Adopted Levels, Gammas

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	N. Nica	NDS 111,525 (2010)	19-Nov-2009

Q(β^-)=6821 *7*; S(n)=5857 *9*; S(p)=10486 *11*; Q(α)=−5932 *11* 2012Wa38
Note: Current evaluation has used the following Q record $ 6689 11 *5982* 26 *10608* 29 −6065 *14* 2003Au03.
Q(β^-n)=1114 *11* (2003Au03); see also preliminary Penning-trap mass measurements, 2007Ha32 (^{97}Y,^{96}Y), 2006Ha03 (96Sr), and 2004Ri12 (96Zr), from which the following values are calculated: Q(β^-)=6822 *29* (a); S(n)=5855 *11*; S(p)=10488 *9*, Q(α)=−5931.9 *11* (a), Q(β^-n)=1214 *41* (a, relative to daughter mass from 2003Au03).
Searched for p radioactivity, not found (1989Ho19). Search range 250 keV≤E≤600 keV, 10 μs≤$T_{1/2}$≤100 ms.

```
Theory, calculations, systematics:
   mean square charge radii: 2007Ch07, 2007Bi14, 2006Ca38, 2006Ga46
   levels: 1998Lh01, 1988Br23, 1988BrZM
   subshell closure effects: 1987Ab21
```

^{97}Y Levels

The configurations given in the table are from ^{97}Y IT decay (142 ms) dataset.

Cross Reference (XREF) Flags

- A ^{97}Sr β^- decay
- B ^{97}Y IT decay (1.17 s)
- C ^{97}Y IT decay (142 ms)
- D ^{98}Sr β^-n decay (0.653 s)

E(level)†	J$^\pi$	$T_{1/2}$‡	XREF	Comments
0.0	(1/2$^-$)	3.75 s *3*	AB	%β^-=100.0; %β^-n=0.055 *4* μ=−0.12 *1* (2007Ch07) J$^\pi$: from shell model. $T_{1/2}$: weighted average of 3.5 *2* s (1987PfZX), 3.76 *2* s (1986Wa17), 3.6 *4* s (1982Ga24), 3.1 *2* s (1981En05), 3.6 *3* s (1976KaYO), 3.70 *10* s (1976MoZC). Others: 3.72 *11* s (1983Re10, earlier report by 1986Wa17), 3.3 *2* s (1979En02, earlier report by 1981En05), 3.7 s (1978St02). %β^-n: weighted average of 0.054 *4* (1986Wa17), 0.06 *1* (1981En05). Others: 0.061 *7* (1983Re10, earlier report by 1986Wa17), 0.006 *1* (1982Ga24). μ: measured by LASER spectroscopy (2007Ch07,2006Ca38).
667.52 *23*	(9/2)$^+$	1.17 s *3*	ABC	%β^->99.3; %IT<0.7; %β^-n<0.08 μ=+5.88 *2* (2007Ch07); Q=−0.76 *8* (2007Ch07) β_2=−0.16 *2* (2007Ch07) J$^\pi$: configuration=(π $1g_{9/2}$) expected from shell model. log *ft*=5.1 to 7/2$^+$ 1264-keV level in ^{97}Zr. $T_{1/2}$: weighted average of 1.18 *4* s (1986Wa17), 1.5 *3* (1976KaYO), 1.21 *3* s (1976MoZC), 1.11 *3* s (1970Ei02). Other 1.19 *4* s (1983Re10, earlier report by 1986Wa17), 1.2 s (1978St02). %β^-,%IT: from ^{97}Y IT decay (1.17 s) (1976MoZC). %β^-n: from 1986Wa17. Other: 0.11 *3* (1983Re10, earlier report by 1986Wa17). μ,Q: measured by LASER spectroscopy (2007Ch07,2007Bi14,2006Ca38).
697.32 *20*	1/2,3/2	44 ps *3*	A	J$^\pi$: log *ft*=6.3 *4* from 1/2$^+$ ^{97}Sr.
953.82 *19*	(3/2$^-$,5/2$^-$)	≤4 ps	A	J$^\pi$: D,E2 γ to (1/2$^-$) level; (E1) γ from (5/2$^+$) 1319.54-keV level.
1319.54 *19*	(5/2$^+$)	12 ps *5*	A	J$^\pi$: (E2) γ to (9/2)$^+$ level; γ's from 1/2$^+$, 3/2$^+$ levels.
1336.0 *3*		<3# ns	C	
1428.11 *20*	(5/2$^+$,7/2$^+$)	21 ps *4*	A	J$^\pi$: D,E2 γ from 1/2$^+$, 3/2$^+$ 1904.87-keV level; D,E2 γ to (9/2)$^+$ level.

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued)

^{97}Y Levels (continued)

E(level)[†]	Jπ	$T_{1/2}$[‡]	XREF	Comments
1526.6 *4*			A	
1530.2 *4*			C	
1613.8? *3*	1/2,3/2		A	Jπ: log *ft*=5.91 *9* from 1/2$^+$ ^{97}Sr.
1657.4 *3*	(13/2$^+$)[#]	<2[#] ns	C	Configuration=((96SR 2$^+$)(π 1g$_{9/2}$))
1738.8? *4*	1/2,3/2	≤9 ps	A	Jπ: log *ft*=6.0 *2* from 1/2$^+$ ^{97}Sr.
1799.6 *3*	(3/2$^-$)		A	Jπ: log *ft*=5.9 *2* from 1/2$^+$ ^{97}Sr; (E1) γ from 1/2$^+$,3/2$^+$ 2211.92-keV level; γ to (5/2$^+$) level.
1848.23 *24*			A	
1904.86 *17*	1/2$^+$,3/2$^+$	<2.3 ps	A	Jπ: log *ft*=4.73 *6* from 1/2$^+$ ^{97}Sr.
1913.9 *4*			C	
2116.1 *4*			C	
2121.19 *20*	1/2$^+$,3/2$^+$	<7 ps	A	Jπ: log *ft*=4.91 *6* from 1/2$^+$ ^{97}Sr.
2211.91 *18*	1/2$^+$,3/2$^+$	≤3.3 ps	A	Jπ: log *ft*=4.27 *6* from 1/2$^+$ ^{97}Sr.
2287.4? *4*	(1/2$^+$,3/2$^+$)		A	Jπ: log *ft*=5.35 *6* from 1/2$^+$ ^{97}Sr.
2435.9 *3*	1/2$^+$,3/2$^+$		A	Jπ: log *ft*=5.16 *7* from 1/2$^+$ ^{97}Sr.
2475.0 *4*			C	
2501.5 *4*			C	
2558.6 *8*	1/2$^+$,3/2$^+$		A	Jπ: log *ft*=5.51 *11* from 1/2$^+$ ^{97}Sr.
2568.8 *3*	(17/2$^+$)[#]	<2[#] ns	C	Configuration=((96SR 4$^+$)(π 1g$_{9/2}$))
2748.2 *4*		<4[#] ns	C	
2965.3 *4*		<2[#] ns	C	
3163.3 *4*			C	
3360.3 *4*	(21/2$^+$)[#]	<2[#] ns	C	Configuration=((96SR 6$^+$)(π 1g$_{9/2}$))
3522.6 *4*	(27/2$^-$)	142 ms *8*	C	%IT=94.8 *9* (2009Ma40); %β^-=5.2 *9* (2009Ma40) Configuration=((π 1g$_{9/2}$)(ν 1h$_{11/2}$)(ν 1g$_{7/2}$))9$^-$ μ=+5.64 *4* (2007Ch07); Q=−1.21 *14* (2007Ch07) β_2=−0.18 *2* (2007Ch07) Jπ: E3 γ to (21/2$^+$) level; no γ's to levels with J<21/2. $T_{1/2}$: weighted average of 138 *15* ms (1987Bo19) and 144 *10* ms (1986Lh01) in ^{97}Y IT decay (142 ms). %IT,%β^-: from ^{97}Y IT decay (142 ms). μ,Q: measured by LASER spectroscopy (2007Ch07,2007Bi14,2006Ca38).

[†] From a least squares fit to Eγ.
[‡] From ^{97}Rb β^- decay (1990Bu01), unless otherwise noted.
[#] From ^{97}Y IT decay (142 ms).

Adopted Levels, Gammas (continued)

$\gamma(^{97}Y)$

All γ data are from ^{97}Sr β^- decay data set, unless otherwise noted (γ mult's from conversion electron measurements).
For unplaced γ's see ^{97}Sr β^- decay and ^{97}Y IT decay (142 ms) datasets.

E_i(level)	J_i^π	E_γ	I_γ	E_f	J_f^π	Mult.	α[&]	Comments
667.52	$(9/2)^+$	667.5 *5*	100	0.0	$(1/2^-)$	[M4]	0.0260	α(K)=0.0225 *4*; α(L)=0.00291 *5*; α(M)=0.000504 *8*; α(N+..)=7.13×10^{-5} *11* α(N)=6.70×10^{-5} *10*; α(O)=4.34×10^{-6} *7* B(M4)(W.u.)=2.5 *25*
697.32	1/2,3/2	697.3 *3*	100	0.0	$(1/2^-)$	D,E2[‡]		
953.82	$(3/2^-,5/2^-)$	953.8 *3*	100	0.0	$(1/2^-)$	(M1,E2)[@]	6.88×10^{-4} *13*	α(K)=0.000609 *11*; α(L)=6.66×10^{-5} *16*; α(M)=1.14×10^{-5} *3*; α(N+..)=1.64×10^{-6} *4* α(N)=1.53×10^{-6} *4*; α(O)=1.066×10^{-7} *16*
1319.54	$(5/2^+)$	365.8 *3*	31 *3*	953.82	$(3/2^-,5/2^-)$	(E1)	0.00267	B(E1)(W.u.)=0.00012 *6* α(K)=0.00236 *4*; α(L)=0.000258 *4*; α(M)=4.40×10^{-5} *7*; α(N+..)=6.29×10^{-6} *9* α(N)=5.89×10^{-6} *9*; α(O)=4.02×10^{-7} *6*
		622.5 *5*	4.2 *15*	697.32	1/2,3/2	D,E2[‡]		
		652.2 *3*	100 *11*	667.52	$(9/2)^+$	(E2)	0.00183	B(E2)(W.u.)=11 *5* α(K)=0.001613 *23*; α(L)=0.000182 *3*; α(M)=3.11×10^{-5} *5*; α(N+..)=4.42×10^{-6} *7* α(N)=4.15×10^{-6} *6*; α(O)=2.79×10^{-7} *4*
1336.0		668.5[†] *2*	100	667.52	$(9/2)^+$	D,E2[‡]		
1428.11	$(5/2^+,7/2^+)$	109.4 *3*	10 *15*	1319.54	$(5/2^+)$			
		474.1 *5*	100 *11*	953.82	$(3/2^-,5/2^-)$	(E1)[#]	1.38×10^{-3}	α(K)=0.001219 *18*; α(L)=0.0001329 *19*; α(M)=2.26×10^{-5} *4*; α(N+..)=3.25×10^{-6} *5* α(N)=3.04×10^{-6} *5*; α(O)=2.09×10^{-7} *3* B(E1)(W.u.)=7.7×10^{-5} *19*
		730.7 *5*	28 *6*	697.32	1/2,3/2	D,E2[‡]		
		760.5 *2*	49 *5*	667.52	$(9/2)^+$	D,E2[‡]		
1526.6		829.5 *5*	100	697.32	1/2,3/2			
1530.2		194.3[†] *6*	100 *57*	1336.0				
		862.5[†] *6*	86 *57*	667.52	$(9/2)^+$			
1613.8?	1/2,3/2	186.0 *3*	7 *4*	1428.11	$(5/2^+,7/2^+)$			
		1613.0 *5*	100 *18*	0.0	$(1/2^-)$			
1657.4	$(13/2^+)$	321.3[†] *2*	50 *7*	1336.0		D,E2[‡]		
		989.9[†] *2*	100 *8*	667.52	$(9/2)^+$	[E2]	6.39×10^{-4}	α(K)=0.000564 *8*; α(L)=6.21×10^{-5} *9*; α(M)=1.060×10^{-5} *15*; α(N+..)=1.522×10^{-6} *22*

$^{97}_{39}Y_{58}$-3

Adopted Levels, Gammas (continued)

γ(^{97}Y) (continued)

E_i(level)	J_i^π	E_γ	I_γ	E_f	J_f^π	Mult.	α[&]	Comments
								α(N)=1.423×10^{-6} *20*; α(O)=9.83×10^{-8} *14* B(E2)(W.u.)>0.0075
1738.8?	1/2,3/2	310.6 *3*	100	1428.11	(5/2$^+$,7/2$^+$)	D[‡]		
1799.6	(3/2$^-$)	480.0 *3*	100	1319.54	(5/2$^+$)	[E1]	1.34×10^{-3}	α(K)=0.001182 *17*; α(L)=0.0001289 *19*; α(M)=2.20×10^{-5} *3*; α(N+..)=3.15×10^{-6} *5* α(N)=2.94×10^{-6} *5*; α(O)=2.03×10^{-7} *3*
1848.23		420.3 *3*	85 *21*	1428.11	(5/2$^+$,7/2$^+$)			
		528.2 *5*	100 *17*	1319.54	(5/2$^+$)			
1904.86	1/2$^+$,3/2$^+$	165.8 *6*	2.2 *8*	1738.8?	1/2,3/2	D[‡]		
		477.1 *5*	3.5 *10*	1428.11	(5/2$^+$,7/2$^+$)	D,E2[‡]		
		585.2 *5*	3.0 *10*	1319.54	(5/2$^+$)	D,E2[‡]		
		951.0 *4*	8.2 *20*	953.82	(3/2$^-$,5/2$^-$)	(E1)[#]	2.96×10^{-4}	α(K)=0.000262 *4*; α(L)=2.82×10^{-5} *4*; α(M)=4.81×10^{-6} *7*; α(N+..)=6.93×10^{-7} *10* α(N)=6.47×10^{-7} *9*; α(O)=4.53×10^{-8} *7* B(E1)(W.u.)>1.1×10^{-5}
		1905.0 *3*	100	0.0	(1/2$^-$)	[E1]	6.42×10^{-4}	α(K)=7.87×10^{-5} *11*; α(L)=8.40×10^{-6} *12*; α(M)=1.431×10^{-6} *20*; α(N+..)=0.000554 *8* α(N)=1.93×10^{-7} *3*; α(O)=1.366×10^{-8} *20*; α(IPF)=0.000554 *8* B(E1)(W.u.)>1.7×10^{-5}
1913.9		383.6[†] *5*	54 *31*	1530.2				
		1246.1[†a] *18*	100 *69*	667.52	(9/2)$^+$			
2116.1		202.1[†] *3*	20 *7*	1913.9				
		458.3[†] *9*	7 *4*	1657.4	(13/2$^+$)			
		585.8[†] *6*	34 *13*	1530.2				
		780.1[†] *3*	100 *20*	1336.0				
2121.19	1/2$^+$,3/2$^+$	216.4 *3*	10.5 *19*	1904.86	1/2$^+$,3/2$^+$	D[‡]		
		273.0 *3*	9.5 *19*	1848.23		D,E2[‡]		
		801.6 *3*	100 *10*	1319.54	(5/2$^+$)	D,E2[‡]		
		1167.5 *4*	29 *4*	953.82	(3/2$^-$,5/2$^-$)	(E1)[#]	2.27×10^{-4}	α(K)=0.0001780 *25*; α(L)=1.91×10^{-5} *3*; α(M)=3.26×10^{-6} *5*; α(N+..)=2.64×10^{-5} *5* α(N)=4.39×10^{-7} *7*; α(O)=3.09×10^{-8} *5*; α(IPF)=2.59×10^{-5} *4* B(E1)(W.u.)>4.4×10^{-6}
		1423.2 *5*	5.7 *14*	697.32	1/2,3/2	D,E2[‡]		
		2121.3 *4*	35 *5*	0.0	(1/2$^-$)	[E1]	7.83×10^{-4}	B(E1)(W.u.)>8.8×10^{-7} α(K)=6.69×10^{-5} *10*; α(L)=7.13×10^{-6} *10*; α(M)=1.215×10^{-6} *17*;

$^{97}_{39}Y_{58}$-4

Adopted Levels, Gammas (continued)

γ(^{97}Y) (continued)

E_i(level)	J_i^π	E_γ	I_γ	E_f	J_f^π	Mult.	α[&]	Comments
								α(N+..)=0.000708 *10* α(N)=1.638×10^{-7} *23*; α(O)=1.160×10^{-8} *17*; α(IPF)=0.000707 *10*
2211.91	1/2$^+$,3/2$^+$	307.1 *2*	100 *10*	1904.86	1/2$^+$,3/2$^+$	(M1)	0.00941	B(M1)(W.u.)>0.058 α(K)=0.00830 *12*; α(L)=0.000928 *13*; α(M)=0.0001587 *23*; α(N+..)=2.28×10^{-5} *4* α(N)=2.13×10^{-5} *3*; α(O)=1.482×10^{-6} *21*
		363.6 *4*	12.5 *25*	1848.23		D,E2[‡]		
		412.3 *3*	24 *3*	1799.6	(3/2$^-$)	(E1)	0.00196	B(E1)(W.u.)>8.3×10^{-5} α(K)=0.001731 *25*; α(L)=0.000189 *3*; α(M)=3.22×10^{-5} *5*; α(N+..)=4.61×10^{-6} *7* α(N)=4.32×10^{-6} *6*; α(O)=2.96×10^{-7} *5*
		685.6 *5*	5 *3*	1526.6		D,E2[‡]		
		892.2 *3*	45 *5*	1319.54	(5/2$^+$)	D,E2[‡]		
		1258.0 *3*	96 *10*	953.82	(3/2$^-$,5/2$^-$)	(E1)[#]	2.56×10^{-4}	α(K)=0.0001558 *22*; α(L)=1.673×10^{-5} *24*; α(M)=2.85×10^{-6} *4*; α(N+..)=8.07×10^{-5} *12* α(N)=3.84×10^{-7} *6*; α(O)=2.70×10^{-8} *4*; α(IPF)=8.03×10^{-5} *12* B(E1)(W.u.)>1.2×10^{-5}
		1514.8 *5*	20 *2*	697.32	1/2,3/2	D,E2[‡]		
		2212.0 *4*	96 *8*	0.0	(1/2$^-$)	[E1]	8.39×10^{-4}	B(E1)(W.u.)>2.2×10^{-6} α(K)=6.29×10^{-5} *9*; α(L)=6.70×10^{-6} *10*; α(M)=1.141×10^{-6} *16*; α(N+..)=0.000768 *11* α(N)=1.539×10^{-7} *22*; α(O)=1.090×10^{-8} *16*; α(IPF)=0.000768 *11*
2287.4?	(1/2$^+$,3/2$^+$)	2287.4[a] *4*	100	0.0	(1/2$^-$)	[D]		
2435.9	1/2$^+$,3/2$^+$	531.0 *4*	26 *9*	1904.86	1/2$^+$,3/2$^+$	[M1,E2]	0.0029 *4*	α(K)=0.0026 *4*; α(L)=0.00029 *5*; α(M)=4.9×10^{-5} *8*; α(N+..)=7.0×10^{-6} *10* α(N)=6.6×10^{-6} *10*; α(O)=4.4×10^{-7} *5*
		1738.3 *5*	19 *3*	697.32	1/2,3/2			
		2436.2 *6*	100 *9*	0.0	(1/2$^-$)	[E1]	9.73×10^{-4}	α(K)=5.46×10^{-5} *8*; α(L)=5.81×10^{-6} *9*; α(M)=9.90×10^{-7} *14*; α(N+..)=0.000911 *13* α(N)=1.336×10^{-7} *19*; α(O)=9.47×10^{-9} *14*; α(IPF)=0.000911 *13*
2475.0		359.0[†] *2*	100 *36*	2116.1				
		817.4[†a] *12*	50 *39*	1657.4	(13/2$^+$)			
		1138.4[†a] *7*	50 *29*	1336.0				

$^{97}_{39}Y_{58}$-5

Adopted Levels, Gammas (continued)

γ(^{97}Y) (continued)

E_i(level)	J_i^π	E_γ	I_γ	E_f	J_f^π	Mult.	α[&]	Comments
2501.5		843.8[†] *4*	75 *33*	1657.4	(13/2$^+$)			
		1165.3[†] *4*	100 *42*	1336.0				
2558.6	1/2$^+$,3/2$^+$	1862.0 *10*	38 *10*	697.32	1/2,3/2			
		2557.8 *10*	100 *21*	0.0	(1/2$^-$)			
2568.8	(17/2$^+$)	94.0[†] *3*	1.8 *7*	2475.0		D,E2[‡]		
		452.7[†] *3*	3.5 *10*	2116.1		D,E2[‡]		
		911.4[†] *2*	100 *14*	1657.4	(13/2$^+$)	[E2]	7.76×10^{-4}	α(K)=0.000685 *10*; α(L)=7.58×10^{-5} *11*; α(M)=1.293×10^{-5} *19*; α(N+..)=1.85×10^{-6} *3* α(N)=1.734×10^{-6} *25*; α(O)=1.192×10^{-7} *17* B(E2)(W.u.)>0.016
2748.2		246.7[†] *2*	31 *9*	2501.5		D,E2[‡]		
		273.2[†] *3*	36 *9*	2475.0		D,E2[‡]		
		632.2[†] *3*	100 *19*	2116.1		D,E2[‡]		
		1091.2[†] *4*	19 *6*	1657.4	(13/2$^+$)	D,Q,E3[‡]		
2965.3		216.9[†] *2*	48 *9*	2748.2		D,E2[‡]		
		396.2[†] *3*	100 *30*	2568.8	(17/2$^+$)	D,E2[‡]		
3163.3		415.1[†] *2*	53 *19*	2748.2				
		594.6[†] *3*	66 *28*	2568.8	(17/2$^+$)			
		688.1[†] *3*	100 *41*	2475.0				
3360.3	(21/2$^+$)	196.9[†] *3*	10.7 *13*	3163.3		D,E2[‡]		
		394.8[†] *2*	21 *3*	2965.3		D,E2[‡]		
		612.3[†] *3*	6.8 *11*	2748.2		D,Q[‡]		
		791.7[†] *2*	100 *7*	2568.8	(17/2$^+$)	[E2]	1.10×10^{-3}	α(K)=0.000969 *14*; α(L)=0.0001080 *16*; α(M)=1.84×10^{-5} *3*; α(N+..)=2.64×10^{-6} *4* α(N)=2.47×10^{-6} *4*; α(O)=1.681×10^{-7} *24* B(E2)(W.u.)>0.025
3522.6	(27/2$^-$)	162.3[†] *2*	100	3360.3	(21/2$^+$)	E3	1.123	α(K)=0.884 *14*; α(L)=0.199 *3*; α(M)=0.0347 *6*; α(N+..)=0.00434 *7* α(N)=0.00421 *7*; α(O)=0.0001332 *20* B(E3)(W.u.)=2.39 *14* Mult.: from α(K)exp, α(exp) in ^{97}Y IT decay (142 ms). B(E2)(W.u.) calculated with %IT=98.4 *7*.

[†] γ observed in ^{97}Y IT decay (142 ms) only.
[‡] Deduced from RUL.

$^{97}_{39}Y_{58}$-6

Adopted Levels, Gammas (continued)

$\gamma(^{97}Y)$ (continued)

D,E2 from RUL, $\Delta\pi$=yes from level scheme.
@ D,E2 from RUL, $\Delta\pi$=no from level scheme.
& Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on γ-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.
a Placement of transition in the level scheme is uncertain.

$^{97}_{39}Y_{58}$-7

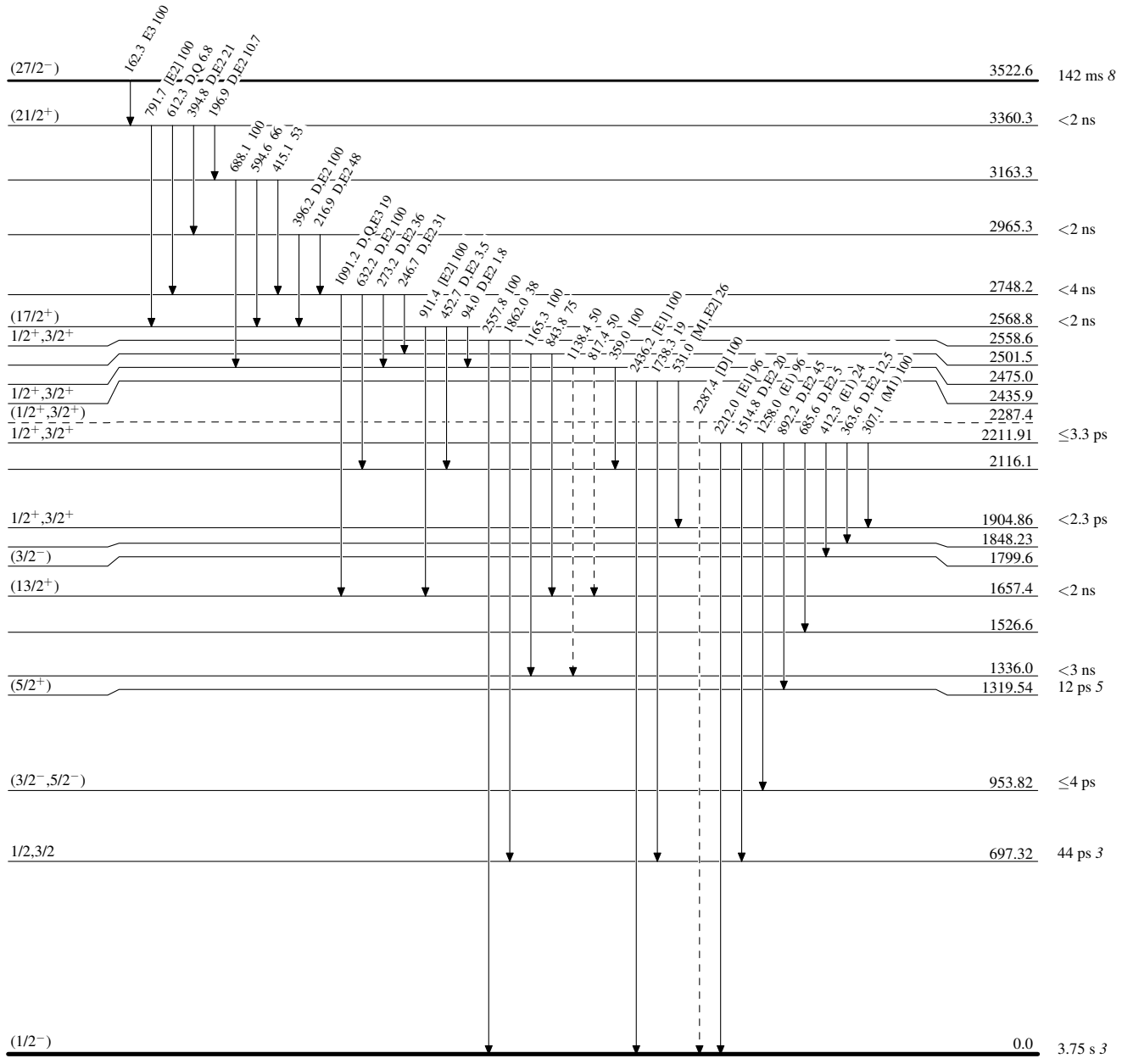
Adopted Levels, Gammas

Legend

Level Scheme

Intensities: Relative photon branching from each level

γ Decay (Uncertain)



$^{97}_{39}Y_{58}$

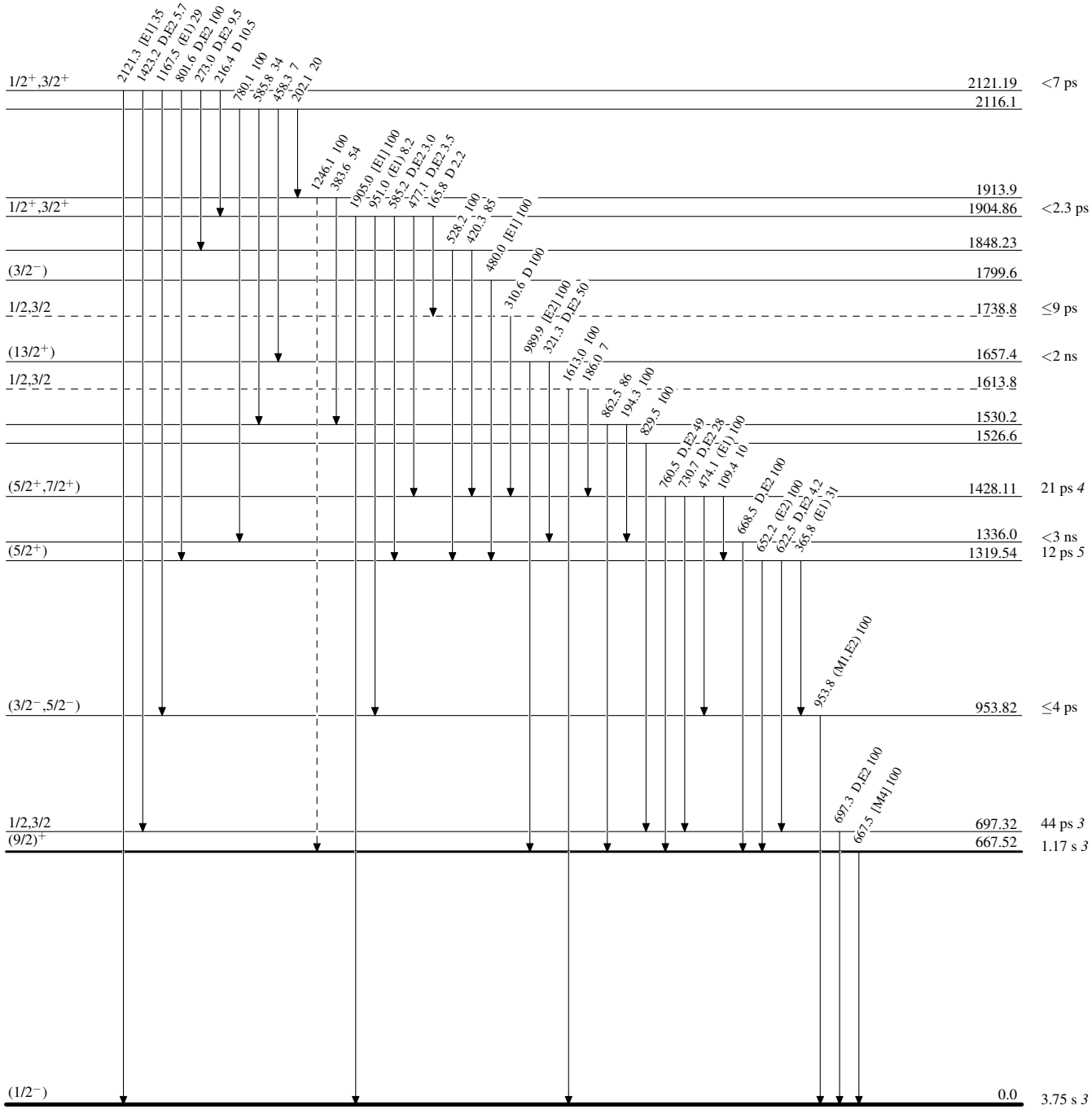
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

γ Decay (Uncertain)



$^{97}_{39}Y_{58}$