455.49	3.5	5.1	av Eβ=420.7 *22*
(1173 *5*)	3393.14	0.38	6.1	av Eβ=448.1 *22*
(1256 *5*)	3310.11	5.5	5.1	av Eβ=484.9 *23*
(1302 *5*)	3264.18	1.0	5.9	av Eβ=505.3 *23*
(1509 *5*)	3057.00	1.1	6.1	av Eβ=598.8 *23*
(2221 *5*)	2345.02	19	5.6	av Eβ=929.0 *24*

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^{43}Ar β^- decay (5.37 min) 1978Hu10 (continued)

β^- radiations (continued)

E(decay)	E(level)	Iβ^-[‡]	Log *ft*	Comments
(2377 *5*)	2189.32	0.39	7.4	av Eβ=1002.6 *24*
(2388 *5*)	2177.72	16	5.8	av Eβ=1008.1 *24*
(2700 *5*)	1865.73	0.32	7.7	av Eβ=1156.5 *24*
(3016 *5*)	1549.90	0.29	7.9	av Eβ=1307.8 *24*
(3056 *5*)	1509.85	0.37	7.9	av Eβ=1327.0 *24*
(3359 *5*)	1206.94	1.5	7.4	av Eβ=1472.9 *25*
(3456 *5*)	1109.96	0.9	7.7	av Eβ=1519.8 *25*
(3591 *5*)	975.31	16	6.5	av Eβ=1585.0 *25*
(3828 *5*)	738.03	1.4	7.7	av Eβ=1699.9 *25*
(4005[#] *5*)	561.32	0.1	9.0	av Eβ=1785.7 *25*
(4566 *5*)	0	30[†]	6.7	av Eβ=2059.2 *25*

[†] Estimated (by 1978Hu10) from a comparison of the observed ^{43}Ar-^{43}K (parent-daughter) activities with those expected from series decay.
[‡] Absolute intensity per 100 decays.
[#] Existence of this branch is questionable.

$\gamma(^{43}K)$

Iγ normalization: Σ(Iγ to g.s.)=70 *7*, based on Iβ(g.s.)=30 *7* (1978Hu10).

E$_\gamma$	I$_\gamma$[e]	E$_i$(level)	J$_i^\pi$	E$_f$	J$_f^\pi$	Mult.	δ
167.1 *1*	2.5	2345.02	(3/2$^-$)	2177.72	5/2$^{(+)}$		
[x]231.4 *1*	2.8						
[x]236.2 *1*	3.4						
302.9 *2*	1.9	1509.85	7/2$^+$	1206.94	(5/2,7/2)$^+$		
413.9 *1*	42.9	975.31	3/2$^-$	561.32	1/2$^+$		
439.3 *2*	2.8	1549.90	3/2$^+$,5/2$^+$	1109.96	3/2$^+$		
479.2 *1*	116.0	2345.02	(3/2$^-$)	1865.73	(3/2,5/2$^+$)		
548.5 *1*	13.4	1109.96	3/2$^+$	561.32	1/2$^+$		
561.1 *1*	94.0	561.32	1/2$^+$	0	3/2$^+$		
[x]587.0[†] *1*	9.0						
639.7 *3*	2.7	2189.32	(3/2,5/2,7/2)	1549.90	3/2$^+$,5/2$^+$		
667.5 *2*	1.9	2177.72	5/2$^{(+)}$	1509.85	7/2$^+$		
738.1 *1*	454.8	738.03	7/2$^-$	0	3/2$^+$	M2+E3[#]	−0.13[#] *2*
755.0 *3*	1.8	1865.73	(3/2,5/2$^+$)	1109.96	3/2$^+$		
[x]812.4 *4*	1.3						
[x]878.2 *8*	0.9						
890.4 *1*	118.3	1865.73	(3/2,5/2$^+$)	975.31	3/2$^-$		
[x]910.5 *9*	1.0						
[x]922.5 *5*	1.7						
974.9[@] *1*	1000	975.31	3/2$^-$	0	3/2$^+$		
1080.0[a] *2*	4.6	2189.32	(3/2,5/2,7/2)	1109.96	3/2$^+$		
1110.1 *1*	31.2	1109.96	3/2$^+$	0	3/2$^+$		
1121.0 *2*	3.2	3310.11	(3/2,5/2)$^+$	2189.32	(3/2,5/2,7/2)		
1132.6 *1*	12.2	3310.11	(3/2,5/2)$^+$	2177.72	5/2$^{(+)}$		
1138.1 *1*	8.7	2345.02	(3/2$^-$)	1206.94	(5/2,7/2)$^+$		
[x]1146.4 *2*	9.1						
[x]1184.3 *3*	5.1						

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^{43}Ar β^- decay (5.37 min) 1978Hu10 (continued)

$\gamma(^{43}K)$ (continued)

E_γ	I_γ[e]	E_i(level)	J_i^π	E_f	J_f^π
1202.4 *3*	98.3	2177.72	$5/2^{(+)}$	975.31	$3/2^-$
1207.1 *3*	75.8	1206.94	$(5/2,7/2)^+$	0	$3/2^+$
1235.7[b] *2*	6.3	2345.02	$(3/2^-)$	1109.96	$3/2^+$
[x]1255.6 *3*	3.2				
1277.9 *5*	2.5	3455.49	$(3/2^-)$	2177.72	$5/2^{(+)}$
1304.3 *7*	3.1	1865.73	$(3/2,5/2^+)$	561.32	$1/2^+$
1311.4[f] *1*	22.7	2048.5?	(9/2)	738.03	$7/2^-$
1369	0.4	3714.29	$(3/2^+,5/2^+)$	2345.02	$(3/2^-)$
1369.9 *1*	200.0	2345.02	$(3/2^-)$	975.31	$3/2^-$
1398.7 *1*	9.5	3264.18	$(3/2,5/2)^+$	1865.73	$(3/2,5/2^+)$
1419.3 *1*	12.9	3608.50	$(5/2^-,7/2^-)$	2189.32	(3/2,5/2,7/2)
1439.8 *1*	369.0	2177.72	$5/2^{(+)}$	738.03	$7/2^-$
1443	48.0	3310.11	$(3/2,5/2)^+$	1865.73	$(3/2,5/2^+)$
[x]1487.8 *5*	2.7				
1509.7 *1*	20.7	1509.85	$7/2^+$	0	$3/2^+$
1550.0 *1*	22.9	1549.90	$3/2^+,5/2^+$	0	$3/2^+$
1559.9[df] *1*	15.9	3608.50	$(5/2^-,7/2^-)$	2048.5?	(9/2)
1590.4 *2*	10.6	3455.49	$(3/2^-)$	1865.73	$(3/2,5/2^+)$
[x]1605.7 *8*	2.6				
[x]1621.7 *5*	5.5				
[x]1713.3 *6*	3.2				
[x]1724.6 *2*	9.3				
[x]1750.0 *5*	2.0				
[x]1758.2[‡] *2*	10.2				
1783.7 *2*	12.6	2345.02	$(3/2^-)$	561.32	$1/2^+$
[x]1849.6 *8*	2.5				
1866.1[&] *1*	70.4	1865.73	$(3/2,5/2^+)$	0	$3/2^+$
[x]1889.2 *7*	3.0				
1905.9 *6*	3.9	3455.49	$(3/2^-)$	1549.90	$3/2^+,5/2^+$
[x]1950.8 *3*	10.0				
2057.9 *3*	10.7	3608.50	$(5/2^-,7/2^-)$	1549.90	$3/2^+,5/2^+$
2097.8 *5*	9.8	3608.50	$(5/2^-,7/2^-)$	1509.85	$7/2^+$
2102.3 *5*	9.8	3310.11	$(3/2,5/2)^+$	1206.94	$(5/2,7/2)^+$
2176.2 *7*	2.5	2177.72	$5/2^{(+)}$	0	$3/2^+$
2189.2 *3*	20.4	2189.32	(3/2,5/2,7/2)	0	$3/2^+$
2287.6[c] *2*	4.7	3264.18	$(3/2,5/2)^+$	975.31	$3/2^-$
2318.9 *2*	31.0	3057.00	$(5/2)^+$	738.03	$7/2^-$
2333.9 *2*	81.9	3310.11	$(3/2,5/2)^+$	975.31	$3/2^-$
2344.5 *2*	217.3	2345.02	$(3/2^-)$	0	$3/2^+$
2345	1.2	3455.49	$(3/2^-)$	1109.96	$3/2^+$
2401.8 *3*	2.8	3608.50	$(5/2^-,7/2^-)$	1206.94	$(5/2,7/2)^+$
2438.9 *5*	6.4	3646.1	$(3/2,5/2,7/2^+)$	1206.94	$(5/2,7/2)^+$
2479.9 *1*	65.5	3455.49	$(3/2^-)$	975.31	$3/2^-$
2506.7 *15*	1.0	3714.29	$(3/2^+,5/2^+)$	1206.94	$(5/2,7/2)^+$
2535.7 *7*	1.2	3646.1	$(3/2,5/2,7/2^+)$	1109.96	$3/2^+$
2603.4 *4*	0.9	3714.29	$(3/2^+,5/2^+)$	1109.96	$3/2^+$
2701.9 *5*	1.3	3264.18	$(3/2,5/2)^+$	561.32	$1/2^+$
2739.5 *7*	2.1	3714.29	$(3/2^+,5/2^+)$	975.31	$3/2^-$
2870.1 *2*	7.5	3608.50	$(5/2^-,7/2^-)$	738.03	$7/2^-$
2894.2 *2*	17.9	3455.49	$(3/2^-)$	561.32	$1/2^+$
[x]2976.2 *3*	2.8				
3264.3 *2*	14.7	3264.18	$(3/2,5/2)^+$	0	$3/2^+$
3309.9 *2*	7.4	3310.11	$(3/2,5/2)^+$	0	$3/2^+$
[x]3380.6 *7*	0.8				

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^{43}Ar β^- decay (5.37 min) 1978Hu10 (continued)

$\gamma(^{43}K)$ (continued)

E_γ	I_γ[e]	E_i(level)	J_i^π	E_f	J_f^π
3393.0 *2*	11.2	3393.14	$(3/2,5/2,7/2)^+$	0	$3/2^+$
3455.1 *4*	2.0	3455.49	$(3/2^-)$	0	$3/2^+$
3646.4 *5*	0.5	3646.1	$(3/2,5/2,7/2^+)$	0	$3/2^+$
3714.3 *2*	9.5	3714.29	$(3/2^+,5/2^+)$	0	$3/2^+$

† In coin with 1758γ.
‡ In coin with 587γ.
# From Adopted Gammas.
@ Level-energy difference=975.4 *1*.
& Level-energy difference=1865.6 *1*.
a Level-energy difference=1079.3 *2*.
b Level-energy difference=1235.0 *2*.
c Poor fit. Level-energy difference=2288.6 *2*.
d Placement (evaluator) based on 1560-1310 $\gamma\gamma$ coin.
e For absolute intensity per 100 decays, multiply by 0.034 *4*.
f Placement of transition in the level scheme is uncertain.
x γ ray not placed in level scheme.

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Decay Scheme

Intensities: I_γ per 100 parent decays

$^{43}_{19}K_{24}$