

¹⁴¹Gd ε decay (24.5 s) 1989Gi06

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

Parent: ¹⁴¹Gd: E=377.76 9; J^π=11/2⁻; T_{1/2}=24.5 s 5; Q(ε)=6701 23; %ε+%β⁺ decay=89 2

¹⁴¹Gd-Q(ε): From 2021Wa16.

¹⁴¹Gd-%ε+%β⁺ decay: From 1989Gi06.

See comment in 14-s ¹⁴¹Gd ε decay.

Measured: γ, γγ, Xγ, ce (1989Gi06,1988TuZY,1988HaZL), γ (1986Re11,1988HaZL,1987Pi05).

All data are from 1989Gi06.

Additional information 1.

¹⁴¹Eu Levels

E(level) [†]	J ^π [‡]	T _{1/2} [‡]	E(level) [†]	J ^π [‡]
0.0	5/2 ⁺	40.7 s 7	837.05 11	9/2,11/2,13/2
96.46 7	11/2 ⁻	2.7 s 3	869.88 10	9/2,11/2,13/2 ⁽⁺⁾
320.36 13	9/2,11/2,13/2		923.15 10	11/2 ⁽⁻⁾ ,13/2
447.75 9	9/2,11/2,13/2		967.66 16	9/2,11/2,13/2
457.60 8	(9/2 ⁺)		1047.44 10	9/2,11/2,13/2 ⁽⁺⁾
622.45 13	15/2 ⁻		1072.65 11	(9/2 ⁺)
656.73 10	(9/2 ⁺)		1795.68 16	9/2,11/2,13/2 ⁽⁺⁾
671.65 11	13/2 ⁻		1820.45 12	9/2 ⁻ ,11/2,13/2 ⁽⁺⁾
749.36 13	9/2,11/2,13/2		2019.57 13	9/2 ⁽⁺⁾ ,11/2,13/2

[†] From least-squares fit to E_γ data (χ² norm=3.89 greater than χ² critical=2.18).

[‡] From Adopted Levels.

ε,β⁺ radiations

E(decay)	E(level)	Iβ ⁺ [†]	Iε [†]	Log ft	I(ε+β ⁺) [†]	Comments
(5059 23)	2019.57	1.8 5	0.52 14	5.99 12	2.3 6	av Eβ=1841 11; εK=0.1907 25; εL=0.0275 4; εM+=0.00795 11
(5258 23)	1820.45	1.1 4	0.28 10	6.29 16	1.4 5	av Eβ=1934 11; εK=0.1708 22; εL=0.0246 4; εM+=0.00711 10
(5283 23)	1795.68	1.4 5	0.34 12	6.21 16	1.7 6	av Eβ=1946 11; εK=0.1685 22; εL=0.0243 3; εM+=0.00702 9
(6006 23)	1072.65	1.4 3	0.22 5	6.52 11	1.6 4	av Eβ=2287 11; εK=0.1152 14; εL=0.01658 20; εM+=0.00479 6
(6031 23)	1047.44	1.8 5	0.28 8	6.41 13	2.1 6	av Eβ=2299 11; εK=0.1138 14; εL=0.01637 19; εM+=0.00473 6
(6111 23)	967.66	2.9 5	0.43 8	6.24 8	3.3 6	av Eβ=2337 11; εK=0.1094 13; εL=0.01573 19; εM+=0.00454 6
(6156 23)	923.15	3.9 8	0.57 11	6.12 9	4.5 9	av Eβ=2358 11; εK=0.1070 13; εL=0.01539 18; εM+=0.00444 5
(6209 23)	869.88	3.5 7	0.49 10	6.19 9	4.0 8	av Eβ=2383 11; εK=0.1042 12; εL=0.01499 17; εM+=0.00433 5
(6242 23)	837.05	4.0 7	0.55 10	6.15 8	4.5 8	av Eβ=2399 11; εK=0.1026 12; εL=0.01475 17; εM+=0.00426 5
(6329 23)	749.36	2.7 5	0.35 7	6.36 9	3.0 6	av Eβ=2440 11; εK=0.0983 11; εL=0.01414 16; εM+=0.00408 5
(6407 23)	671.65	6.7 13	0.84 17	5.99 9	7.5 15	av Eβ=2477 11; εK=0.0947 11; εL=0.01362 15; εM+=0.00393 5
(6422 23)	656.73	3.3 7	0.41 9	6.30 10	3.7 8	av Eβ=2484 11; εK=0.0941 11; εL=0.01352 15; εM+=0.00390 5
(6621 23)	457.60	2.5 9	0.28 10	6.49 16	2.8 10	av Eβ=2579 11; εK=0.0857 10; εL=0.01231 14; εM+=0.00355

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¹⁴¹Gd ε decay (24.5 s) **1989Gi06 (continued)**

ε,β⁺ radiations (continued)

E(decay)	E(level)	Iβ ⁺ †	Iε †	Log ft	I(ε+β ⁺) †	Comments
(6631 23)	447.75	7.0 18	0.79 20	6.05 12	7.8 20	4 av Eβ=2584 11; εK=0.0853 10; εL=0.01225 14; εM+=0.00354 4
(6758 23)	320.36	6.2 14	0.66 14	6.14 10	6.9 15	4 av Eβ=2644 11; εK=0.0804 9; εL=0.01155 13; εM+=0.00334 4
(6982 23)	96.46	28 14	2.7 13	5.56 21	31 15	4 av Eβ=2751 11; εK=0.0727 8; εL=0.01045 11; εM+=0.00302 4

† Absolute intensity per 100 decays.

γ(¹⁴¹Eu)

I_γ normalization: From ΣI(γ+ce) to g.s.=100 with I(γ+ce)(96γ) corrected for isomeric state branching.

E _γ	I _γ #	E _i (level)	J _i ^π	E _f	J _f ^π	Mult. †	α ‡	Comments
96.4 1	13 2	96.46	11/2 ⁻	0.0	5/2 ⁺	E3	46.3 7	%I _γ =1.84 5 α(K)=5.03 7; α(L)=31.6 5; α(M)=7.79 12 α(N)=1.734 26; α(O)=0.2298 35; α(P)=0.000472 7
223.9 1	72 7	320.36	9/2,11/2,13/2	96.46	11/2 ⁻			%I _γ =10.2 18
300.7 1	10 2	923.15	11/2 ⁽⁻⁾ ,13/2	622.45	15/2 ⁻			%I _γ =1.4 4
351.1 1	100 10	447.75	9/2,11/2,13/2	96.46	11/2 ⁻			%I _γ =14.2 26
361.2 1	42 4	457.60	(9/2 ⁺)	96.46	11/2 ⁻	[E1]	0.00967 14	%I _γ =5.9 11 α(K)=0.00825 12; α(L)=0.001120 16; α(M)=0.0002403 34 α(N)=5.47×10 ⁻⁵ 8; α(O)=8.54×10 ⁻⁶ 12; α(P)=7.93×10 ⁻⁷ 11
389.2 1	14 2	837.05	9/2,11/2,13/2	447.75	9/2,11/2,13/2			%I _γ =2.0 4
412.2 1	13 2	869.88	9/2,11/2,13/2 ⁽⁺⁾	457.60	(9/2 ⁺)			%I _γ =1.8 4
457.6 1	9 2	457.60	(9/2 ⁺)	0.0	5/2 ⁺	[E2]	0.01698 24	%I _γ =1.27 34 α(K)=0.01378 19; α(L)=0.002507 35; α(M)=0.000554 8 α(N)=0.0001254 18; α(O)=1.897×10 ⁻⁵ 27; α(P)=1.360×10 ⁻⁶ 19
475.4 1	13 2	923.15	11/2 ⁽⁻⁾ ,13/2	447.75	9/2,11/2,13/2			%I _γ =1.8 4
^x 487.5 1	12 2							%I _γ =1.7 4
526.0 2	19 5	622.45	15/2 ⁻	96.46	11/2 ⁻	E2	0.01171 16	%I _γ =2.7 8 α(K)=0.00961 13; α(L)=0.001648 23; α(M)=0.000362 5 α(N)=8.22×10 ⁻⁵ 12; α(O)=1.253×10 ⁻⁵ 18; α(P)=9.61×10 ⁻⁷ 13
^x 544.3 1	5 2							%I _γ =0.71 30
^x 557.5 1	25 2							%I _γ =3.5 6

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¹⁴¹Gd ε decay (24.5 s) **1989Gi06** (continued)

γ(¹⁴¹Eu) (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>
560.5 1	27 3	656.73	(9/2 ⁺)	96.46	11/2 ⁻			%I _γ =3.8 7
574.9 1	57 6	671.65	13/2 ⁻	96.46	11/2 ⁻	M1+E2	0.0129 35	%I _γ =8.1 15 α(K)=0.0108 31; α(L)=0.00159 32; α(M)=0.00035 7 α(N)=7.9×10 ⁻⁵ 15; α(O)=1.24×10 ⁻⁵ 26; α(P)=1.1×10 ⁻⁶ 4
590.0 1	13 2	1047.44	9/2,11/2,13/2 ⁽⁺⁾	457.60	(9/2 ⁺)			%I _γ =1.8 4
599.6 1	12 2	1047.44	9/2,11/2,13/2 ⁽⁺⁾	447.75	9/2,11/2,13/2			%I _γ =1.7 4
647.3 1	23 2	967.66	9/2,11/2,13/2	320.36	9/2,11/2,13/2			%I _γ =3.3 6
652.9 1	21 2	749.36	9/2,11/2,13/2	96.46	11/2 ⁻			%I _γ =3.0 5
657.0 2	4 2	656.73	(9/2 ⁺)	0.0	5/2 ⁺			%I _γ =0.57 30
^x 700.6 1	8 2							%I _γ =1.13 33
740.7 1	18 2	837.05	9/2,11/2,13/2	96.46	11/2 ⁻			%I _γ =2.5 5
^x 746.4 1	7 2							%I _γ =0.99 32
773.5 1	15 2	869.88	9/2,11/2,13/2 ⁽⁺⁾	96.46	11/2 ⁻			%I _γ =2.1 4
826.7 1	9 2	923.15	11/2 ⁽⁻⁾ ,13/2	96.46	11/2 ⁻			%I _γ =1.27 34
^x 841.4 1	7 2							%I _γ =0.99 32
^x 864.4 1	6 2							%I _γ =0.85 31
972.2 1	10 2	2019.57	9/2 ⁽⁺⁾ ,11/2,13/2	1047.44	9/2,11/2,13/2 ⁽⁺⁾			%I _γ =1.4 4
976.2 1	9 2	1072.65	(9/2 ⁺)	96.46	11/2 ⁻			%I _γ =1.27 34
^x 1036.4 1	4 2							%I _γ =0.57 30
1072.6 2	2 1	1072.65	(9/2 ⁺)	0.0	5/2 ⁺			%I _γ =0.28 15
^x 1097.6 1	12 2							%I _γ =1.7 4
1148.5 1	5 2	1820.45	9/2 ⁻ ,11/2,13/2 ⁽⁺⁾	671.65	13/2 ⁻			%I _γ =0.71 30
1164.0 1	5 2	1820.45	9/2 ⁻ ,11/2,13/2 ⁽⁺⁾	656.73	(9/2 ⁺)			%I _γ =0.71 30
^x 1172.2 1	6 2							%I _γ =0.85 31
1338.0 2	6 3	1795.68	9/2,11/2,13/2 ⁽⁺⁾	457.60	(9/2 ⁺)			%I _γ =0.8 4
1348.0 2	6 2	1795.68	9/2,11/2,13/2 ⁽⁺⁾	447.75	9/2,11/2,13/2			%I _γ =0.85 31
^x 1397.2 2	9 2							%I _γ =1.27 34
1922.8 2	6 2	2019.57	9/2 ⁽⁺⁾ ,11/2,13/2	96.46	11/2 ⁻			%I _γ =0.85 31

[†] Adopted values.

[‡] [Additional information 2.](#)

[#] For absolute intensity per 100 decays, multiply by 0.142 22.

^x γ ray not placed in level scheme.

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Decay Scheme

Legend

Intensities: I_γ per 100 parent decays

- I_γ < 2% × I_γ^{max}
- I_γ < 10% × I_γ^{max}
- I_γ > 10% × I_γ^{max}

11/2⁻ 377.76 24.5 s 5
 Q_ε=6701.23
¹⁴¹Gd₇₇

