^{74}As ε decay (17.77 d) 1976Ha61,1972Va14,1969Ha28

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh, Ameenah R. Farhan	NDS 107, 1923 (2006)	30-Apr-2006

Parent: ^{74}As: E=0.0; $J^\pi=2^-$; $T_{1/2}$=17.77 d *2*; Q(ε)=2562.5 *17*; %ε+%$β^+$ decay=66 *2*

^{74}As-%ε+%$β^+$ decay: Deduced from ratios of $β^-$,$β^+$ intensities (1958Gr02) and Iγ's of γ's to g.s. in both ^{74}Ge and ^{74}Se. Also see comments above.

^{74}As decays 66% by ε+$β^+$ and 34% by $β^-$. See ^{74}As $β^-$ decay also.

Main references: 1976Ha61, 1972Va14, 1969Ha28, 1968Ku09. Others:

$β^+$: 1958Gr02, 1971Bo01, 1968Va13, 1965He08, 1957Sc23, 1951Jo06, 1950Me55, 1942El04, for theoretical computations see 1988Cr04, 1972Ma72, 1970Ko20, 1970Ko06, 1960Ko06.

$β^+$ spectra shapes: 1971Bo01, 1971De02 (theoretical analysis of results in 1971Bo01 and 1969De21). Others: 1958Gr02, 1951Jo06.

($β^+$)(γ)(θ): 1969De21, 1971De02 (theory), 1966Ha06, 1964Si12.

($β^+$)(γ): 1983PuZX, 1972MoZD, 1969De21, 1966Ha06, 1951Jo06.

($β^+$)(γ)(CP): 1983PuZX.

γ and/or γγ: 1976Ha61, 1972Va14, 1969Ha28, 1968Ku09. Others: 1975Ca37, 1972MoZD, 1970CoZU, 1969GuZV, 1968Da24, 1967Vi06, 1966St14, 1962Ei02, 1960Ya02, 1959Lo60, 1959Gi53, 1959Ho87, 1958Gr02, 1951Jo06, 1941De01.

γγ(θ): 1975Ca37, 1970CoZU, 1969Ha28, 1969Sc11, 1962Ei02, 1960Ya02.

γγ(θ,H,t): 1972BeWU.

γ(pol,θ,t): 1972Ka35.

ce: 1983Pa10, 1958Gr02. (ce)(γ)(t): 1959Ho87.

ε/$β^+$ ratio at 596 level: 1992BeZE.

$T_{1/2}$ and production: 1976Ha61, 1972Em01, 1964St08, 1962Ei02. Others: 1973ArZI, 1968Bo25, 1967Gl05, 1967De22, 1956Ru45, 1953Wa40, 1950Ho26, 1950Og11, 1950Me55, 1948Mo33, 1948Mc31, 1948Ho04, 1941De01, 1939Sa10, 1938Cu01.

^{74}Ge Levels

E(level)†	J^π‡	Comments
0.0	0^+	
595.86 *7*	2^+	g-factor=+0.46 *21* (1972BeWU). g-factor from (608γ)(596γ)(θ,H,t).
1204.36 *7*	2^+	
1463.6 *3*	4^+	
1482.81 *11*	0^+	
1696.97 *21*	$(3)^+$	
2197.89 *10*	2^+	

† From least-squares fit to Eγ's.

‡ From 'Adopted Levels'.

ε,$β^+$ radiations

E(decay)	E(level)	I$β^+$ †	Iε†	Log *ft*	I(ε+$β^+$)†	Comments
(364.6 *17*)	2197.89		0.051 *4*	8.28 *4*	0.051 *4*	εK=0.8773; εL=0.1032; εM+=0.01946
(865.5 *17*)	1696.97		0.0071 *18*	9.91 *11*	0.0071 *18*	εK=0.8807; εL=0.1004; εM+=0.01885
(1079.7 *17*)	1482.81		0.018 *3*	10.34^{1u} *8*	0.018 *3*	εK=0.8786; εL=0.1022; εM+=0.01920
(1098.9 *17*)	1463.6		0.0022 *10*	11.28^{1u} *20*	0.0022 *10*	εK=0.8787; εL=0.1021; εM+=0.01918
1422 *50*	1204.36	0.016 *1*	0.80 *4*	8.247 *22*	0.82 *4*	av Eβ=147.6 *8*; εK=0.8639; εL=0.09768; εM+=0.01832 E($β^+$)=400 *50* (from ($β^+$)(γ) 1972MoZD).
1962.9 *10*	595.86	26 *2*	33 *2*	6.96 *3*	59 *4*	av Eβ=408.0 *8*; εK=0.4868 *13*; εL=0.05480 *15*;

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ε,β+ radiations (continued)

E(decay)	E(level)	Iβ+ †	Iε†	Log *ft*	I(ε+β+)†	Comments

						εM+=0.01027 *3*
						E(β+)=940.9 *10* (1971Bo01). Others: 1958Gr02, 1951Jo06, 1950Me55, 1942El04, 1972MoZD.
						Iβ(596)/Iβ(g.s.)=180 *10*/24 *5* (1958Gr02). Other: 1951Jo06.
						Iε/Iβ=1.332 *46* (1976Ha61), 1.288 *16* (1971Bo01). Iε(K)/Iβ=1.20 *14* (1958Gr02).
						From γ- and x- ray spectra, ε/β+=1.31 *3*; ε(K)/β+=1.20 *21* (1992BeZE).
						For (944β+)(596γ) see 1983PuZX.
						For (941β+)(596γ)(θ) and associated A_2 values see 1969De21, 1971De02 and 1966Ha06.
						Spectral shape factors measured by 1971Bo01.

2556.0 *12*	0.0	3 *2*	3 *2*	9.7[1u] *3*	6 *4*	av Eβ=701.1 *8*; εK=0.3975 *9*; εL=0.04503 *10*; εM+=0.008446 *19* E(β+)=1534.0 *12* (1971Bo01). Others: 1958Gr02, 1951Jo06, 1972MoZD. (1958Gr02). Others: 1951Jo06, 1950Me55, 1942El04. Spectral shape factor suggest first forbidden unique transition (1971Bo01). Other: 1958Gr02. I(γ±)/I(596)=0.99 *6* (1969Ha28). Others: 1960Ya02, 1959Ho87, 1959Gi53, 1958Gr02.

† Absolute intensity per 100 decays.

γ(^{74}Ge)

Iγ normalization: Deduced from ratios of β−,β+ intensities (1958Gr02) and Iγ′s of γ′s to g.s. in both ^{74}Ge and ^{74}Se. Also see comments above.

The normalization of the decay schemes has been carried out by using relative intensities of 596γ, 635γ, 1204γ and the following ratios of experimental (1958Gr02) relative Iβ′s: I(1350β−)/I(717β−)=1.22 *10* (1958Gr02), I(1534β+)/I(941β+)=0.133 *28* (1958Gr02), I(1534β+)/I(717β−)=0.24 *5* (1958Gr02), I(1534β++941β+)I(596γ)=0.495 *30* (1969Ha28). For feeding to g.s. Iε/Iβ+=0.82 (theory for 1U transition).

E_γ†	I_γ‡#	E_i(level)	J_i^π	E_f	J_f^π	Mult.	δ	Comments
595.83 *8*	100 *5*	595.86	2+	0.0	0+			α(K)exp=0.0011 *2* (1958Gr02); ce(K)/ce(L+M)=8.0 *17* (1958Gr02).
608.43 *8*	0.93 *2*	1204.36	2+	595.86	2+	E2+M1	+3.4 *4*	(608γ)(596γ)(θ): A_2=−0.25 *2*, A_4=0.27 *4* (1975Ca37). Others: 1969Ha28, 1969Sc11, 1960Ya02. (608γ)(596γ)(θ,H,t): 1972BeWU. δ: from γγ(θ).
715.3 *2*	0.012 *4*	2197.89	2+	1482.81	0+			
734.2 *3*	0.006 *2*	2197.89	2+	1463.6	4+			γ reported by 1972Va14 only.
867.2 *7*	0.0077 *3*	1463.6	4+	595.86	2+			
887.0 *1*	0.043 *2*	1482.81	0+	595.86	2+			(887γ)(596γ)(θ): A_2=0.39 *4*, A_4=1.06 *11* (1975Ca37). Other: 1969Ha28.
993.46 *8*	0.031 *3*	2197.89	2+	1204.36	2+	[E2+M1]	−2.8 *2*	(993γ)(1204γ)(θ): A_2=0.18 *3*, A_4=0.33 *5* (1975Ca37); (993γ)(596γ)(θ): A_2=0.05 *2*, A_4=0.08 *4* (1975Ca37). δ: from γγ(θ).
1101.1 *2*	0.012 *3*	1696.97	(3)+	595.86	2+			
1204.35 *8*	0.48 *3*	1204.36	2+	0.0	0+			

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$\gamma(^{74}Ge)$ (continued)

E_γ [†]	I_γ [‡#]	E_i(level)	J_i^π	E_f	J_f^π	Comments
1482.6 [@]		1482.81	0^+	0.0	0^+	From ce and γ spectra, Ice(K)/Iγ(887γ)<5×10^{-5} (1983Pa10). This limit implies B(E0)/B(E2)<0.055 and monopole strength <0.35 (1983Pa10).
1602.5 *5*	0.012 *1*	2197.89	2^+	595.86	2^+	
2198.2 *3*	0.025 *3*	2197.89	2^+	0.0	0^+	

[†] Weighted averages of values from 1972Va14, 1969Ha28 and 1968Ku09.
[‡] Weighted averages of values from 1976Ha61, 1972Va14, 1969Ha28 and 1968Ku09.
[#] For absolute intensity per 100 decays, multiply by 0.594 *18*.
[@] Placement of transition in the level scheme is uncertain.

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Decay Scheme

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

Legend
- $I_\gamma < 2\% \times I_\gamma^{max}$
- $I_\gamma < 10\% \times I_\gamma^{max}$
- $I_\gamma > 10\% \times I_\gamma^{max}$
- γ Decay (Uncertain)