

¹⁴¹Eu ε decay (40.7 s) 1977De25

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	N. Nica	NDS 187,1 (2023)	12-Oct-2022

Parent: ¹⁴¹Eu: E=0.0; J^π=5/2⁺; T_{1/2}=40.7 s 7; Q(ε)=6008 14; %ε+%β⁺ decay=100

¹⁴¹Eu-Q(ε): From 2021Wa16.

Measured: γ, γγ, βγ, K x ray (1977De25,1989Gi06), β⁺ (1983Al06), γ, ce (1973VaYZ).

Level scheme is that of 1977De25.

Others: 1973WeZK, 1973HaWA.

%ε+%β⁺=73 5 to <2-keV levels of ¹⁴¹Sm (1989Gi06); 59 4 in 1977De25.

¹⁴¹Sm Levels

E(level)	J ^π †	T _{1/2} †	E(level)	J ^π †
0.0	1/2 ⁺	10.2 min 2	1083.45 16	≤5/2
1.58 4	3/2 ⁺		1160.5 4	
175.9 3	11/2 ⁻	22.6 min 2	1345.1 7	
384.46 11	3/2 ⁺		1521.7 5	
395.55 11	(5/2,3/2) ⁺		1530.4 4	
545.5 4	(7/2 ⁻)		1629.91 23	
594.71 13	(5/2 ⁺ ,3/2 ⁺)		1766.5 3	(3/2 ⁺ ,5/2 ⁺)
597.90 13	(3/2 ⁺ ,5/2 ⁺)		1895.13 22	
829.41 19	(7/2)		1956.3 6	
899.9 4	7/2 ⁻		2221.9 3	(3/2 ⁺ ,5/2 ⁺)
990.5 3			2290.4 5	
1001.44 18				

† Adopted values.

ε,β⁺ radiations

ε feedings were determined from the imbalance of I_γ feedings and measured %ε+%β⁺=73 5 to 1.58 level (1989Gi06, assuming no ε+β⁺ to g.s.).

ε/β⁺=0.22 2 and I_γ(394γ)=9% 2 (1989Gi06).

E(decay)	E(level)	Iβ ⁺ †	Iε †	Log ft	I(ε+β ⁺) †	Comments
(3718 14)	2290.4	0.14 5	0.13 5	6.52 17	0.27 10	av Eβ=1218.6 65; εK=0.398 4; εL=0.0572 5; εM+=0.01646 14
(3786 14)	2221.9	0.38 12	0.31 10	6.14 14	0.69 22	av Eβ=1250.1 65; εK=0.382 4; εL=0.0549 5; εM+=0.01580 14
(4052 14)	1956.3	0.06 3	0.03 2	7.16 25	0.09 5	av Eβ=1372.5 65; εK=0.326 3; εL=0.0467 4; εM+=0.01344 12
(4113 14)	1895.13	0.40 10	0.23 6	6.34 11	0.63 16	av Eβ=1400.7 65; εK=0.314 3; εL=0.0450 4; εM+=0.01295 12
(4242 14)	1766.5	0.41 11	0.21 6	6.41 12	0.62 17	av Eβ=1460.2 65; εK=0.2904 25; εL=0.0416 4; εM+=0.01197 11
(4378 14)	1629.91	0.32 8	0.15 4	6.59 12	0.47 12	av Eβ=1523.6 65; εK=0.2674 23; εL=0.0383 4; εM+=0.01102 10
(4478 14)	1530.4	0.09 3	0.039 12	7.20 14	0.13 4	av Eβ=1569.9 66; εK=0.2518 22; εL=0.0361 3; εM+=0.01037 9
(4486 14)	1521.7	0.12 4	0.050 15	7.09 13	0.17 5	av Eβ=1573.9 66; εK=0.2505 22; εL=0.0359 3; εM+=0.01032 9
(4663 14)	1345.1	0.20 7	0.072 24	6.96 15	0.27 9	av Eβ=1656.2 66; εK=0.2255 19; εL=0.0323 3; εM+=0.00928 8

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¹⁴¹Eu ε decay (40.7 s) **1977De25** (continued)

ε,β⁺ radiations (continued)

E(decay)	E(level)	Iβ ⁺ †	Iε [†]	Log ft	I(ε+β ⁺) [†]	Comments
(4848 14)	1160.5	0.37 15	0.12 5	6.79 18	0.49 20	av Eβ=1742.4 66; εK=0.2022 17; εL=0.02893 24; εM+=0.00832 7
(4925 14)	1083.45	0.50 12	0.15 4	6.70 11	0.65 16	av Eβ=1778.4 66; εK=0.1934 16; εL=0.02765 23; εM+=0.00795 7
(5007 14)	1001.44	0.86 23	0.24 7	6.50 12	1.1 3	av Eβ=1816.8 66; εK=0.1844 15; εL=0.02637 22; εM+=0.00758 7
(5018 14)	990.5	0.38 9	0.10 3	6.87 11	0.48 12	av Eβ=1822.0 66; εK=0.1833 15; εL=0.02620 22; εM+=0.00753 7
(5108 14)	899.9	0.25 8	0.064 21	7.10 14	0.31 10	av Eβ=1864.5 66; εK=0.1740 14; εL=0.02487 20; εM+=0.00715 6
(5179 14)	829.41	0.39 10	0.10 3	6.93 12	0.49 13	av Eβ=1897.6 66; εK=0.1672 14; εL=0.02389 19; εM+=0.00687 6
(5410 14)	597.90	1.7 4	0.35 9	6.41 11	2.0 5	av Eβ=2006.5 66; εK=0.1470 12; εL=0.02099 17; εM+=0.00603 5
(5413 14)	594.71	2.3 6	0.49 12	6.27 11	2.8 7	av Eβ=2008.0 66; εK=0.1468 12; εL=0.02095 17; εM+=0.00602 5
(5463 14)	545.5	0.51 19	0.10 4	6.95 17	0.61 23	av Eβ=2031.2 66; εK=0.1429 11; εL=0.02040 16; εM+=0.00586 5
(5613 14)	395.55	7.1 16	1.3 3	5.87 10	8.4 19	av Eβ=2101.9 67; εK=0.1317 10; εL=0.01880 15; εM+=0.00540 4
(5624 14)	384.46	5.9 14	1.1 3	5.95 11	7.0 17	av Eβ=2107.1 67; εK=0.1310 10; εL=0.01869 15; εM+=0.00537 4
5950 40	1.58	64 4	9.3 6	5.08 4	73 5	av Eβ=2288.3 67; εK=0.1073 8; εL=0.01529 11; εM+=0.00439 4 E(decay): from Eβ+=4925 40 (1983Al06). Other: Eβ+=4620 110 (1977De25).

† Absolute intensity per 100 decays.

γ(¹⁴¹Sm)

I_γ normalization: I(394γ)=9% 2 (1989Gi06). Other: I_γ(394γ)=14% 3 (1977De25).

E _γ	I _γ [#]	E _i (level)	J _i ^π	E _f	J _f ^π	Mult. [†]	α [‡]	Comments
(1.58 4)		1.58	3/2 ⁺	0.0	1/2 ⁺			E _γ ,ΔE: calculated by 1977De25 by observing five pairs of relatively intense non-coincident γ-rays, 384.5-382.9, 395.6-394.0, 594.7-593.1, 597.9-596.3 and 1083.6-1081.9 keV.
(174.2 3)		175.9	11/2 ⁻	1.58	3/2 ⁺			E _γ ,ΔE: the determination of 1.58 4 γ ray concomitantly determined this γ ray in 1977De25.
202.3 3	1.9 5	597.90	(3/2 ⁺ ,5/2 ⁺)	395.55	(5/2,3/2) ⁺			%I _γ =0.17 6
213.5 3	1.3 6	597.90	(3/2 ⁺ ,5/2 ⁺)	384.46	3/2 ⁺			%I _γ =0.12 6
234.6 3	0.63 12	829.41	(7/2)	594.71	(5/2 ⁺ ,3/2 ⁺)			%I _γ =0.057 17
354.4 3	1.6 4	899.9	7/2 ⁻	545.5	(7/2 ⁻)			%I _γ =0.14 5
369.5 2	18.0 13	545.5	(7/2 ⁻)	175.9	11/2 ⁻			%I _γ =1.6 4
382.9 2	33.0 23	384.46	3/2 ⁺	1.58	3/2 ⁺			%I _γ =3.0 7
384.5 2	61.7 37	384.46	3/2 ⁺	0.0	1/2 ⁺	M1	0.0422	%I _γ =5.6 13 α(K)=0.0359 5; α(L)=0.00493 7; α(M)=0.001057 15 α(N)=0.000240 4; α(O)=3.60×10 ⁻⁵ 5;

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¹⁴¹Eu ε decay (40.7 s) **1977De25** (continued)

γ(¹⁴¹Sm) (continued)

<u>E_γ</u>	<u>I_γ[#]</u>	<u>E_i(level)</u>	<u>J_i^π</u>	<u>E_f</u>	<u>J_f^π</u>	<u>Mult.[†]</u>	<u>α[‡]</u>	<u>Comments</u>
394.0 2	100	395.55	(5/2,3/2) ⁺	1.58	3/2 ⁺	M1	0.0396	α(P)=2.26×10 ⁻⁶ 4 Mult.: α(K)exp=0.031 10 (1973VaYZ). %I _γ =9.0 20 α(K)=0.0337 5; α(L)=0.00463 7; α(M)=0.000992 14 α(N)=0.000225 4; α(O)=3.38×10 ⁻⁵ 5; α(P)=2.12×10 ⁻⁶ 3 Mult.: α(K)exp=0.042 15 (1973VaYZ).
395.6 2	18.2 15	395.55	(5/2,3/2) ⁺	0.0	1/2 ⁺			%I _γ =1.6 4
395.8 3	1.8 4	990.5		594.71	(5/2 ⁺ ,3/2 ⁺)			%I _γ =0.16 5
433.9 2	6.3 6	829.41	(7/2)	395.55	(5/2,3/2) ⁺			%I _γ =0.57 14
593.1 2	32.8 25	594.71	(5/2 ⁺ ,3/2 ⁺)	1.58	3/2 ⁺			%I _γ =3.0 7
594.7 2	4.6 5	594.71	(5/2 ⁺ ,3/2 ⁺)	0.0	1/2 ⁺			%I _γ =0.41 10
596.3 2	5.6 5	597.90	(3/2 ⁺ ,5/2 ⁺)	1.58	3/2 ⁺			%I _γ =0.50 12
597.9 2	13.6 12	597.90	(3/2 ⁺ ,5/2 ⁺)	0.0	1/2 ⁺			%I _γ =1.22 29
605.9 2	10.5 12	1001.44		395.55	(5/2,3/2) ⁺			%I _γ =0.95 24
606.0 4	3.5 5	990.5		384.46	3/2 ⁺			%I _γ =0.31 8
687.8 3	2.1 3	1083.45	≤5/2	395.55	(5/2,3/2) ⁺			%I _γ =0.19 5
699.0 2	2.1 2	1083.45	≤5/2	384.46	3/2 ⁺			%I _γ =0.19 5
724.2 5	1.8 6	899.9	7/2 ⁻	175.9	11/2 ⁻			%I _γ =0.16 6
764.9 5	2.4 10	1160.5		395.55	(5/2,3/2) ⁺			%I _γ =0.22 10
776.0 6	3.0 15	1160.5		384.46	3/2 ⁺			%I _γ =0.27 15
799.6 6	3.0 7	1345.1		545.5	(7/2 ⁻)			%I _γ =0.27 9
^x 817.4 3	0.9 2							%I _γ =0.081 25
^x 882.9 2	8.1 7							%I _γ =0.73 17
893.6 5	0.9 2	1895.13		1001.44				%I _γ =0.081 25
935.7 3	1.4 3	1530.4		594.71	(5/2 ⁺ ,3/2 ⁺)			%I _γ =0.13 4
976.2 3	1.9 3	1521.7		545.5	(7/2 ⁻)			%I _γ =0.17 5
^x 990.0 5	1.6 3							%I _γ =0.14 4
^x 996.1 3	4.1 4							%I _γ =0.37 9
999.8 3	2.8 3	1001.44		1.58	3/2 ⁺			%I _γ =0.25 6
^x 1052.0 3	2.2 3							%I _γ =0.20 5
^x 1053.4 4	1.0 5							%I _γ =0.09 5
1081.9 3	2.1 3	1083.45	≤5/2	1.58	3/2 ⁺			%I _γ =0.19 5
1083.6 5	0.9 2	1083.45	≤5/2	0.0	1/2 ⁺			%I _γ =0.081 25
1234.4 3	2.0 4	1629.91		395.55	(5/2,3/2) ⁺			%I _γ =0.18 5
1245.4 3	3.2 5	1629.91		384.46	3/2 ⁺			%I _γ =0.29 8
1300.4 3	2.2 4	1895.13		594.71	(5/2 ⁺ ,3/2 ⁺)			%I _γ =0.20 6
1382.1 3	2.4 5	1766.5	(3/2 ⁺ ,5/2 ⁺)	384.46	3/2 ⁺			%I _γ =0.22 7
1392.4 5	1.5 4	2221.9	(3/2 ⁺ ,5/2 ⁺)	829.41	(7/2)			%I _γ =0.14 5
1510.7 3	3.9 7	1895.13		384.46	3/2 ⁺			%I _γ =0.35 10
1560.7 5	1.0 4	1956.3		395.55	(5/2,3/2) ⁺			%I _γ =0.09 4
1676.0 6	1.7 8	2221.9	(3/2 ⁺ ,5/2 ⁺)	545.5	(7/2 ⁻)			%I _γ =0.15 8
^x 1691.6 7	1.5 8							%I _γ =0.14 8
1744.9 4	3.0 9	2290.4		545.5	(7/2 ⁻)			%I _γ =0.27 10
1766.2 5	4.5 9	1766.5	(3/2 ⁺ ,5/2 ⁺)	0.0	1/2 ⁺			%I _γ =0.41 12
1826.6 4	2.6 12	2221.9	(3/2 ⁺ ,5/2 ⁺)	395.55	(5/2,3/2) ⁺			%I _γ =0.23 12
^x 1839.0 5	2.4 7							%I _γ =0.22 8
2221.6 6	1.9 7	2221.9	(3/2 ⁺ ,5/2 ⁺)	0.0	1/2 ⁺			%I _γ =0.17 7

[†] From α(K)exp.

[‡] Additional information 1.

^{141}Eu ε decay (40.7 s) **1977De25** (continued)

$\gamma(^{141}\text{Sm})$ (continued)

For absolute intensity per 100 decays, multiply by 0.09 2.

^x γ ray not placed in level scheme.

¹⁴¹Eu ε decay (40.7 s) 1977De25

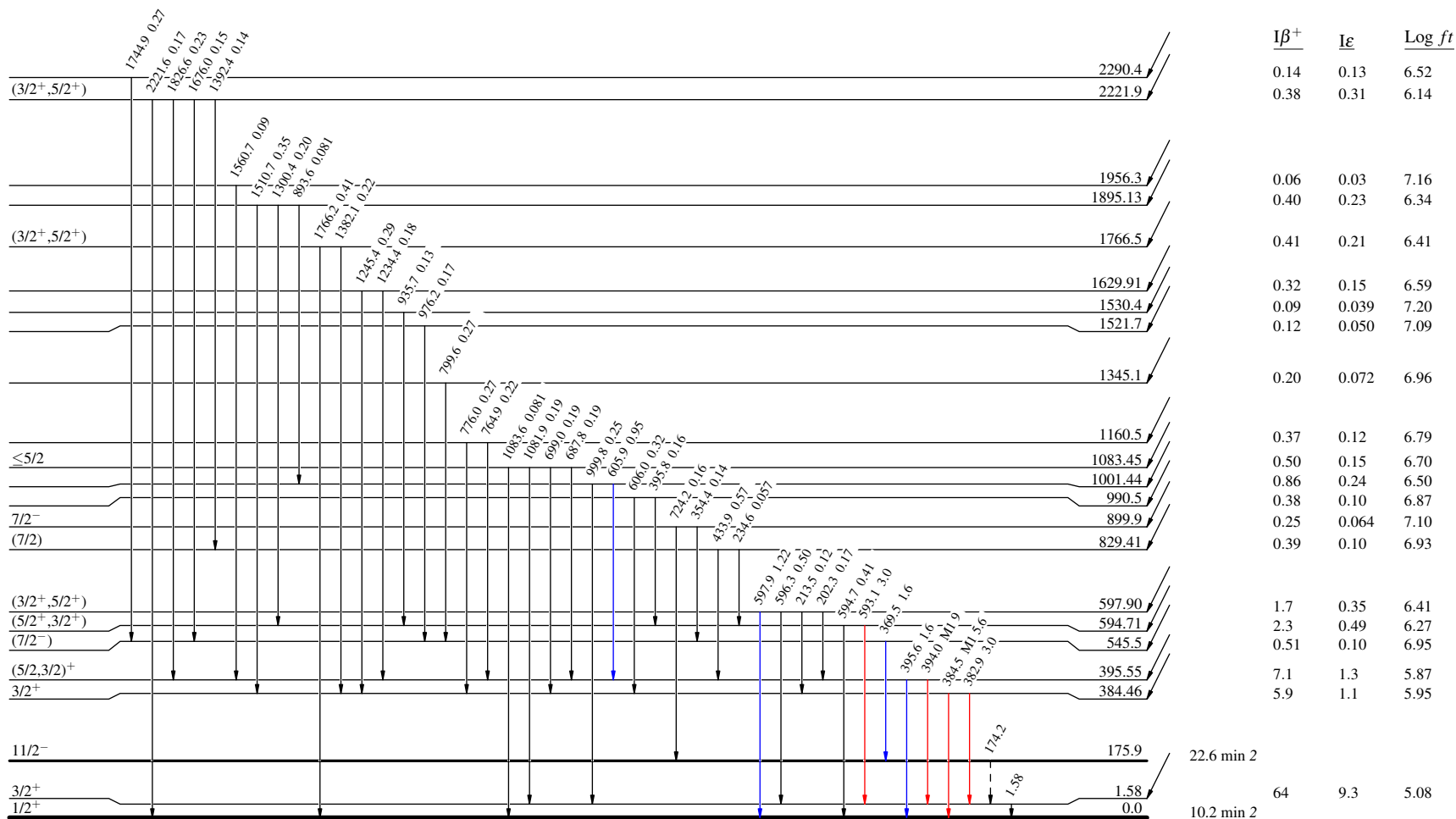
Decay Scheme

Intensities: I_γ per 100 parent decays

Legend

- I_γ < 2% × I_γ^{max}
- I_γ < 10% × I_γ^{max}
- I_γ > 10% × I_γ^{max}
- - - - - γ Decay (Uncertain)

5/2⁺ 0.0 40.7 s 7
 Q_ε=6008 14
¹⁴¹Eu₇₈



¹⁴¹Sm₇₉