

Adopted Levels, Gammas

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	E. Browne, J. K. Tuli		NDS 145, 25 (2017)	1-Jul-2017

Q(β^-)=4715 16; S(n)=4405 14; S(p)=12615 13; Q(α)=-4926 12 2017Wa10

Additional information 1.

Fission yield=4.419 438% for ²³⁹Pu(n,F) E=thermal (2011Ba33).

⁹⁹Zr Levels

Cross Reference (XREF) Flags

A	⁹⁹ Y β^- decay (1.484 s)	D	²³⁸ U(α ,F γ)
B	¹⁰⁰ Y β^- n decay (735 ms)	E	²⁵² Cf SF decay
C	²⁴⁸ Cm SF decay		

E(level) [†]	J π [‡]	T _{1/2}	XREF	Comments
0.0	(1/2 ⁺)	2.1 s 1	ABCDE	% β^- =100 μ =-0.930 4 J π : From systematics of J π =1/2 ⁺ in nuclei with N=59, such as ¹⁰¹ Mo, ⁹⁷ Sr, ⁹⁵ Kr, and ⁹³ Se. T _{1/2} : from 1979Se01. Others: 2.0 s 2, 1.8 s 3 (1972Tr08), 2.5 s 1, 2.1 s 1, 2.8 s 3 (1970Ei02). μ : Resonance cell laser spectroscopy (2003Th03, 2005St24). J π : γ 122 M1 to (1/2 ⁺), log ft>5.9 from (5/2 ⁺). T _{1/2} : from 1990OhZT. Others: 0.9 ns 1 (1989Lh01); 1.1 ns 2 (1987KaZV,1986SiZY).
121.74 7	(3/2 ⁺)	1.07 ns 3	ABCDE	μ =+0.42 6 J π : γ 122 M1 to (1/2 ⁺), log ft>5.9 from (5/2 ⁺). T _{1/2} : from 1990OhZT. Others: 0.9 ns 1 (1989Lh01); 1.1 ns 2 (1987KaZV,1986SiZY).
251.96 9	(7/2 ⁺)	293 ns 10	A CDE	μ : Integral perturbed angular correlation (1995Wo01, 2005St24). J π : γ 130 (E2) to (3/2 ⁺). Systematics of J π =7/2 ⁺ in neighboring nuclei with N=59. T _{1/2} : from $\gamma\gamma$ (t) in ⁹⁹ Y β^- Decay (1986SiZY); 292 ns 20 from $\beta\gamma$ (t) (1979Se01). Other: 400 ns 80 (1970Gr38); 400 ns 20 (1999Ge01); 316 ns 48 (2005Hw06, 2004Hw02).
575.69 7	(3/2 ⁺)	0.33 ns 2	A C E	J π : γ 324 to (7/2 ⁺), γ 576 to (1/2 ⁺). T _{1/2} : from 1990OhZT.
614.14 & 11	(3/2 ⁻)	7.0 ns 9	A CDE	J π : γ 614 to (1/2 ⁺). No other γ ray observed from this level. T _{1/2} : From β^- decay (2005Lh01). Other value: 6.9 ns 12 (1997Lh02). Other: 1997Lh01.
657.90 # 8	(3/2 ⁺)		A CDE	J π : γ 658 to (1/2 ⁺), γ 406 to (7/2 ⁺).
667.48 a 11	(5/2 ⁻)	2.6 ns 14	A CDE	J π : γ 53 (M1) to (3/2 ⁻), γ 416 to (7/2 ⁺). T _{1/2} : From β^- decay (2005Lh01, 1997Lh02). Other: 1997Lh01.
678.55 & 14	(7/2 ⁻)	8.9 ns 12	A CDE	J π : γ 64 E2 to (3/2 ⁻), γ 427 to (7/2 ⁺). T _{1/2} : From β^- decay (2005Lh01, 1997Lh02). Other: 10.2 ns 15 (1979Se01).
724.50 9	(3/2 ⁺ ,5/2 ⁺)		A	J π : γ 724 to (1/2 ⁺), γ 473 to (7/2 ⁺).
761.68 10	(3/2 ⁺ ,5/2 ⁺)		A	J π : From γ decay.
782.24 11	(3/2 ⁺)		A	J π : γ 661 to (3/2 ⁺), γ 782 to (1/2 ⁺). Even parity from systematics of J π =3/2 ⁺ in neighboring nuclei.
821.63 & 24	(11/2 ⁻)		A CDE	J π : γ 143 to (7/2 ⁻).
850.49 @ 16	(5/2 ⁺)		A CDE	J π : γ 193 to (3/2 ⁺).
852.12 9	(5/2 ⁺)	0.04 ns 1	A C	J π : γ 238 to (3/2 ⁻), γ 600 to (7/2 ⁺). T _{1/2} : From 1990OhZT.
867.77 a 22	(9/2 ⁻)		A CD	J π : γ 189 M1 to (7/2 ⁻), γ 200 E2 to (5/2 ⁻), γ 46 to (11/2 ⁻).
885.08 15			A	
958.73 15			A	

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Adopted Levels, Gammas (continued)

^{99}Zr Levels (continued)				
E(level) [†]	J ^π [‡]	T _{1/2}	XREF	Comments
1005.50 13			A	
1038.5 ^b 5	(9/2 ⁺)	54 ns 10	CD	T _{1/2} : From 2003Ur01 in ^{248}Cm SF decay. J ^π : 381γ reported in 2003Ur01 decaying to 658 level is inconsistent with adopted J ^π values.
1051.14 18			A	
1064.74 14	(3/2 ⁺)		A	J ^π : From γ decay.
1065.86 [#] 21	(7/2 ⁺)		A CD	J ^π : γ408 to (3/2 ⁺), γ814 to (7/2 ⁺).
1079.09 12	(3/2 ⁺ , 5/2 ⁺)		A	J ^π : γ827 to (7/2 ⁺), γ1079 to (1/2 ⁺).
1090.3 11	(13/2 ⁻)		C	
1146.48 18			A	
1154.2 4			A	
1230.32 17			A	
1236.6 ^{&} 11	(15/2 ⁻)		CDE	
1255.9 ^b 3	(11/2 ⁺)		A CD	J ^π : γ1003 to (7/2 ⁺), γ218 to (9/2 ⁺).
1277.2? 4			A	
1279.5? ^a 8	(13/2 ⁻)		CD	
1322.8 [@] 7	(9/2 ⁺)		CD	
1326.7? 4			A	
1433.08 18			A	
1444.9 4			A	
1507.4 ^b 7	(13/2 ⁺)		CD	
1585.5 [#] 8	(11/2 ⁺)		CD	
1587.82 11			A E	Additional information 2.
1670.3? 4			A	
1699.61 22			A	
1716.09 24			A	
1790.7 ^b 8	(15/2 ⁺)		CD	E(level): level from 2003Ur01.
1802.6 ^{&} 15	(19/2 ⁻)	5.43 ps 74	CDE	T _{1/2} : From 2012Sm02 in ^{248}Cm SF decay.
1834.30 23			A	Additional information 3.
1883.5? ^a 13	(17/2 ⁻)		CD	
1892.8 [@] 12	(13/2 ⁺)		CD	
1925.1? 3			A	
2079.2 3			A	
2104.6 ^b 9	(17/2 ⁺)		CD	
2209.7 [#] 13	(15/2 ⁺)		CD	
2296.9 3			A	
2400.68 16	(3/2 ⁺ , 5/2 ⁺)		A	J ^π : γ1787 to (3/2 ⁻), γ1743 to (5/2 ⁺), γ1733 to (5/2 ⁻).
2447.1 ^b 11	(19/2 ⁺)		D	
2448.50 19			A	Additional information 4.
2484.2 7			A	
2516.7 ^{&} 18	(23/2 ⁻)	1.59 ps 22	CDE	T _{1/2} : From 2012Sm02.
2556.8 [@] 16	(17/2 ⁺)		CD	
2657.5 ^a 16	(21/2 ⁻)		D	
2816.9 ^b 12	(21/2 ⁺)		D	
2935.7 [#] 17	(19/2 ⁺)		D	
3215.1 ^b 15	(23/2 ⁺)		D	
3301.8 [@] 19	(21/2 ⁺)		D	
3360.7 ^{&} 21	(27/2 ⁻)		CDE	
3583.5 ^a 19	(25/2 ⁻)		D	
3638.9 ^b 16	(25/2 ⁺)		D	

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Adopted Levels, Gammas (continued) ^{99}Zr Levels (continued)

E(level) [†]	J ^π [‡]	XREF	E(level) [†]	J ^π [‡]	XREF	E(level) [†]	J ^π [‡]	XREF
3754.7 [#] 19	(23/2 ⁺)	D	4320.7 ^{&} 23	(31/2 ⁻)	DE	5391.8 ^{&} 25	(35/2 ⁻)	D
4090.1 ^b 18	(27/2 ⁺)	D	4627.5 ^a 22	(29/2 ⁻)	D	5734.5 ^a 24	(33/2 ⁻)	D
4134.8 [@] 21	(25/2 ⁺)	D	5041.8 [@] 24	(29/2 ⁺)	D	6567 ^{&} 3	(39/2 ⁻)	D

[†] Deduced by evaluators from least-squares fit to γ -ray energies.

[‡] Spin/parity and configuration assignments are based on rotational band structure, except as noted. Some assignments to specific configurations are given individually.

[#] Band(A): Band based on 3/2⁺, $\alpha=-1/2$.

[@] Band(a): Band based on 5/2⁺, $\alpha=+1/2$.

[&] Band(B): Band based on 3/2⁻, $\alpha=-1/2$.

^a Band(b): Band based on 5/2⁻, $\alpha=+1/2$.

^b Band(C): 9/2[404] band.

 $\gamma(^{99}\text{Zr})$

$E_i(\text{level})$	J_i^{π}	$E_{\gamma}^{\dagger}$	$I_{\gamma}^{\dagger}$	E_f	J_f^{π}	Mult. [#]	$\alpha^{\text{@}}$	Comments
121.74	(3/2 ⁺)	121.7 1	100	0.0	(1/2 ⁺)	M1	0.1179	$\alpha(\text{K})=0.1035$ 15; $\alpha(\text{L})=0.01200$ 17; $\alpha(\text{M})=0.00209$ 3 $\alpha(\text{N})=0.000295$ 5; $\alpha(\text{O})=2.04\times 10^{-5}$ 3 B(M1)(W.u.)=0.0102 3
251.96	(7/2 ⁺)	130.2 1	100	121.74	(3/2 ⁺)	E2	0.425	$\alpha(\text{K})=0.358$ 6; $\alpha(\text{L})=0.0555$ 8; $\alpha(\text{M})=0.00969$ 14 $\alpha(\text{N})=0.001293$ 19; $\alpha(\text{O})=5.99\times 10^{-5}$ 9 B(E2)(W.u.)=1.33 5
575.69	(3/2 ⁺)	323.8 3 454.0 1 575.7 1	4.1 6 57 7 100 19	251.96 (7/2 ⁺) 121.74 (3/2 ⁺) 0.0 (1/2 ⁺)				
614.14	(3/2 ⁻)	614.2 2	100	0.0 (1/2 ⁺)				
657.90	(3/2 ⁺)	82.2 ^{&} 2	3.2 10	575.69 (3/2 ⁺)	[M1,E2]	1.31 96		$\alpha(\text{K})=1.07$ 76; $\alpha(\text{L})=0.20$ 17; $\alpha(\text{M})=0.035$ 30 $\alpha(\text{N})=0.0046$ 38; $\alpha(\text{O})=1.7\times 10^{-4}$ 12
667.48	(5/2 ⁻)	405.9 2 536.2 1 658.0 4	18.8 25 100 13 3.4 5	251.96 (7/2 ⁺) 121.74 (3/2 ⁺) 0.0 (1/2 ⁺)	(M1)	1.208		$\alpha(\text{K})=1.058$ 16; $\alpha(\text{L})=0.1248$ 19; $\alpha(\text{M})=0.0217$ 4 $\alpha(\text{N})=0.00307$ 5; $\alpha(\text{O})=0.000209$ 4 B(M1)(W.u.)=0.015 9
		91.7 2	54 17	575.69 (3/2 ⁺)	[E1]	0.1463 23		$\alpha(\text{K})=0.1288$ 20; $\alpha(\text{L})=0.01463$ 23; $\alpha(\text{M})=0.00252$ 4 $\alpha(\text{N})=0.000350$ 6; $\alpha(\text{O})=2.20\times 10^{-5}$ 4 B(E1)(W.u.)=2.2 $\times 10^{-5}$ 15
678.55	(7/2 ⁻)	415.6 2 546.0 3 (11.1) (20.7) 64.4 1	71 9 27 5 29 7	251.96 (7/2 ⁺) 121.74 (3/2 ⁺) 667.48 (5/2 ⁻) 657.90 (3/2 ⁺) 614.14 (3/2 ⁻)	E2	5.46		$\alpha(\text{K})=4.20$ 7; $\alpha(\text{L})=1.052$ 17; $\alpha(\text{M})=0.185$ 3 $\alpha(\text{N})=0.0236$ 4; $\alpha(\text{O})=0.000635$ 10 B(E2)(W.u.)=2.1 $\times 10^2$ 7

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Adopted Levels, Gammas (continued)

$\gamma(^{99}\text{Zr})$ (continued)								
$E_i(\text{level})$	J_i^π	$E_\gamma^\dagger$	$I_\gamma^\dagger$	E_f	J_f^π	Mult.#	$\alpha^@$	Comments
678.55	(7/2 ⁻)	426.7 3	100 17	251.96	(7/2 ⁺)			
724.50	(3/2 ⁺ ,5/2 ⁺)	66.6 1	1.5 3	657.90	(3/2 ⁺)	[M1]	0.637	$\alpha(\text{K})=0.558$ 9; $\alpha(\text{L})=0.0656$ 10; $\alpha(\text{M})=0.01143$ 17 $\alpha(\text{N})=0.001613$ 24; $\alpha(\text{O})=0.0001103$ 17
		149.0 2	0.92 11	575.69	(3/2 ⁺)	[M1,E2]	0.164 96	$\alpha(\text{K})=0.140$ 81; $\alpha(\text{L})=0.020$ 13; $\alpha(\text{M})=0.0034$ 23 $\alpha(\text{N})=4.7\times 10^{-4}$ 30; $\alpha(\text{O})=2.5\times 10^{-5}$ 13
		472.7 2	5.1 9	251.96	(7/2 ⁺)			
		602.7 2	43 6	121.74	(3/2 ⁺)			
		724.4 2	100 11	0.0	(1/2 ⁺)			
761.68	(3/2 ⁺ ,5/2 ⁺)	186.1 2	10.0 10	575.69	(3/2 ⁺)	[M1,E2]	0.077 40	$\alpha(\text{K})=0.067$ 34; $\alpha(\text{L})=0.0087$ 50; $\alpha(\text{M})=0.00152$ 86 $\alpha(\text{N})=2.1\times 10^{-4}$ 12; $\alpha(\text{O})=1.19\times 10^{-5}$ 55
		509.6 2	8.8 12	251.96	(7/2 ⁺)			
		639.9 2	100 14	121.74	(3/2 ⁺)			
		761.6 5	25 5	0.0	(1/2 ⁺)			
782.24	(3/2 ⁺)	660.6 2	8.2 12	121.74	(3/2 ⁺)			
		782.3 2	100 9	0.0	(1/2 ⁺)			
821.63	(11/2 ⁻)	143.0 3	100	678.55	(7/2 ⁻)	E2	0.302	$\alpha(\text{K})=0.256$ 4; $\alpha(\text{L})=0.0382$ 7; $\alpha(\text{M})=0.00666$ 11 $\alpha(\text{N})=0.000893$ 15; $\alpha(\text{O})=4.33\times 10^{-5}$ 7
850.49	(5/2 ⁺)	192.7 2	100 13	657.90	(3/2 ⁺)	[M1,E2]	0.068 35	$\alpha(\text{K})=0.059$ 29; $\alpha(\text{L})=0.0077$ 43; $\alpha(\text{M})=0.00134$ 74 $\alpha(\text{N})=1.8\times 10^{-4}$ 10; $\alpha(\text{O})=1.07\times 10^{-5}$ 48
		274.9 3	34 5	575.69	(3/2 ⁺)			
852.12	(5/2 ⁺)	90.4 1	17 3	761.68	(3/2 ⁺ ,5/2 ⁺)	[M1]	0.268	$\alpha(\text{K})=0.235$ 4; $\alpha(\text{L})=0.0275$ 4; $\alpha(\text{M})=0.00479$ 7 $\alpha(\text{N})=0.000677$ 10; $\alpha(\text{O})=4.65\times 10^{-5}$ 7 B(M1)(W.u.)=0.037 12
		127.6 2	6.3 9	724.50	(3/2 ⁺ ,5/2 ⁺)	[M1,E2]	0.28 18	$\alpha(\text{K})=0.24$ 15; $\alpha(\text{L})=0.035$ 25; $\alpha(\text{M})=0.0062$ 44 $\alpha(\text{N})=8.3\times 10^{-4}$ 57; $\alpha(\text{O})=4.1\times 10^{-5}$ 24
		194.1 2	81 9	657.90	(3/2 ⁺)			
		238.2 2	6.9 9	614.14	(3/2 ⁻)			
		276.6 2	71 9	575.69	(3/2 ⁺)			
		600.1 2	100 15	251.96	(7/2 ⁺)			
		730.4 2	53 8	121.74	(3/2 ⁺)			
867.77	(9/2 ⁻)	46.1 2	17 6	821.63	(11/2 ⁻)	[M1,E2]	9.9 81	$\alpha(\text{K})=7.0$ 54; $\alpha(\text{L})=2.4$ 23; $\alpha(\text{M})=0.43$ 40 $\alpha(\text{N})=0.054$ 49; $\alpha(\text{O})=0.00106$ 74
		189.3 3	100 10	678.55	(7/2 ⁻)	M1	0.0360	$\alpha(\text{K})=0.0317$ 5; $\alpha(\text{L})=0.00363$ 6; $\alpha(\text{M})=0.000631$ 10 $\alpha(\text{N})=8.94\times 10^{-5}$ 13; $\alpha(\text{O})=6.22\times 10^{-6}$ 9
		200.3 3	52 10	667.48	(5/2 ⁻)	E2	0.0893	$\alpha(\text{K})=0.0769$ 12; $\alpha(\text{L})=0.01032$ 16; $\alpha(\text{M})=0.00180$ 3 $\alpha(\text{N})=0.000245$ 4; $\alpha(\text{O})=1.348\times 10^{-5}$ 21

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Adopted Levels, Gammas (continued)

$\gamma(^{99}\text{Zr})$ (continued)						
$E_i(\text{level})$	J_i^π	E_γ	I_γ	E_f	J_f^π	Comments
885.08		309.6 2	32 5	575.69	(3/2 ⁺)	
		885.2 3	1.0×10 ² 3	0.0	(1/2 ⁺)	
958.73		234.4 3	7.8 22	724.50	(3/2 ⁺ , 5/2 ⁺)	
		301.0 3	7.4 18	657.90	(3/2 ⁺)	
		706.7 2	100 13	251.96	(7/2 ⁺)	
		836.8 3	10.9 22	121.74	(3/2 ⁺)	
1005.50		347.8 2	17.6 24	657.90	(3/2 ⁺)	
		391.4 4	3.3 10	614.14	(3/2 ⁻)	
		429.7 3	14.8 19	575.69	(3/2 ⁺)	
		883.6 2	57 8	121.74	(3/2 ⁺)	
		1005.5 3	100 12	0.0	(1/2 ⁺)	
1038.5	(9/2 ⁺)	188.5 [‡]	48 [‡] 4	850.49	(5/2 ⁺)	
		360.1 [‡]	88 [‡] 6	678.55	(7/2 ⁻)	
		786.8 [‡]	100 [‡] 8	251.96	(7/2 ⁺)	
1051.14		475.3 4	8 4	575.69	(3/2 ⁺)	
		929.5 3	1.0×10 ² 4	121.74	(3/2 ⁺)	
		1051.1 3	23 10	0.0	(1/2 ⁺)	
1064.74	(3/2 ⁺)	282.6 2	8.3 12	782.24	(3/2 ⁺)	
		942.9 2	36 5	121.74	(3/2 ⁺)	
		1064.7 3	100 12	0.0	(1/2 ⁺)	
1065.86	(7/2 ⁺)	215.5 2	33 7	850.49	(5/2 ⁺)	
		407.7 3	100 16	657.90	(3/2 ⁺)	
		813.6 ^{&} 4	23 13	251.96	(7/2 ⁺)	
1079.09	(3/2 ⁺ , 5/2 ⁺)	296.9 2	34 5	782.24	(3/2 ⁺)	
		317.4 ^{&} 3	13.6 23	761.68	(3/2 ⁺ , 5/2 ⁺)	
		354.7 3	20 4	724.50	(3/2 ⁺ , 5/2 ⁺)	
		421.4 3	15.5 23	657.90	(3/2 ⁺)	
		827.1 2	24 4	251.96	(7/2 ⁺)	
		957.2 2	100 14	121.74	(3/2 ⁺)	
		1079.0 4	77 19	0.0	(1/2 ⁺)	
1090.3	(13/2 ⁻)	268.7 [‡]	100 [‡]	821.63	(11/2 ⁻)	
1146.48		261.6 3	35 8	885.08		
		422.0 4	28 9	724.50	(3/2 ⁺ , 5/2 ⁺)	
		570.6 3	100 17	575.69	(3/2 ⁺)	
		1024.7 3	40 8	121.74	(3/2 ⁺)	
1154.2		392.5 3	100	761.68	(3/2 ⁺ , 5/2 ⁺)	
1230.32		448.1 3	32 8	782.24	(3/2 ⁺)	
		572.3 4	100 16	657.90	(3/2 ⁺)	
		1108.6 2	79 16	121.74	(3/2 ⁺)	
1236.6	(15/2 ⁻)	415 [‡] 1	100 [‡]	821.63	(11/2 ⁻)	
1255.9	(11/2 ⁺)	218 1		1038.5	(9/2 ⁺)	
		1003.8 3	100	251.96	(7/2 ⁺)	
1277.2?		619.3 ^{&} 4	100	657.90	(3/2 ⁺)	
1279.5?	(13/2 ⁻)	411.6 10	100	867.77	(9/2 ⁻)	
		457.9	38 3	821.63	(11/2 ⁻)	
1322.8	(9/2 ⁺)	257.4 [‡]	56 [‡] 11	1065.86	(7/2 ⁺)	
		472.8 [‡]	100 [‡] 11	850.49	(5/2 ⁺)	
1326.7?		476.2 ^{&} 3	100	850.49	(5/2 ⁺)	
1433.08		671.7 3	84 15	761.68	(3/2 ⁺ , 5/2 ⁺)	
		857.7 ^{&} 3	51 13	575.69	(3/2 ⁺)	
		1181.0 4	79 14	251.96	(7/2 ⁺)	
		1311.1 3	100 19	121.74	(3/2 ⁺)	
1444.9		830.8 3	100	614.14	(3/2 ⁻)	

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Adopted Levels, Gammas (continued)

$\gamma(^{99}\text{Zr})$ (continued)					
$E_i(\text{level})$	J_i^π	E_γ	I_γ	E_f	J_f^π
1507.4	(13/2 ⁺)	251.1 [‡]	100 [‡]	1255.9	(11/2 ⁺)
		469.6 [‡]	36 [‡] 4	1038.5	(9/2 ⁺)
1585.5	(11/2 ⁺)	262.5	30 11	1322.8	(9/2 ⁺)
		519.8	100 11	1065.86	(7/2 ⁺)
1587.82		703.1 3	9.7 20	885.08	
		805.7 3	6.1 15	782.24	(3/2 ⁺)
		929.8 2	36 8	657.90	(3/2 ⁺)
		1012.1 1	100 11	575.69	(3/2 ⁺)
1670.3?		1548.5 ^{&} 4	100	121.74	(3/2 ⁺)
1699.61		938.5 ^{&} 4	41 10	761.68	(3/2 ⁺ , 5/2 ⁺)
		1041.7 2	100 13	657.90	(3/2 ⁺)
1716.09		865.6 3	57 8	850.49	(5/2 ⁺)
		954.4 3	100 18	761.68	(3/2 ⁺ , 5/2 ⁺)
		1594.9 ^{&} 4	5.×10 ¹ 4	121.74	(3/2 ⁺)
1790.7	(15/2 ⁺)	283.3 [‡]	100 [‡]	1507.4	(13/2 ⁺)
		534.5 [‡]	70 [‡] 8	1255.9	(11/2 ⁺)
1802.6	(19/2 ⁻)	566.0	100	1236.6	(15/2 ⁻)
1834.30		1072.5 3	43 9	761.68	(3/2 ⁺ , 5/2 ⁺)
		1220.2 4	15 5	614.14	(3/2 ⁻)
		1834.5 5	100 3	0.0	(1/2 ⁺)
1883.5?	(17/2 ⁻)	604.0	100	1279.5?	(13/2 ⁻)
1892.8	(13/2 ⁺)	308 ^{&}		1585.5	(11/2 ⁺)
		570.0	100	1322.8	(9/2 ⁺)
1925.1?		1074.6 ^{&} 2	100	850.49	(5/2 ⁺)
2079.2		1317.2 ^{&} 6	20 7	761.68	(3/2 ⁺ , 5/2 ⁺)
		1421.4 4	38 7	657.90	(3/2 ⁺)
		1957.4 4	100 23	121.74	(3/2 ⁺)
2104.6	(17/2 ⁺)	313.8 [‡]	100 [‡]	1790.7	(15/2 ⁺)
		597.7 [‡]	16 [‡] 2	1507.4	(13/2 ⁺)
2209.7	(15/2 ⁺)	624.2	100	1585.5	(11/2 ⁺)
2296.9		1572.7 4	1.0×10 ² 4	724.50	(3/2 ⁺ , 5/2 ⁺)
		1629.2 5	82 25	667.48	(5/2 ⁻)
		1720.7 7	77 25	575.69	(3/2 ⁺)
2400.68	(3/2 ⁺ , 5/2 ⁺)	967.6 3	43 9	1433.08	
		1548.9 ^{&} 6	12 6	852.12	(5/2 ⁺)
		1639.0 4	21 6	761.68	(3/2 ⁺ , 5/2 ⁺)
		1733.0 4	26 9	667.48	(5/2 ⁻)
		1742.7 2	100 18	657.90	(3/2 ⁺)
		1786.9 4	74 20	614.14	(3/2 ⁻)
2447.1	(19/2 ⁺)	343 1		2104.6	(17/2 ⁺)
		656 1		1790.7	(15/2 ⁺)
2448.50		1397.3 4	21 5	1051.14	
		1596.6 5	30 7	852.12	(5/2 ⁺)
		1597.6 ^{&} 5	9 3	850.49	(5/2 ⁺)
		1666.1 4	68 14	782.24	(3/2 ⁺)
		1724.4 7	26 10	724.50	(3/2 ⁺ , 5/2 ⁺)
		1790.6 3	100 19	657.90	(3/2 ⁺)
		1833.7 7	8 4	614.14	(3/2 ⁻)
		1873.0 6	23 7	575.69	(3/2 ⁺)
2484.2		1870.0 ^{&} 7	100	614.14	(3/2 ⁻)
2516.7	(23/2 ⁻)	714.1	100	1802.6	(19/2 ⁻)
2556.8	(17/2 ⁺)	664.0	100	1892.8	(13/2 ⁺)

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued) $\gamma(^{99}\text{Zr})$ (continued)

$E_i(\text{level})$	J_i^π	$E_\gamma^\dagger$	$I_\gamma^\dagger$	E_f	J_f^π	$E_i(\text{level})$	J_i^π	$E_\gamma^\dagger$	E_f	J_f^π
2657.5	(21/2 ⁻)	774 <i>I</i>		1883.5?	(17/2 ⁻)	3754.7	(23/2 ⁺)	819 <i>I</i>	2935.7	(19/2 ⁺)
2816.9	(21/2 ⁺)	370 <i>I</i>		2447.1	(19/2 ⁺)	4090.1	(27/2 ⁺)	875 <i>I</i>	3215.1	(23/2 ⁺)
		712 <i>I</i>		2104.6	(17/2 ⁺)	4134.8	(25/2 ⁺)	833 <i>I</i>	3301.8	(21/2 ⁺)
2935.7	(19/2 ⁺)	726 <i>I</i>		2209.7	(15/2 ⁺)	4320.7	(31/2 ⁻)	960 <i>I</i>	3360.7	(27/2 ⁻)
3215.1	(23/2 ⁺)	768 <i>I</i>		2447.1	(19/2 ⁺)	4627.5	(29/2 ⁻)	1044 <i>I</i>	3583.5	(25/2 ⁻)
3301.8	(21/2 ⁺)	745 <i>I</i>		2556.8	(17/2 ⁺)	5041.8	(29/2 ⁺)	907 <i>I</i>	4134.8	(25/2 ⁺)
3360.7	(27/2 ⁻)	844	100	2516.7	(23/2 ⁻)	5391.8	(35/2 ⁻)	1071 <i>I</i>	4320.7	(31/2 ⁻)
3583.5	(25/2 ⁻)	926 <i>I</i>		2657.5	(21/2 ⁻)	5734.5	(33/2 ⁻)	1107 <i>I</i>	4627.5	(29/2 ⁻)
3638.9	(25/2 ⁺)	822 <i>I</i>		2816.9	(21/2 ⁺)	6567	(39/2 ⁻)	1175 <i>I</i>	5391.8	(35/2 ⁻)

[†] From ^{99}Y β^- decay, unless otherwise specified.

[‡] From ^{248}Cm SF decay.

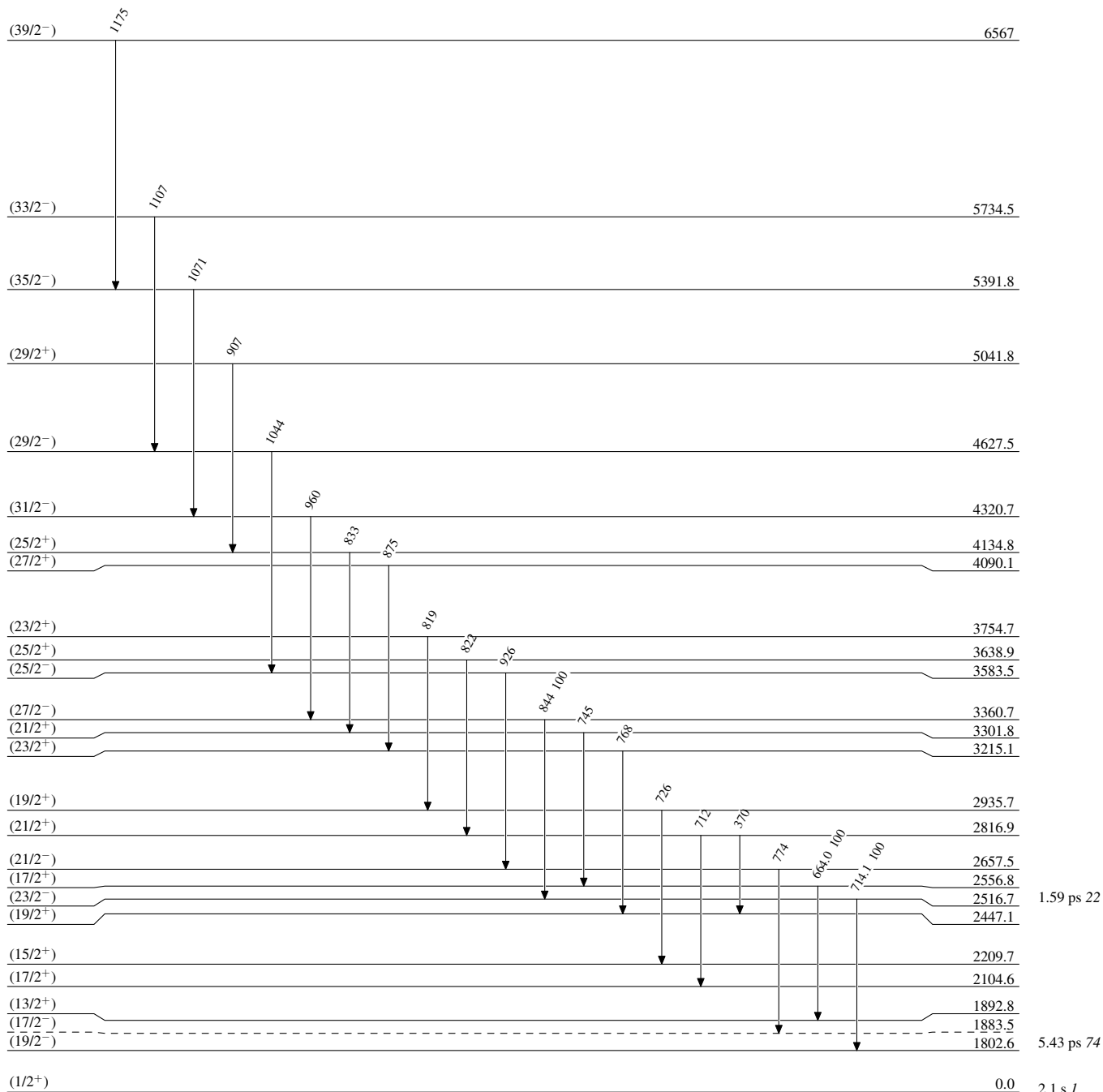
From ^{99}Y β^- Decay.

@ [Additional information 5](#).

& Placement of transition in the level scheme is uncertain.

Adopted Levels, GammasLevel Scheme

Intensities: Relative photon branching from each level

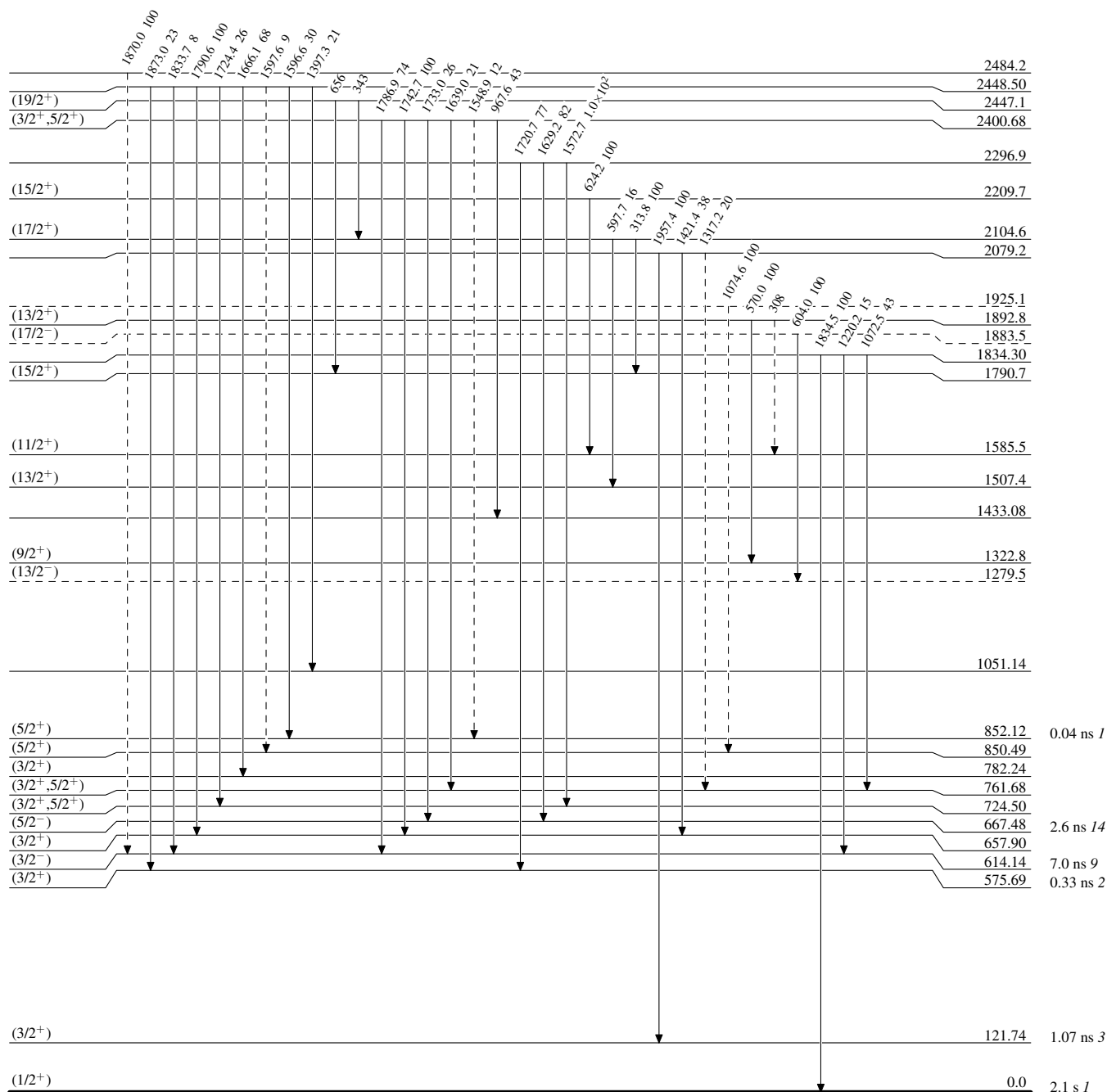


Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

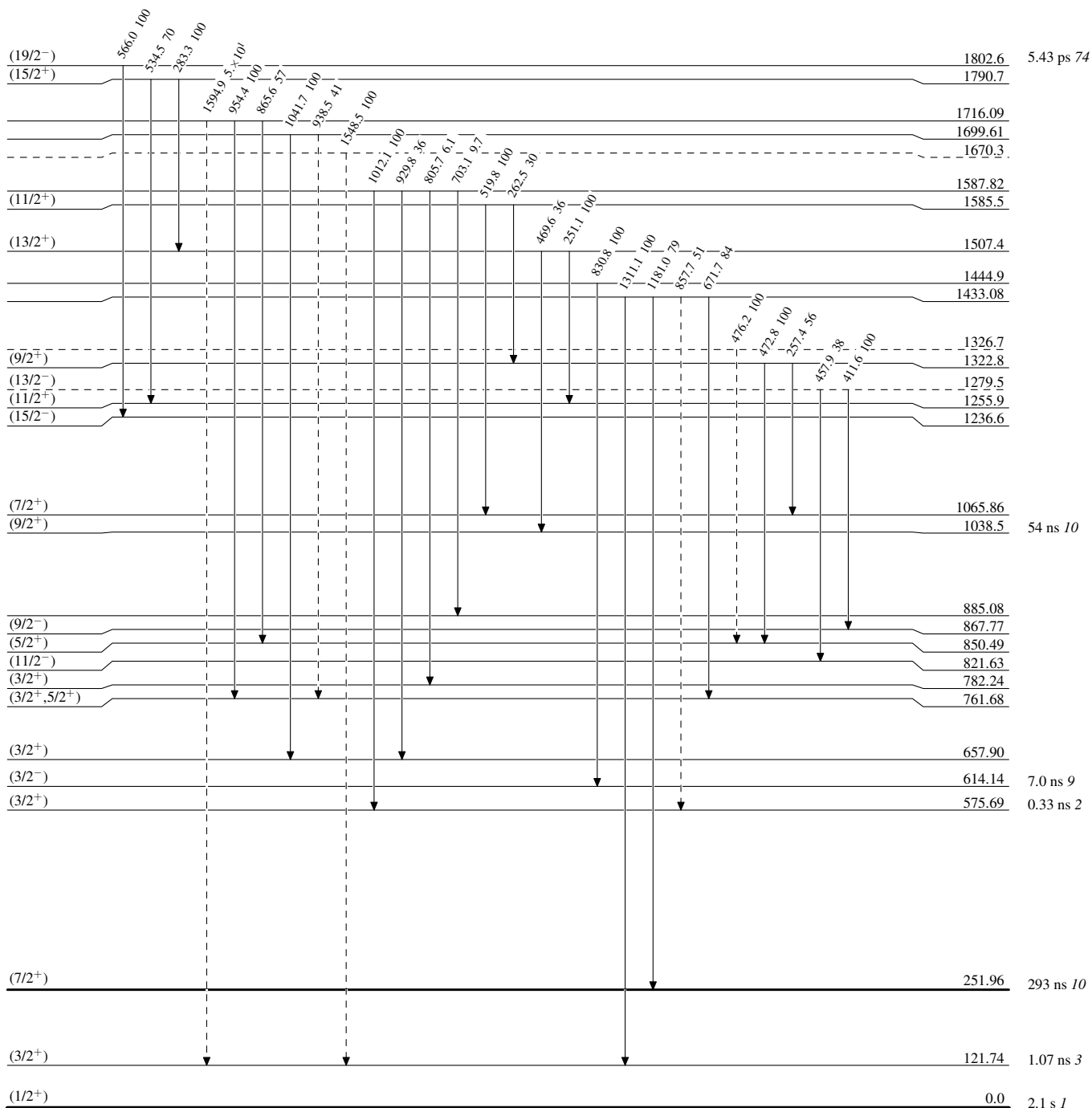
-----► γ Decay (Uncertain)

Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

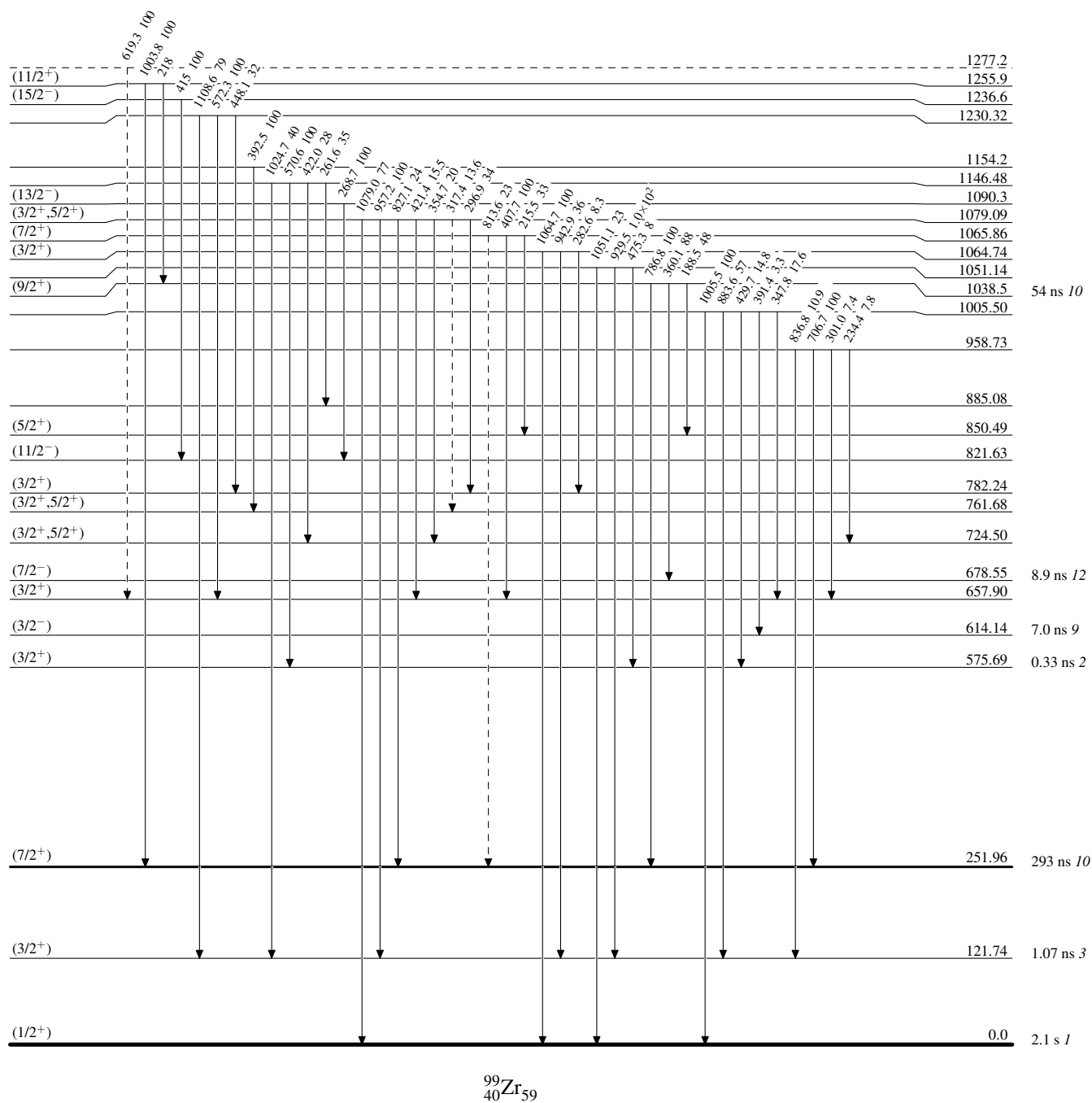
-----► γ Decay (Uncertain)

 $^{99}_{40}\text{Zr}_{59}$

Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

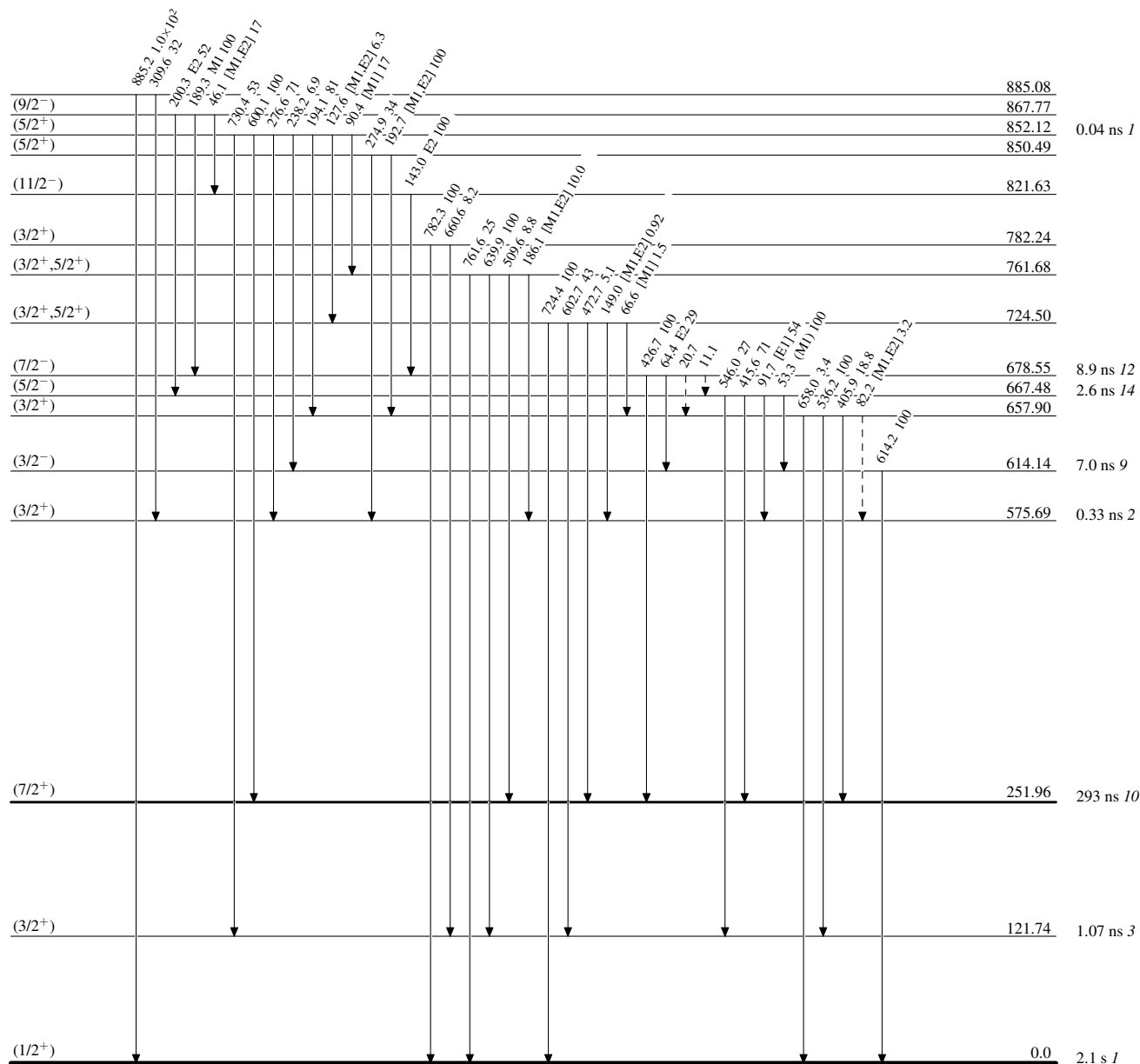
-----► γ Decay (Uncertain)

Adopted Levels, Gammas

Legend

Level Scheme (continued)

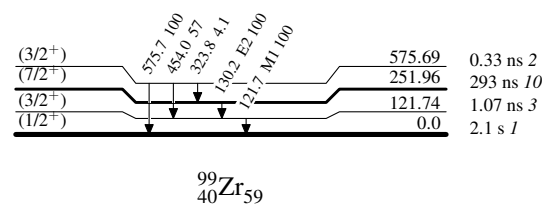
Intensities: Relative photon branching from each level

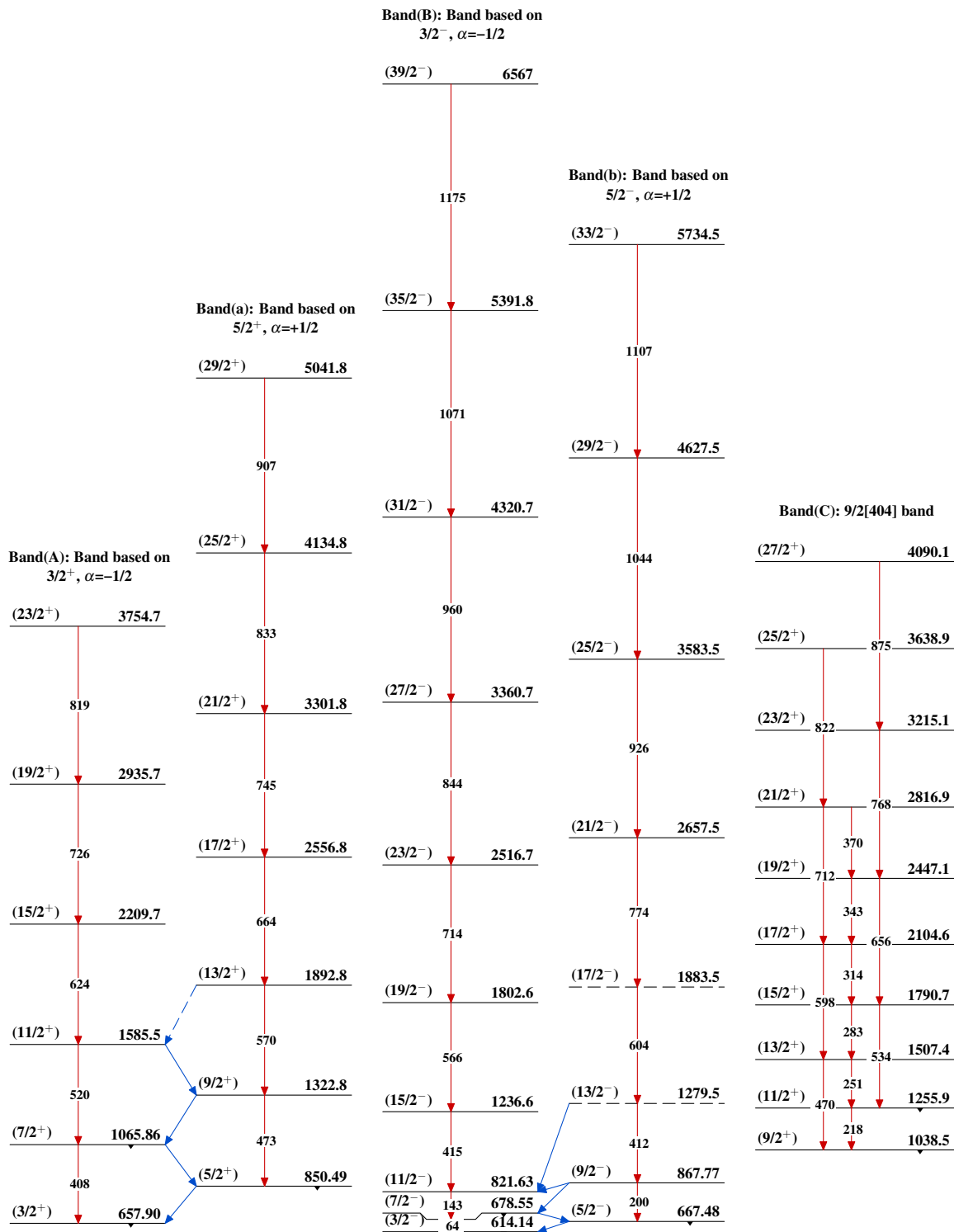
-----► γ Decay (Uncertain)

⁹⁹Zr₅₉

Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level



Adopted Levels, Gammas $^{99}_{40}\text{Zr}_{59}$