

⁸⁹Mo ε decay (2.11 min) 1985Be12,1981Ga05,1983OxZZ

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh	NDS 114, 1 (2013)	20-Oct-2012

Parent: ⁸⁹Mo: E=0.0; J^π=(9/2⁺); T_{1/2}=2.11 min 10; Q(ε)=5635 27; %ε+%β⁺ decay=100.0

⁸⁹Mo-Q(ε): From 2011AuZZ. Other: 5650 30 (2003Au03).

1985Be12: ⁸⁹Mo produced by ^{92, 94, 96}Moxn). Measured γ, γγ.

1981Ga05: ⁸⁹Mo produced by ⁹²Mo(p,p3n). Measured G.

1983OxZZ: measured Eγ, Iγ, γγ.

Energy balance: total decay energy of 5706 keV 36 deduced (using RADLIST code) from proposed decay scheme is in agreement with the expected value of 5635 keV 27, suggesting that the decay scheme is reasonably complete. However, large Q value suggests that the decay scheme may not be well known.

⁸⁹Nb Levels

E(level) [†]	J ^π [‡]	T _{1/2} [‡]	Comments
0.0	(9/2 ⁺)	2.03 h 7	
<35	(1/2) ⁻	66 min 2	%ε+%β ⁺ =100
658.6 2	(7/2 ⁺)		
≈838? [@]			
844.0 5	(7/2,9/2,11/2)		
1155.2 3	(7/2,9/2,11/2)		
1272.0 3	(7/2,9/2,11/2)		
1640.2 10	(7/2,9/2,11/2)		
1694.0? [#] 5			
1789.6? [#] 10			
2221.0 10	(7/2,9/2,11/2)		
2420.0 10	(7/2,9/2,11/2)		

[†] From least-squares fit to Eγ data.

[‡] From Adopted Levels.

[#] From 1983OxZZ only.

[@] Level proposed by 1981Ga05 and 1983OxZZ.

ε,β⁺ radiations

ε+β⁺ branches and associated log ft values are considered as approximate since the decay scheme does not seem well established.

E(decay)	E(level)	Iβ ⁺ [†]	Iε [†]	Log ft	I(ε+β ⁺) [†]	Comments
(3.22×10 ³ 3)	2420.0	≈0.7	≈0.2	≈6.0	≈0.9	av Eβ=980 13; εK=0.167 6; εL=0.0200 7; εM+=0.00455 15
(3.41×10 ³ 3)	2221.0	≈1.0	≈0.18	≈6.0	≈1.2	av Eβ=1072 13; εK=0.134 4; εL=0.0161 5; εM+=0.00365 11
(3.85×10 ³ [‡] 3)	1789.6?	<1.4	<0.15	>6.2	<1.5	av Eβ=1274 13; εK=0.0861 23; εL=0.0103 3; εM+=0.00234 7
(3.94×10 ³ [‡] 3)	1694.0?	<0.91	<0.090	>6.4	<1.0	av Eβ=1318 13; εK=0.0786 21; εL=0.00941 25; εM+=0.00214 6
(3.99×10 ³ 3)	1640.2	≈0.91	≈0.086	≈6.5	≈1.0	av Eβ=1344 13; εK=0.0747 19; εL=0.00895 23; εM+=0.00203 6
(4.36×10 ³ 3)	1272.0	≈2.7	≈0.18	≈6.2	≈2.9	av Eβ=1518 13; εK=0.0540 13; εL=0.00646 15; εM+=0.00147 4
(4.48×10 ³ 3)	1155.2	≈1.8	≈0.11	≈6.5	≈1.9	av Eβ=1573 13; εK=0.0490 11; εL=0.00587 14; εM+=0.00133 3

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⁸⁹Mo ε decay (2.11 min) **1985Be12,1981Ga05,1983OxZZ (continued)**

ε,β⁺ radiations (continued)

E(decay)	E(level)	Iβ ⁺ †	Iε †	Log ft	I(ε+β ⁺) †	Comments
(4.79×10 ³ 3)	844.0	≈3.6	≈0.17	≈6.3	≈3.8	av Eβ=1721 13; εK=0.0384 8; εL=0.00459 10; εM+=0.001043 22
(4.80×10 ³ ‡ 3)	≈838?	<0.95	<0.05	>6.9	<1.0	av Eβ=1699 23; εK=0.0398 15; εL=0.00476 18; εM+=0.00108 5
(4.98×10 ³ 3)	658.6	≈4.3	≈0.17	≈6.4	≈4.5	av Eβ=1810 13; εK=0.0335 7; εL=0.00400 8; εM+=0.000909 18
(5.64×10 ³ 3)	0.0	≈81	≈2.0	≈5.4	≈83	av Eβ=2126 13; εK=0.0215 4; εL=0.00257 5; εM+=0.000583 10

† Absolute intensity per 100 decays.

‡ Existence of this branch is questionable.

γ(⁸⁹Nb)

I_γ normalization: from I_γ(γ[±])=95 3 (1985Be12). It is considered as approximate normalization since the level scheme does not seem well established and contribution of impurities in γ[±] intensity is not known from 1985Be12.

E _γ †	I _γ # @	E _i (level)	J _i ^π	E _f	J _f ^π	Comments
496.4 ‡ & 5	0.097 8	1155.2	(7/2,9/2,11/2)	658.6	(7/2 ⁺)	E _γ : from 1983OxZZ. Other: 658.5 5 (1985Be12). I _γ : I _γ =100 in 1983OxZZ normalized to 2.78 as in 1985Be12.
658.6 2	2.78 20	658.6	(7/2 ⁺)	0.0	(9/2 ⁺)	
803.0 & 10	0.43 2	≈838?		<35	(1/2) ⁻	E _γ : 803.3 5 (1983OxZZ), 803 (1981Ga05). I _γ : from 1983OxZZ. I _γ =0.31 (1981Ga05), <0.4 (1985Be12). γ not reported by 1983OxZZ.
844.0 5	1.80 18	844.0	(7/2,9/2,11/2)	0.0	(9/2 ⁺)	E _γ : from 1983OxZZ. Others: 1154.0 (1985Be12), 1155.1 (1981Ga05). I _γ : others: 0.97 3 (1983OxZZ), 0.81 (1981Ga05).
1035.4 ‡ & 3	0.46 2	1694.0?		658.6	(7/2 ⁺)	
1131 ‡ & 1	0.70 3	1789.6?		658.6	(7/2 ⁺)	E _γ : from 1983OxZZ. Others: 1272.6 (1985Be12), 1272.0 (1981Ga05). I _γ : from 1983OxZZ. Others: 1.80 16 (1985Be12), 1.31 (1981Ga05).
1155.3 3	0.88 9	1155.2	(7/2,9/2,11/2)	0.0	(9/2 ⁺)	
1272.0 3	1.38 4	1272.0	(7/2,9/2,11/2)	0.0	(9/2 ⁺)	
1640.2 10	0.47 15	1640.2	(7/2,9/2,11/2)	0.0	(9/2 ⁺)	
2221.0 10	0.57 15	2221.0	(7/2,9/2,11/2)	0.0	(9/2 ⁺)	
2420.0 10	0.44 15	2420.0	(7/2,9/2,11/2)	0.0	(9/2 ⁺)	

† From 1985Be12. Uncertainty=0.4-1.0 keV. The evaluator assigns ΔE=0.5 for I_γ>1, ΔE=0.5 and 1.0 for others.

‡ From 1983OxZZ only.

From 1985Be12.

@ For absolute intensity per 100 decays, multiply by ≈2.1.

& Placement of transition in the level scheme is uncertain.

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Decay Scheme

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)

Intensities: I_γ per 100 parent decays

