^{87}Y ε decay (79.8 h)

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	T. D. Johnson and W. D. Kulp(a)	NDS 129, 1 (2015)	27-Jul-2015

Parent: ^{87}Y: E=0.0; J^{π}=1/2$^-$; $T_{1/2}$=79.8 h *3*; Q(ε)=1861.7 *11*; %ε+%β^+ decay=100.0

1988AL01: Source preparation by $^{87}Sr(p,n)$ with E_p=18 MeV. Measured precise E_γ and relative I_γ; deduced ε branching.

1993Va03: Measured P_K to 873 level.

1984Pr01: Measured parent $T_{1/2}$ and relative I_γ.

1971Ja24: Measured E_γ and I_γ.

1970Kl02 and 1970Ca17: Measured α_K for both γ's.

1969Zo04: Measured parent $T_{1/2}$ and I_γ.

1969Cl11: Measured E_γ(388).

1967Mi13: Measured parent $T_{1/2}$ and β^+ spectrum.

1963Gr41: Measured K/L for 388 γ.

^{87}Sr Levels

Note that the level at 388 keV decays 99.70 *8%* by an isomeric transition to the ground state and 0.30 *8%* by ε+β+ decay to ^{87}Rb.

E(level)†	J^{π}‡	$T_{1/2}$	Comments
0.0	9/2$^+$		
388.5276 *23*	1/2$^-$	2.815 h *12*	$T_{1/2}$: from ^{87m}Sr decay.
873.338 *6*	3/2$^-$		

† From γ energies.
‡ From ^{87}Sr Adopted Levels.

ε,β^+ radiations

The decay to the ^{87}Sr ground state is unique third forbidden for which the log*ft* is expected to be about 21 (1998Si17) with a corresponding $I_{\varepsilon+\beta+}$ of 1.0x10^{-13}%.

E(decay)	E(level)	Iβ^+ †	Iε†	Log *ft*	I($\varepsilon+\beta^+$)†	Comments
(988.4 *11*)	873.338		93.4 *4*	5.444 *4*	93.4 *4*	εK=0.8729; εL=0.1043; εM+=0.02279 Iε: from from analysis of γ data (1988Al01); others: 97 from γ data (1971Ja24), 87.4 from decomposition of β^+ spectrum (1967Mi13). From the analysis of 1988Al01, the authors used %IT(388 level) = 99.70 *8*, Iγ(484γ)/Iγ(388γ)=1.093 *5*, α(388γ)=0.212 *2*, α(484γ)=0.00298, T1/2(^{87}Y)=79.8 h *3* and T1/2(^{87m}Sr=2.81 h *1*, all consistent with the present adopted values for these quantities. The measured P_K=0.91 *5* (1993Va03), which agrees with the theoretical value of 0.873.
(1473.2 *11*)	388.5276	0.18 *2*	6.4 *4*	6.96 *5*	6.6 *7*	av Eβ=200.41 *47*; εK=0.8499 *3*; εL=0.10056 *3*; εM+=0.021952 *6*

† Absolute intensity per 100 decays.

^{87}Y ε decay (79.8 h) (continued)

$\gamma(^{87}Sr)$

Iγ normalization: from the intensity of the 484 γ, the normalization factor is 93.4 / (113.3 x 1.0029), where the 113.3 would be the relative intensity of the 484 γ if the half-life of the 388 level were insignificant.

α(K)exp: are weighted average of values from 1970Kl02 and 1961Hu12, normalized to the 661 γ from the decay of ^{137}Cs. Other: 1970Ca17.

E_γ[†]	I_γ[#a]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[@]	δ[@]	α[&]	Comments
388.5276[‡] *23*	100	388.5276	1/2⁻	0.0	9/2⁺	M4		0.213	α(K)exp=0.168 *8* α(K)=0.181 *3*; α(L)=0.0266 *4*; α(M)=0.00456 *7* α(N)=0.000557 *8*; α(O)=3.13×10^{-5} *5*
484.805[‡] *5*	109.3 *5*	873.338	3/2⁻	388.5276	1/2⁻	M1(+E2)	<0.6	0.00298 *17*	α(K)exp=0.00260 *11* α(K)=0.00264 *15*; α(L)=0.000290 *18*; α(M)=4.9×10^{-5} *3* α(N)=6.1×10^{-6} *4*; α(O)=3.95×10^{-7} *20* I_γ: weighted average of 108.7 11 (1969Zo04), 110.0 5 (1984Pr01), and 108.8 5 (1988Al01); average gives a reduced-χ^2=1.62 and the external uncertainty has been adopted. This is the measured value at secular equilibrium, which is 0.966 times the value that would be observed if the 388 level had an insignificant half-life.

[†] From 1988Al01, on a scale where the strong ^{198}Au line has E_γ=411.8044 keV; if the energies of the reference lines are adjusted to those of the evaluation of 2000He14, the 388 and 484 energies would be lower by 4 and 3 eV, respectively.

[‡] The authors′ value has been corrected for the reference data in 200He14.

[#] Due to the significant half-life of the 388-keV level, the measured relative intensity of the two γ rays will vary with time and the secular equilibrium ratio is 1.0352 *2* times the relative intensity.

[@] From α_K(exp).

[&] Additional information 1.

[a] For absolute intensity per 100 decays, multiply by 0.822 *7*.

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Decay Scheme