

Adopted Levels, Gammas

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Coral M. Baglin	NDS 111,275 (2010)	1-Oct-2009

Q(β⁻)=32 5; S(n)=6485 9; S(p)=5146 5; Q(α)=2287 5 [2012Wa38](#)

Note: Current evaluation has used the following Q record 30 4 6487 9 5149 4 2285 5 [2003Au03,2009AuZZ](#).

Other reactions:

¹⁸¹Ta(α,n), Eα=12, 13, 13.9 MeV ([1998Sc36](#)). The observed ¹⁸⁴Re yields showed large discrepancies for different irradiation times. Authors interpreted this as evidence for the existence of an otherwise unknown isomer of ¹⁸⁴Re with T_{1/2}≈2 h.

W(³He,t), E=200 MeV ([1991Ja04](#)): natural W target; unresolved triton groups to IAS from constituent isotopes dominated by that for A=184; deduced Q(IAS)=16904 16 and Coulomb displacement energy=17668 16 for E=15404 16 IAS.

¹⁸⁴Re Levels

Cross Reference (XREF) Flags

- A ¹⁸⁴Re IT decay (169 d)
- B ¹⁸⁵Re(d,t),(³He,α)
- C ¹⁸³W(³He,d),(α,t)
- D ¹⁸⁰Hf(⁷Li,3nγ)

E(level) [†]	J ^π [‡]	T _{1/2} [#]	XREF	Comments
0.0 ^a	3 ⁽⁻⁾	35.4 d 7	ABCD	%ε+%β ⁺ =100 μ=+2.53 5 (1981Ha22) Q=+2.8 2 μ: from 1981Ha22 , NMR on oriented nuclei. Others: 2.53 9 (1973Hu06), 2.48 12 (1973Kr01) from static nuclear orientation. Q: from 1983Ha52 , static nuclear orientation. Other: 1981Er01 +3.3 3 (1981Er01 ; nuclear orientation). J ^π : μ consistent with J=3 only; parity from Nilsson assignment. T _{1/2} : from 2006Ha51 ; source produced by ¹⁸⁵ Re(γ,n) reaction which should not excite the 169 d isomer. Others: 1960Bo07 (38 d 1), 1962Dz04 (38.0 d 5), 1963Jo03 (33 d 3), 1965Bl06 (34 d 5); some or all of these measurements may have been perturbed by presence of the then-unknown 169 d isomer.
56 ^k 3	(1 ⁻)&		B	
74.01 ^f 16	(2 ⁻)		BCD	
104.7395 ^a 14	4 ⁽⁻⁾		AB D	J ^π : M4-M1+E2 cascade from the 188 level to the 104 level to the 3 ⁽⁻⁾ g.s., and crossover from 188 to g.s. with mult=E3 or E4 or E5.
141.92 ^f 15	(3 ⁻)		BCD	J ^π : probable doublet based on rotational band predictions. No peak broadening was observed.
188.0463 ⁱ 17	8 ⁽⁺⁾	169 d 8	AB	%ε=25.5 8; %IT=74.5 8 μ=(+)2.88 10 μ: from nuclear orientation; weighted average of 2.86 13 (1973Hu06) and 2.90 15 (1973Kr01). T _{1/2} : from 1963Jo03 . Others: 1965Bl06 (166 d 12), 1964Ha06 (160 d). J ^π : see comment on 104.7 level.
237.17 ^a 10	5 ⁽⁻⁾		B D	J ^π : D intraband 133γ to 4 ⁽⁻⁾ 105; band assignment.
242.15 ^f 18	(4 ⁻)		B D	J ^π : 100γ to (3 ⁻) 142; band assignment.
256.60 ^k 20	(3 ⁻)		B D	
311.62 ^b 11	(4 ⁻)	<6 ns	B D	J ^π : gammas to 4 ⁽⁻⁾ 105 and 3 ⁽⁻⁾ g.s.; band assignment.
347.56 ^d 13	(6 ⁻)	8.1 ns 8	B D	J ^π : M1 110γ to 5 ⁽⁻⁾ 237; 243γ to 4 ⁽⁻⁾ 105; band assignment.
368.81 ^f 18	(5 ⁻)		B D	J ^π : intraband D 127γ to (4 ⁻) 242; band assignment.
388 3	(4 ⁻)&		B	

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Adopted Levels, Gammas (continued)

^{184}Re Levels (continued)

E(level) [†]	J ^π [‡]	T _{1/2} [#]	XREF	Comments
389.1 3	(5 ⁺)		D	J ^π : possible bandhead for (ν 1/2[510] + π 9/2[514]) configuration; 314 γ from (5 ⁻ ,6 ⁻) 703. No deexciting transition observed in ($^7\text{Li},3n\gamma$); may be an isomeric state with T _{1/2} >>1 μs or, alternatively, a level whose decay is fragmented over many states.
397.00 ^a 12	6 ⁽⁻⁾		B D	J ^π : D intraband 160 γ to 5 ⁽⁻⁾ 237.
440 ^{@q} 3	(1 ⁻)&		B	
445.98 ⁱ 13	(9 ⁺)		B D	XREF: B(440).
472.78 ^b 12	(5 ⁻)		B D	J ^π : D 161 γ to (4 ⁻) 312; band assignment.
474 ^{@r} 3	(4 ⁺)&		B	
498 ^q 3	(2 ⁻)&		B	
527.49 ^f 20	(6 ⁻)		B D	J ^π : intraband D 159 γ to (5 ⁻) 369 and 285 γ to (4 ⁻) 242.
554.1 ^k 3	(5 ⁻)		B D	XREF: B(549).
565.98 ^d 16	7 ⁻		D	J ^π : D(+Q) 219 γ to (6 ⁻) 348; band assignment.
581 ^q 3	(3 ⁻)&		B	
583.95 ^a 15	7 ⁽⁻⁾		D	J ^π : D intraband 187 γ to 6 ⁽⁻⁾ 397; stretched Q 347 γ to 5 ⁽⁻⁾ 237.
590 ^{@j} 3	(7 ⁺)		B	E(level): from (d,t),($^3\text{He},\alpha$) for doublet.
590 ^{@r} 3	(5 ⁺)&		B	E(level): from (d,t),($^3\text{He},\alpha$) for doublet.
602 3			B	
662.06 ^b 13	(6 ⁻)		B D	J ^π : intraband D+Q 190 γ to (5 ⁻) 473; intraband 350 γ to (4 ⁻) 312.
684.53 ^c 15	(4 ⁺)		D	
693 ^q 3	(4 ⁻)&		B	
702.87 ^g 18	(5 ⁻ ,6 ⁻)	<4 ns	BCD	
709.14 ^f 22	(7 ⁻)		D	J ^π : intraband D 182 γ to (6 ⁻) 527 and 340 γ to (5 ⁻) 369.
715.4 ^e 3	(8 ⁺)		D	
727.86 ⁱ 14	(10 ⁺)		B D	
741 ^r 3	(6 ⁺)&		B	
751 ^j 3	(8 ⁺)		BC	E(level): from (d,t),($^3\text{He},\alpha$).
775 5			C	E(level): from ($^3\text{He},d$); uncertainty estimated by evaluator.
783 3			B	
795.26 ^a 18	8 ⁽⁻⁾		B D	J ^π : D 211 γ to 7 ⁽⁻⁾ 584; stretched Q 398 γ to 6 ⁽⁻⁾ 397.
804.3 ^c 3	(5 ⁺)		B D	XREF: B(800).
810.23 ^d 15	(8 ⁻)		D	
816 3			B	
821.93 ^g 23	(7 ⁻ ,8 ⁻)		b D	
825.50 14	(9 ⁻)	<5 ns	b D	
854.0 ^o 3	(8 ⁻)		D	
864.52 23			B D	
878.34 ^b 17	(7 ⁻)		b D	XREF: b(881). J ^π : intraband D+Q 216 γ to (6 ⁻) 662; intraband 406 γ to (5 ⁻) 473.
887.1 ^p 3	(6 ⁻ ,7 ⁻)		b D	XREF: b(881).
891.1 ^e 3	(9 ⁺)		D	
910 3			BC	
917.00 ^h 16	(10 ⁻)	<5 ns	D	
922.11 ^f 24	(8 ⁻)		CD	XREF: C(927). J ^π : intraband D 213 γ to (7 ⁻) 709 and 395 γ to (6 ⁻) 527.
951.5 ^c 4	(6 ⁺)		b D	XREF: b(953).
955.0 ^k 4	(7 ⁻)		b D	XREF: b(953).
970.00 ^j 18	(9 ⁺)		B D	
973 5			C	E(level): from ($^3\text{He},d$); uncertainty estimated by evaluator.

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Adopted Levels, Gammas (continued) ^{184}Re Levels (continued)

E(level) [†]	J ^π [‡]	T _{1/2} [#]	XREF	Comments
988.3			B	
1003.3			BC	
1022.5			C	E(level): from ($^3\text{He},d$); uncertainty estimated by evaluator.
1032.22 ⁱ 17	(11 ⁺)		D	
1033.28 ^a 20	9 ⁽⁻⁾		D	J ^π : D 238γ to 8 ⁽⁻⁾ 795; stretched Q 449γ to 7 ⁽⁻⁾ 584.
1045.5			C	E(level): from ($^3\text{He},d$); uncertainty estimated by evaluator.
1055.08 ^g 3	(9 ⁻ ,10 ⁻)		D	
1069.23 ^d 19	(9 ⁻)		D	
1074.1 ^o 3	(9 ⁻)		D	
1091.6 ^e 3	(10 ⁺)		D	
1097.3 ^p 3	(8 ⁻ ,9 ⁻)		D	
1120.73 ^b 19	(8 ⁻)		D	J ^π : intraband D(+Q) 243γ to (7 ⁻) 878 and 459γ to (6 ⁻) 662.
1122.91 ^h 18	(11 ⁻)		D	
1125.7 ^c 4	(7 ⁺)		D	
1155.8 ^f 3	(9 ⁻)		D	
1185.33 17	(10 ⁻)		D	
1205.8 4	(8)		D	
1221.06 ^j 17	(10 ⁺)		D	
1293.12 23	(10 ⁻)		D	
1298.47 ^a 23	(10 ⁻)		D	
1320.2 ^e 4	(11 ⁺)		D	
1357.23 ⁱ 19	(12 ⁺)		D	
1361.65 ^h 19	(12 ⁻)		D	
1367.34 ^d 25	(10 ⁻)		D	
1385.88 ^b 22	(9 ⁻)		D	
1400.58 ^g 4	(11 ⁻ ,12 ⁻)		D	
1406.08 ^o 21	(10 ⁻)		D	
1407.8 ^p 3	(10 ⁻ ,11 ⁻)		D	
1417.6 ^f 3	(10 ⁻)		D	
1479.74 ⁿ 18	(11 ⁻)		D	
1499.97 ^j 17	(11 ⁺)		D	
1519.7 4	(10)		D	
1543.18 ^l 22	(12 ⁻)	<6 ns	D	
1572.2 ^e 4	(12 ⁺)		D	
1579.1 ^a 3	(11 ⁻)		D	
1626.40 ^h 22	(13 ⁻)		D	
1675.5 ^b 3	(10 ⁻)		D	
1677.1 ^d 3	(11 ⁻)		D	
1699.8 ^f 3	(11 ⁻)		D	
1700.63 ⁱ 22	(13 ⁺)		D	
1717.92 ⁿ 19	(12 ⁻)		D	
1803.90 ^j 21	(12 ⁺)		D	
1819.4 ^p 4	(12 ⁻ ,13 ⁻)		D	
1826.1 ^l 3	(13 ⁻)		D	
1834.0 ^m 3	(14)	<5 ns	D	
1843.2 ^e 5	(13 ⁺)		D	
1854.9 ^g 4	(13 ⁻ ,14 ⁻)		D	
1911.52 ^h 24	(14 ⁻)		D	

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Adopted Levels, Gammas (continued)

^{184}Re Levels (continued)

E(level) [†]	J ^π [‡]	XREF	E(level) [†]	J ^π [‡]	T _{1/2} [#]	XREF
1927.28 22	(13 ⁻)	D	2219.9 ^h 3	(15 ⁻)		D
1971.53 ⁿ 23	(13 ⁻)	D	2406.2 4	(16)	<5 ns	D
2002.5 ^f 3	(12 ⁻)	D	2412.5 ^g 4	(15 ⁻ ,16 ⁻)		D
2060.1 ⁱ 3	(14 ⁺)	D	2432.0 ^j 3	(15 ⁺)		D
2123.4 ^l 3	(14 ⁻)	D	2433.3 ^l 3	(15 ⁻)		D
2160.4 3	(14)	D	2511.6 ^m 4	(16)		D
2163.7 ^m 4	(15)	D	2657.3 4	(17)		D
2180.9 ^o 4	(13 ⁻)	D	2991.5 ^p 5	(18)		D
2192.0 4	(15)	D				

[†] From least-squares fit to adopted E γ , holding E(56 level) fixed, for levels deexcited by γ -rays; from reaction(s) indicated by cross-references otherwise, unless noted to the contrary.

[‡] Values given without further comment are based on band structure deduced in ($^7\text{Li},3n\gamma$), supported by calculated (g_K-g_R) values, alignments and possible available configurations, except as noted.

[#] from x- γ (t) or $\gamma\gamma$ (t) in ($^7\text{Li},3n\gamma$), except as noted.

@ Partially resolved doublet in (d,t); two states assigned on the basis of rotational band expectations.

& Suggested by 1976EI12 based on a comparison between Nilsson calculations and experimental (d,t) or ($^3\text{He},t$) cross sections and level energy spacings.

^a Band(A): K $^{\pi}=3^{-}$ (π 5/2[402])+(ν 1/2[510]) band.

^b Band(B): K $^{\pi}=4^{-}$ (π 5/2[402])+(ν 3/2[512]) band.

^c Band(C): K $^{\pi}=4^{+}$ (ν 1/2[510])-(π 9/2[514]) (?) band.

^d Band(D): K $^{\pi}=6^{-}$ (π 5/2[402])+(ν 7/2[503])? band.

^e Band(E): K $^{\pi}=8^{+}$ (ν 7/2[503])+(π 9/2[514]) (?) band.

^f Band(F): K $^{\pi}=2^{-}$ (π 5/2[402])-(ν 1/2[510]) band.

^g Band(G): K $^{\pi}=5^{-},6^{-}$ (ν 11/2[615]) \otimes (π 1/2[541]) (?) band.

^h Band(H): K $^{\pi}=10^{-}$ (ν 11/2[615])+(π 9/2[514]) (?) band.

ⁱ Band(I): K $^{\pi}=8^{+}$ (π 5/2[402])+(ν 11/2[615]) band.

^j Band(J): K $^{\pi}=7^{+}$ (π 5/2[402])+(ν 9/2[624])? band.

^k Band(K): K $^{\pi}=1^{-}$ (π 5/2[402])-(ν 3/2[512]) band.

^l Band(L): Band based on (12⁻) 1543 level.

^m Band(M): Band based on (14) 1834 level.

ⁿ Band(N): Band based on (11⁻) 1480 level.

^o Band(O): Band based on (8⁻) 854 level.

^p Band(P): Band based on (6⁻,7⁻) 887 level.

^q Band(Q): K $^{\pi}=1^{-}$ (π 5/2[402])-(ν 7/2[503])? band.

^r Band(R): K $^{\pi}=3^{+}$ (π 5/2[402])-(ν 11/2[615])? band.

Adopted Levels, Gammas (continued)

E _i (level)	J ^π _i	γ(¹⁸⁴ Re)		E _f	J ^π _f	Mult.‡	δ#	α@	Comments
		E _γ †	I _γ †						
74.01	(2 ⁻)	74.0 2	100	0.0	3 ⁽⁻⁾	[M1]		12.19 20	
104.7395	4 ⁽⁻⁾	104.7395 14	100	0.0	3 ⁽⁻⁾	M1+E2	+0.220 4	4.48	E _γ ,Mult.,δ: from IT decay.
141.92	(3 ⁻)	67.9 2	100 24	74.01	(2 ⁻)	[M1]		2.75 5	
188.0463	8 ⁽⁺⁾	141.9 2	5.3 7	0.0	3 ⁽⁻⁾	M4		1.346×10 ⁴	B(M4)(W.u.)=0.124 10 E _γ ,I _γ : from IT decay. Mult.: from subshell ratios in IT decay.
		188.0462 17	3.6	0.0	3 ⁽⁻⁾				
237.17	5 ⁽⁻⁾	132.5 2	100 3	104.7395	4 ⁽⁻⁾	(M1+E2)		2.31	
		237.3 2	17.2 9	0.0	3 ⁽⁻⁾				
242.15	(4 ⁻)	100.3 2	100	141.92	(3 ⁻)				
256.60	(3 ⁻)	200.6 2	100	56	(1 ⁻)				
311.62	(4 ⁻)	206.9 2	66 5	104.7395	4 ⁽⁻⁾				
		311.6 2	100 9	0.0	3 ⁽⁻⁾				
347.56	(6 ⁻)	110.4 2	100 3	237.17	5 ⁽⁻⁾	M1		3.89	B(M1)(W.u.)=0.00039 5 Mult.: from DCO and α(exp)=3.3 3 in (⁷ Li,3nγ).
368.81	(5 ⁻)	242.8 2	30.8 17	104.7395	4 ⁽⁻⁾				
		126.7 2	100 4	242.15	(4 ⁻)	(M1)		2.63	
		226.8 2	15.3 16	141.92	(3 ⁻)	[E2]		0.2108	
397.00	6 ⁽⁻⁾	159.9 2	100 3	237.17	5 ⁽⁻⁾	(M1)		1.358	
		292.2 2	45.7 23	104.7395	4 ⁽⁻⁾				
445.98	(9 ⁺)	257.9 2	100	188.0463	8 ⁽⁺⁾				
472.78	(5 ⁻)	161.1 2	100 4	311.62	(4 ⁻)	(M1)		1.329	
		235.7 2	36.3 26	237.17	5 ⁽⁻⁾				
		367.7& 2	3.9 22	104.7395	4 ⁽⁻⁾				
527.49	(6 ⁻)	472.9 2	17 4	0.0	3 ⁽⁻⁾				
		158.7 2	100 5	368.81	(5 ⁻)	(M1)		1.387	
		285.4 2	25.6 23	242.15	(4 ⁻)				
554.1?	(5 ⁻)	297.5 2	100	256.60	(3 ⁻)				
565.98	7 ⁻	169.1 2	0.9 3	397.00	6 ⁽⁻⁾				
		218.5 2	100 3	347.56	(6 ⁻)	(M1(+E2))		0.40 17	
583.95	7 ⁽⁻⁾	187.0 2	100 3	397.00	6 ⁽⁻⁾	(M1)		0.875	
		346.8 2	72 3	237.17	5 ⁽⁻⁾	(E2)		0.0578	
662.06	(6 ⁻)	189.5 2	100 4	472.78	(5 ⁻)	(M1+E2)		0.61 23	
		350.4 2	12 3	311.62	(4 ⁻)				
		557.2 2	22 4	104.7395	4 ⁽⁻⁾				

Adopted Levels, Gammas (continued)

$\gamma(^{184}\text{Re})$ (continued)									
$E_i(\text{level})$	J_i^π	E_γ^\dagger	I_γ^\dagger	E_f	J_f^π	Mult. [‡]	$\delta^\#$	$\alpha^@$	Comments
684.53	(4 ⁺)	373.0 2	54 4	311.62	(4 ⁻)				
		579.7 2	100 10	104.7395	4 ⁽⁻⁾				
702.87	(5 ⁻ ,6 ⁻)	305.9 2	15.9 10	397.00	6 ⁽⁻⁾				
		313.8 2	24.1 21	389.1	(5 ⁺)				
		334.1 2	74 3	368.81	(5 ⁻)	(D)			B(M1)(W.u.)>4.7×10 ⁻⁵
		460.7 2	100 5	242.15	(4 ⁻)				
		465.8& 2	5.4 11	237.17	5 ⁽⁻⁾				
709.14	(7 ⁻)	181.8 2	100 5	527.49	(6 ⁻)	(M1)		0.947	
		340.2 2	39 3	368.81	(5 ⁻)				
715.4	(8 ⁺)	149.4 2	100	565.98	7 ⁻	E1		0.1360	Mult.: from $\alpha(\text{exp})=0.39$ 12 in (⁷ Li,3n γ).
727.86	(10 ⁺)	282.0 2	100 3	445.98	(9 ⁺)				
		539.8 2	84 5	188.0463	8 ⁽⁺⁾				
795.26	8 ⁽⁻⁾	211.4 2	100 4	583.95	7 ⁽⁻⁾	(M1)		0.622	
		398.2 2	88 4	397.00	6 ⁽⁻⁾	(E2)		0.0394	
804.3	(5 ⁺)	119.8 2	100	684.53	(4 ⁺)				
810.23	(8 ⁻)	226.3 2	27.4 19	583.95	7 ⁽⁻⁾				
		244.5 2	76 4	565.98	7 ⁻				
		413.1 2	33.0 26	397.00	6 ⁽⁻⁾				
821.93	(7 ⁻ ,8 ⁻)	462.6 2	100 6	347.56	(6 ⁻)				
		119.1 2	100 4	702.87	(5 ⁻ ,6 ⁻)	(E2)		2.07 4	
		294.4 2	33.0 21	527.49	(6 ⁻)				
825.50	(9 ⁻)	379.6 2	2.41 19	445.98	(9 ⁺)				
		637.5 2	100 12	188.0463	8 ⁽⁺⁾	(E1+M2)	<1.2	0.03 3	B(E1)(W.u.)>1.6×10 ⁻⁷ D+Q from R(DCO) in (⁷ Li,4n γ); $\Delta\pi$ =(yes) from level scheme; δ (E1,M2)<1.2 from RUL.
854.0	(8 ⁻)	288.0 2	100	565.98	7 ⁻	D			
864.52		552.9 2	100	311.62	(4 ⁻)				
878.34	(7 ⁻)	216.4 2	100 6	662.06	(6 ⁻)	(M1+E2)		0.41 17	
		405.5 2	44 5	472.78	(5 ⁻)				
887.1	(6 ⁻ ,7 ⁻)	184.2 2	100	702.87	(5 ⁻ ,6 ⁻)				
891.1	(9 ⁺)	175.8 2	100	715.4	(8 ⁺)				
917.00	(10 ⁻)	91.5 2	100 4	825.50	(9 ⁻)	(M1,E2)		6.3 4	Mult.: not E1 from $\alpha(\text{exp})=3.8$ 10 from (⁷ Li,3n γ), but $\alpha(\text{exp})$ is lower than expected from theory for M1 or E2.
		471.0 2	57 3	445.98	(9 ⁺)	D(+Q)			B(E1)(W.u.)>2.9×10 ⁻⁸
922.11	(8 ⁻)	213.0 2	100 5	709.14	(7 ⁻)	(M1)		0.609	
		394.6 2	55 4	527.49	(6 ⁻)				
951.5	(6 ⁺)	147.2 2	100	804.3	(5 ⁺)				
955.0?	(7 ⁻)	400.9 2	100	554.1?	(5 ⁻)				
970.00	(9 ⁺)	524.0 2	100	445.98	(9 ⁺)	D			
1032.22	(11 ⁺)	304.5 2	50.0 19	727.86	(10 ⁺)				

Adopted Levels, Gammas (continued)

$\gamma(^{184}\text{Re})$ (continued)

$E_i(\text{level})$	J_i^π	E_γ^\dagger	I_γ^\dagger	E_f	J_f^π	Mult. [‡]	$\alpha^@$
1032.22	(11 ⁺)	586.3 2	100 4	445.98	(9 ⁺)		
1033.28	9 ⁽⁻⁾	238.1 2	100 5	795.26	8 ⁽⁻⁾	(M1)	0.448
		449.3 2	100 5	583.95	7 ⁽⁻⁾	(E2)	0.0287
1055.0	(9 ⁻ ,10 ⁻)	233.0 2	100	821.93	(7 ⁻ ,8 ⁻)	(E2)	0.193
1069.23	(9 ⁻)	259.0 2	24.2 22	810.23	(8 ⁻)		
		503.2 2	100 4	565.98	7 ⁻		
1074.1	(9 ⁻)	508.1 2	100	565.98	7 ⁻		
1091.6	(10 ⁺)	200.6 2	100 5	891.1	(9 ⁺)		
		376.1 2	23 3	715.4	(8 ⁺)		
1097.3	(8 ⁻ ,9 ⁻)	275.4 2	100	821.93	(7 ⁻ ,8 ⁻)		
1120.73	(8 ⁻)	242.5 2	100 6	878.34	(7 ⁻)	(M1(+E2))	0.30 13
		458.6 2	53 6	662.06	(6 ⁻)		
1122.91	(11 ⁻)	206.0 2	100 3	917.00	(10 ⁻)		
		395.1 2	3.9 3	727.86	(10 ⁺)		
1125.7	(7 ⁺)	174.2 & 2	100	951.5	(6 ⁺)		
1155.8	(9 ⁻)	233.8 2	100 5	922.11	(8 ⁻)		
		446.7 2	78 6	709.14	(7 ⁻)		
1185.33	(10 ⁻)	268.5 2	11.6 22	917.00	(10 ⁻)		
		359.8 2	100 6	825.50	(9 ⁻)		
		739.2 2	34 4	445.98	(9 ⁺)		
1205.8	(8)	318.7 2	100	887.1	(6 ⁻ ,7 ⁻)		
1221.06	(10 ⁺)	251.1 2	18.0 15	970.00	(9 ⁺)		
		493.2 2	100 5	727.86	(10 ⁺)	D+Q	
		775.0 2	24 3	445.98	(9 ⁺)		
1293.12	(10 ⁻)	259.8 2	77 5	1033.28	9 ⁽⁻⁾		
		497.9 2	100 6	795.26	8 ⁽⁻⁾		
1298.47	(10 ⁻)	265.3 2	73 4	1033.28	9 ⁽⁻⁾		
		503.1 2	100 6	795.26	8 ⁽⁻⁾	(E2)	0.0215
1320.2	(11 ⁺)	228.6 2	100 5	1091.6	(10 ⁺)		
		429.1 2	35 4	891.1	(9 ⁺)		
1357.23	(12 ⁺)	325.2 2	34.1 16	1032.22	(11 ⁺)	(M1)	0.192
		629.4 2	100 4	727.86	(10 ⁺)		
1361.65	(12 ⁻)	238.8 2	100 3	1122.91	(11 ⁻)	(M1)	0.444
		444.6 2	32.7 20	917.00	(10 ⁻)		
1367.34	(10 ⁻)	557.1 & 2	100	810.23	(8 ⁻)		
1385.88	(9 ⁻)	265.2 2	100 8	1120.73	(8 ⁻)		
		507.5 2	73 9	878.34	(7 ⁻)		
1400.5	(11 ⁻ ,12 ⁻)	345.5 2	100	1055.0	(9 ⁻ ,10 ⁻)	(E2)	0.0584
1406.08	(10 ⁻)	336.8 2	39 4	1069.23	(9 ⁻)		
		595.9 2	100 9	810.23	(8 ⁻)		
1407.8	(10 ⁻ ,11 ⁻)	310.5 2	13 3	1097.3	(8 ⁻ ,9 ⁻)		

Adopted Levels, Gammas (continued)

$\gamma(^{184}\text{Re})$ (continued)

$E_i(\text{level})$	J_i^π	E_γ^\dagger	I_γ^\dagger	E_f	J_f^π	Mult. [‡]	$\alpha^@$	Comments
1407.8	(10 ⁻ ,11 ⁻)	352.8 2	100 6	1055.0	(9 ⁻ ,10 ⁻)	D+Q		
1417.6	(10 ⁻)	261.8 2	100 7	1155.8	(9 ⁻)			
		495.4 2	72 7	922.11	(8 ⁻)			
1479.74	(11 ⁻)	294.4 2	22.7 20	1185.33	(10 ⁻)			
		562.7 2	100 7	917.00	(10 ⁻)			
		654.4 2	16 3	825.50	(9 ⁻)			
1499.97	(11 ⁺)	279.0 2	42 5	1221.06	(10 ⁺)			
		467.8 2	100 8	1032.22	(11 ⁺)	(M1+E2)	0.049 24	D+Q from DCO; $\Delta\pi=(\text{no})$ from level scheme.
		529.9 2	58 6	970.00	(9 ⁺)			
		772.0 2	36 8	727.86	(10 ⁺)			
1519.7	(10)	464.7 2	100	1055.0	(9 ⁻ ,10 ⁻)			
1543.18	(12 ⁻)	181.5 2	8.0 4	1361.65	(12 ⁻)			
		420.2 2	100 4	1122.91	(11 ⁻)	(M1+E2)	0.07 4	B(M1)(W.u.) $>4.2\times 10^{-5}$ Mult.: D+Q from DCO; $\Delta\pi=(\text{no})$ from level scheme.
1572.2	(12 ⁺)	252.0 2	100	1320.2	(11 ⁺)			
1579.1	(11 ⁻)	545.8 2	100	1033.28	9 ⁽⁻⁾			
1626.40	(13 ⁻)	264.8 2	100 4	1361.65	(12 ⁻)	(M1)	0.334	
		503.5 2	89 6	1122.91	(11 ⁻)	(E2)	0.0215	
1675.5	(10 ⁻)	289.6 2	100 14	1385.88	(9 ⁻)			
		554.6 ^{&} 2	62 14	1120.73	(8 ⁻)			
1677.1	(11 ⁻)	607.9 2	100	1069.23	(9 ⁻)			
1699.8	(11 ⁻)	282.3 2	100 11	1417.6	(10 ⁻)			
		544.0 2	97 13	1155.8	(9 ⁻)			
1700.63	(13 ⁺)	343.5 2	24.3 23	1357.23	(12 ⁺)			
		668.3 2	100 6	1032.22	(11 ⁺)			
1717.92	(12 ⁻)	238.3 2	34 4	1479.74	(11 ⁻)			
		595.1 2	46 5	1122.91	(11 ⁻)			
		800.7 2	100 11	917.00	(10 ⁻)			
1803.90	(12 ⁺)	446.8 2	100 18	1357.23	(12 ⁺)			
		582.7 2	100 21	1221.06	(10 ⁺)			
1819.4	(12 ⁻ ,13 ⁻)	411.7 2	59 13	1407.8	(10 ⁻ ,11 ⁻)			
		418.9 2	100 15	1400.5	(11 ⁻ ,12 ⁻)			
1826.1	(13 ⁻)	282.8 2	100	1543.18	(12 ⁻)			
1834.0	(14)	290.8 2	100	1543.18	(12 ⁻)			
1843.2	(13 ⁺)	271.0 2	100 18	1572.2	(12 ⁺)			
		522.5 ^{&} 2	91 14	1320.2	(11 ⁺)			
1854.9	(13 ⁻ ,14 ⁻)	454.4 2	100	1400.5	(11 ⁻ ,12 ⁻)			
1911.52	(14 ⁻)	285.1 2	72 4	1626.40	(13 ⁻)	(M1)	0.273	
		549.8 2	100 6	1361.65	(12 ⁻)			
1927.28	(13 ⁻)	384.0 2	100 10	1543.18	(12 ⁻)			
		565.7 2	92 11	1361.65	(12 ⁻)			

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Adopted Levels, Gammas (continued) $\gamma(^{184}\text{Re})$ (continued)

$E_i(\text{level})$	J_i^π	E_γ^\dagger	I_γ^\dagger	E_f	J_f^π	Mult.‡	$\alpha^@$
1927.28	(13 ⁻)	804.4 2	90 16	1122.91	(11 ⁻)		
1971.53	(13 ⁻)	253.5& 2	18 7	1717.92	(12 ⁻)		
		609.9 2	77 10	1361.65	(12 ⁻)		
		848.6 2	100 14	1122.91	(11 ⁻)		
2002.5?	(12 ⁻)	302.7& 2	100 38	1699.8	(11 ⁻)		
		584.8& 2	56 44	1417.6	(10 ⁻)		
2060.1	(14 ⁺)	702.9 2	100	1357.23	(12 ⁺)		
2123.4	(14 ⁻)	297.3 2	100 8	1826.1	(13 ⁻)		
		580.3 2	97 10	1543.18	(12 ⁻)	(E2)	0.01527
2160.4	(14)	617.2 2	100	1543.18	(12 ⁻)		
2163.7	(15)	329.8 2	100	1834.0	(14)		
2180.9?	(13 ⁻)	601.8& 2	100	1579.1	(11 ⁻)		
2192.0	(15)	358.0 2	100	1834.0	(14)		
2219.9	(15 ⁻)	308.3 2	53 5	1911.52	(14 ⁻)		
		593.6 2	100 10	1626.40	(13 ⁻)		
2406.2	(16)	572.2 2	100	1834.0	(14)	Q	
2412.5	(15 ⁻ , 16 ⁻)	557.6 2	100	1854.9	(13 ⁻ , 14 ⁻)		
2432.0?	(15 ⁺)	731.4& 2	100	1700.63	(13 ⁺)		
2433.3	(15 ⁻)	310.0 2	44 7	2123.4	(14 ⁻)		
		607.1 2	100 11	1826.1	(13 ⁻)		
2511.6	(16)	348.0 2	100 13	2163.7	(15)		
		677.6 2	91 19	1834.0	(14)		
2657.3	(17)	251.1 2	100	2406.2	(16)		
2991.5?	(18)	334.2& 2	100	2657.3	(17)		

† From ($^7\text{Li}, 3n\gamma$), except as noted.

‡ From DCO in ($^7\text{Li}, 3n\gamma$), except as noted, assigning $\Delta\pi=(\text{no})$ to intraband transitions.

From IT decay.

@ 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.

& Placement of transition in the level scheme is uncertain.

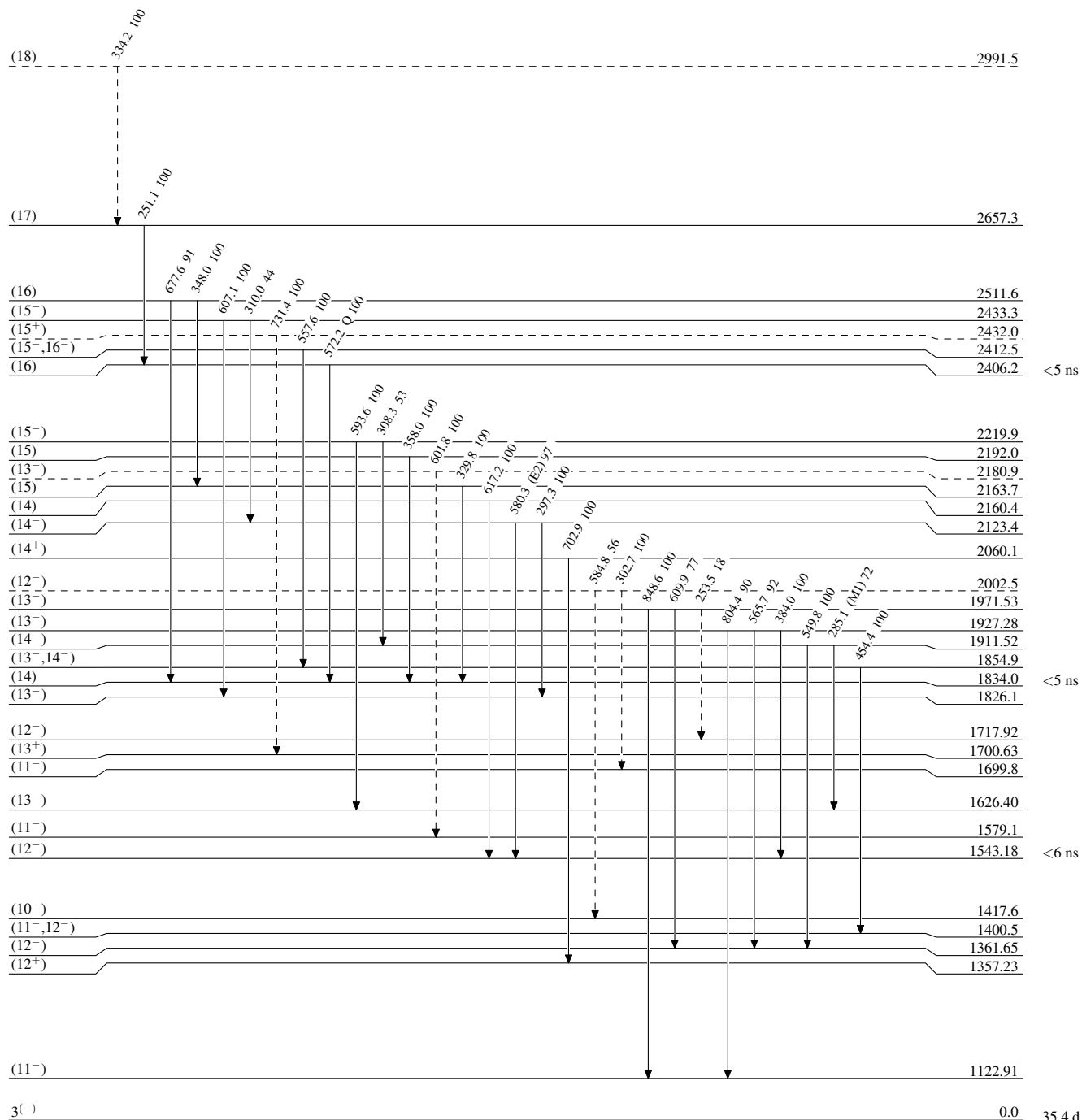
Adopted Levels, Gammas

Legend

Level Scheme

Intensities: Relative photon branching from each level

-----▶ γ Decay (Uncertain)



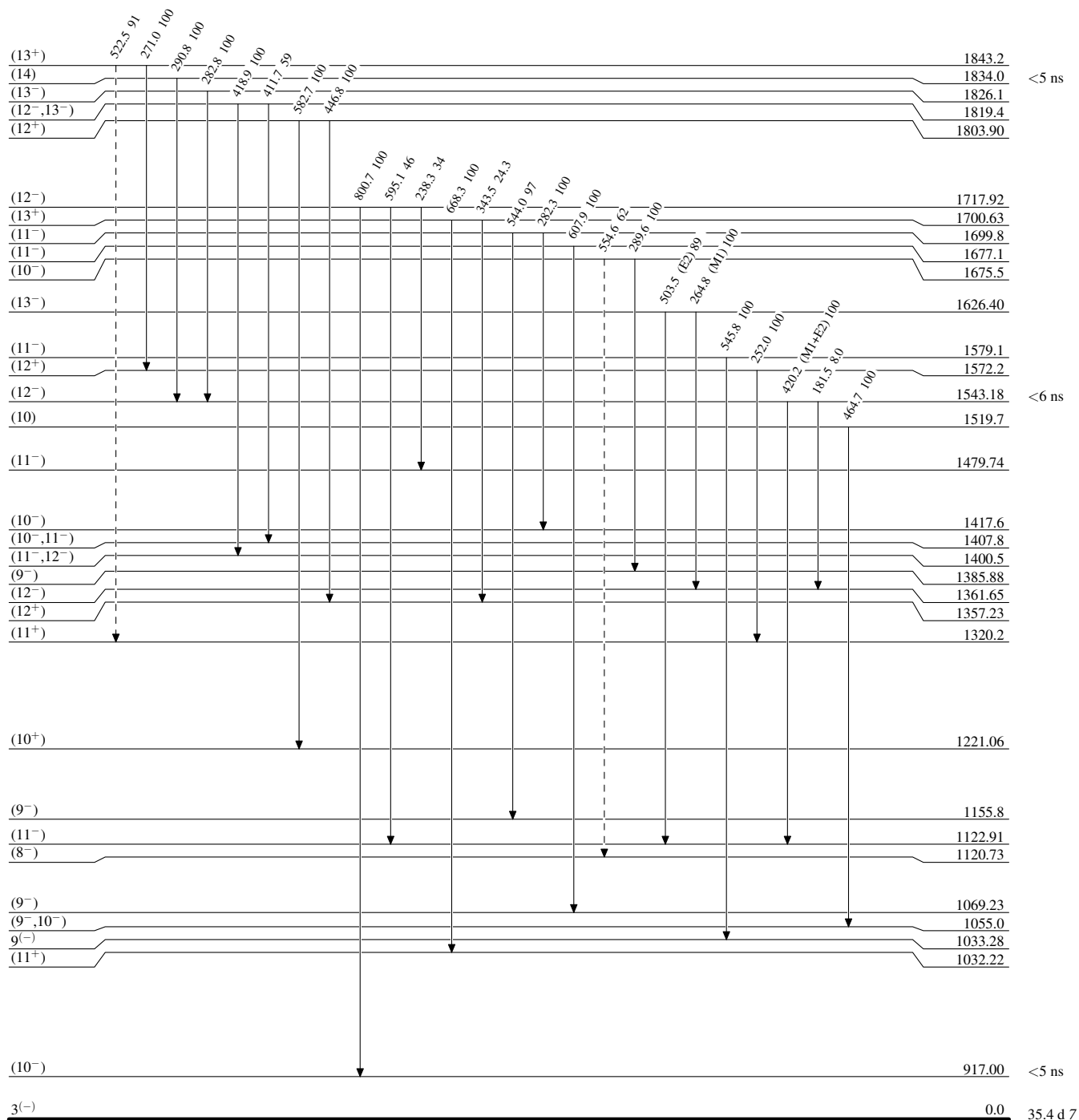
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

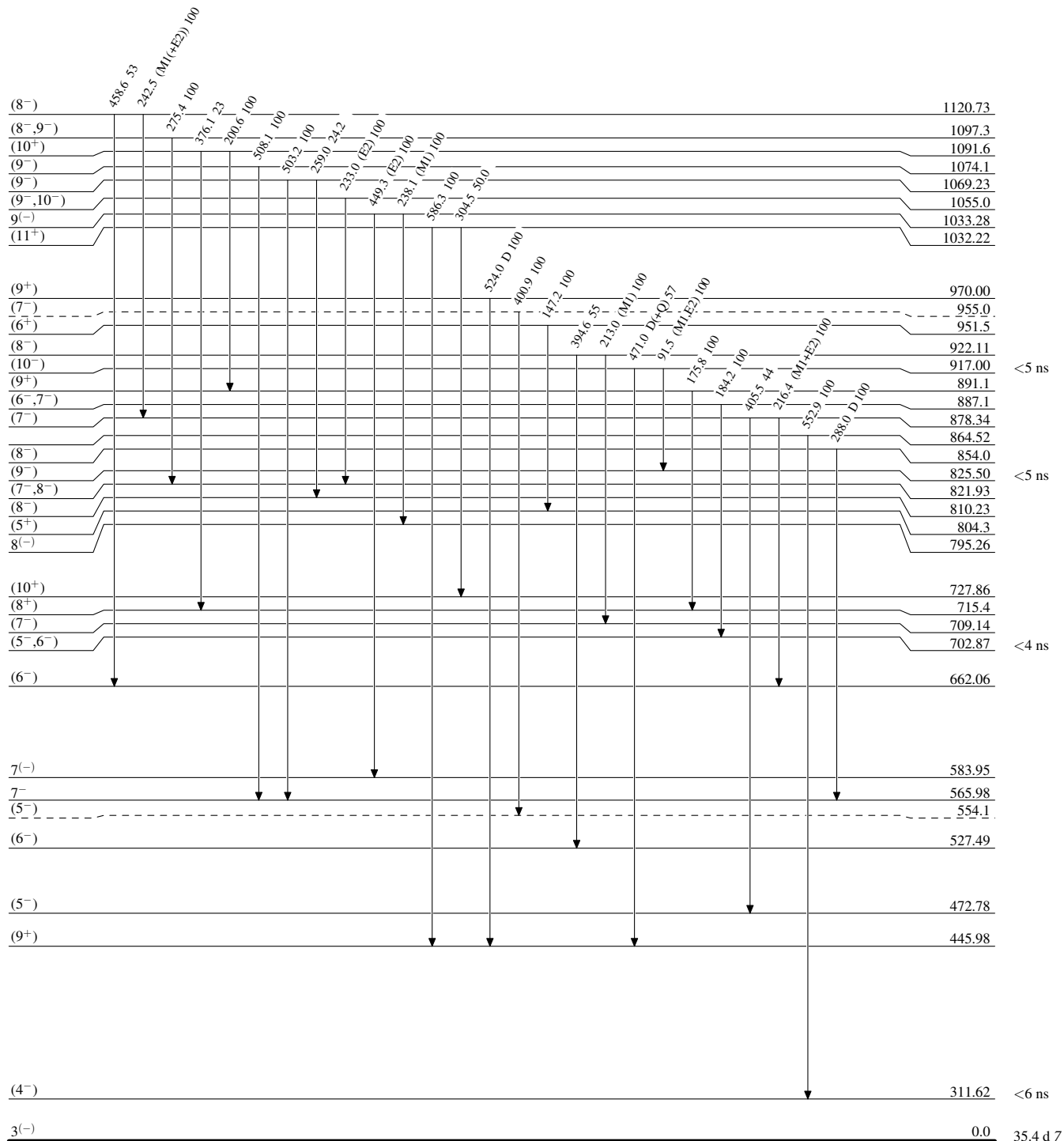
-----▶ γ Decay (Uncertain)



Adopted Levels, Gammas

Level Scheme (continued)

Intensities: Relative photon branching from each level



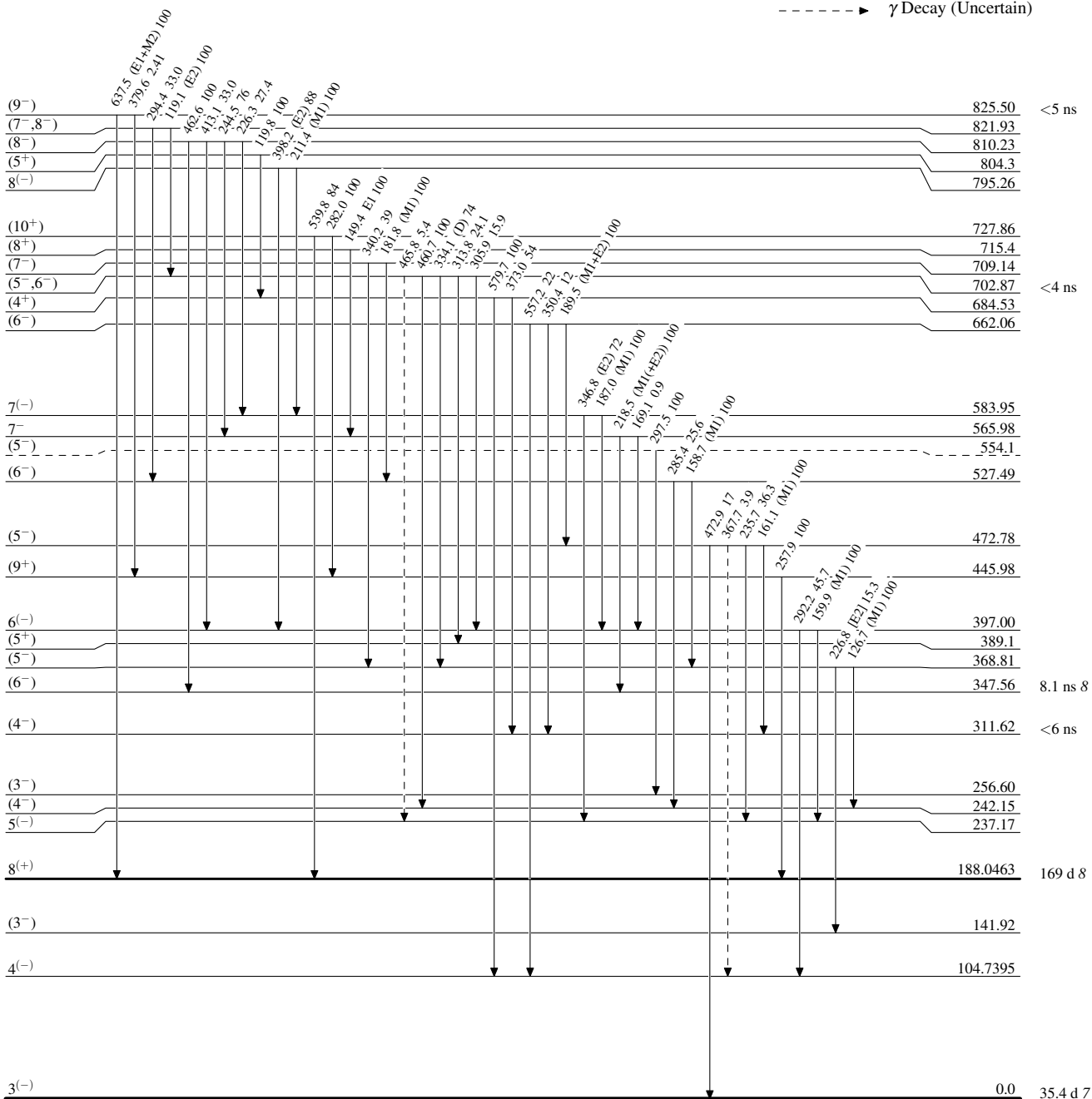
Adopted Levels, Gammas

Legend

Level Scheme (continued)

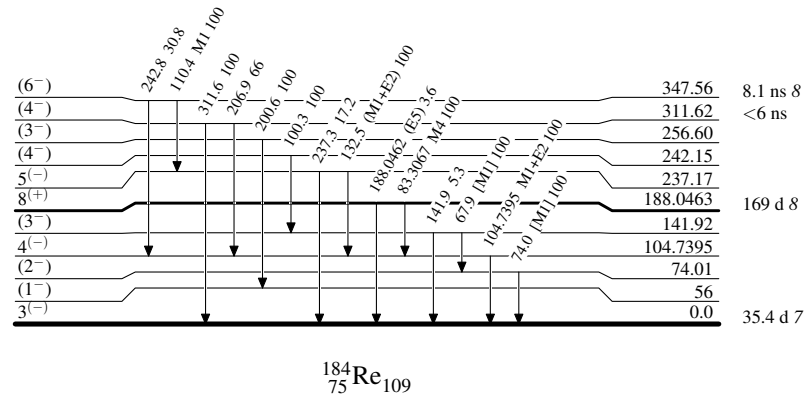
Intensities: Relative photon branching from each level

-----> γ Decay (Uncertain)



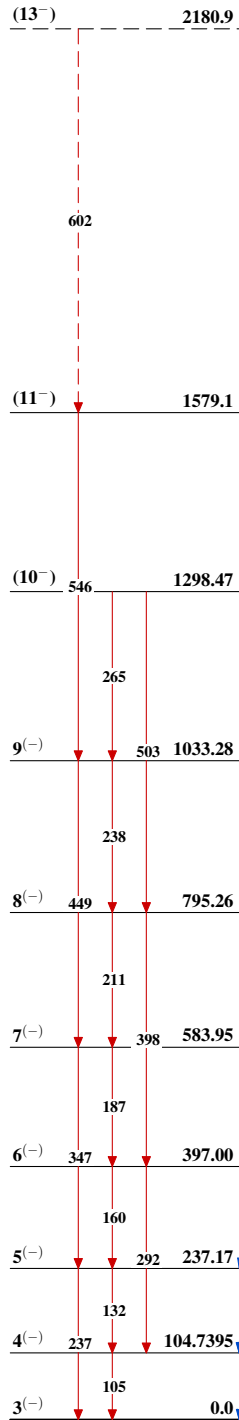
Adopted Levels, Gammas**Level Scheme (continued)**

Intensities: Relative photon branching from each level

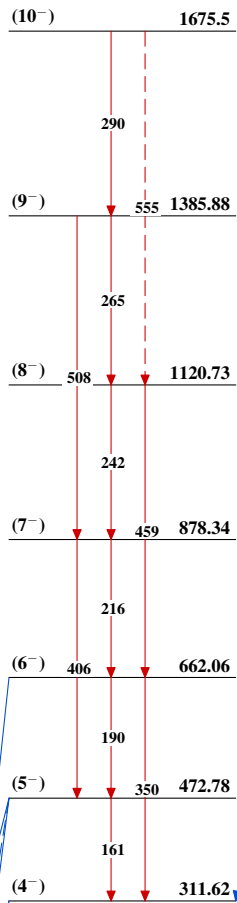


Adopted Levels, Gammas

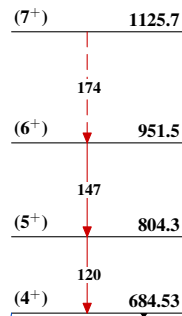
Band(A): $K^\pi=3^- (\pi 5/2[402])+(\nu 1/2[510])$ band



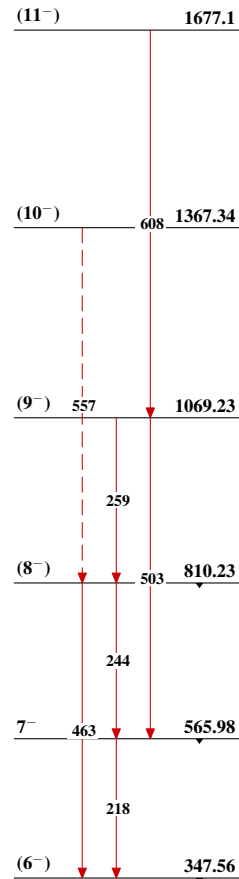
Band(B): $K^\pi=4^- (\pi 5/2[402])+(\nu 3/2[512])$ band



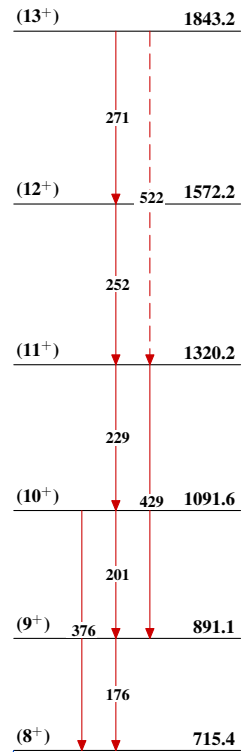
Band(C): $K^\pi=4^+ (\nu 1/2[510])-(\pi 9/2[514])$ (?) band



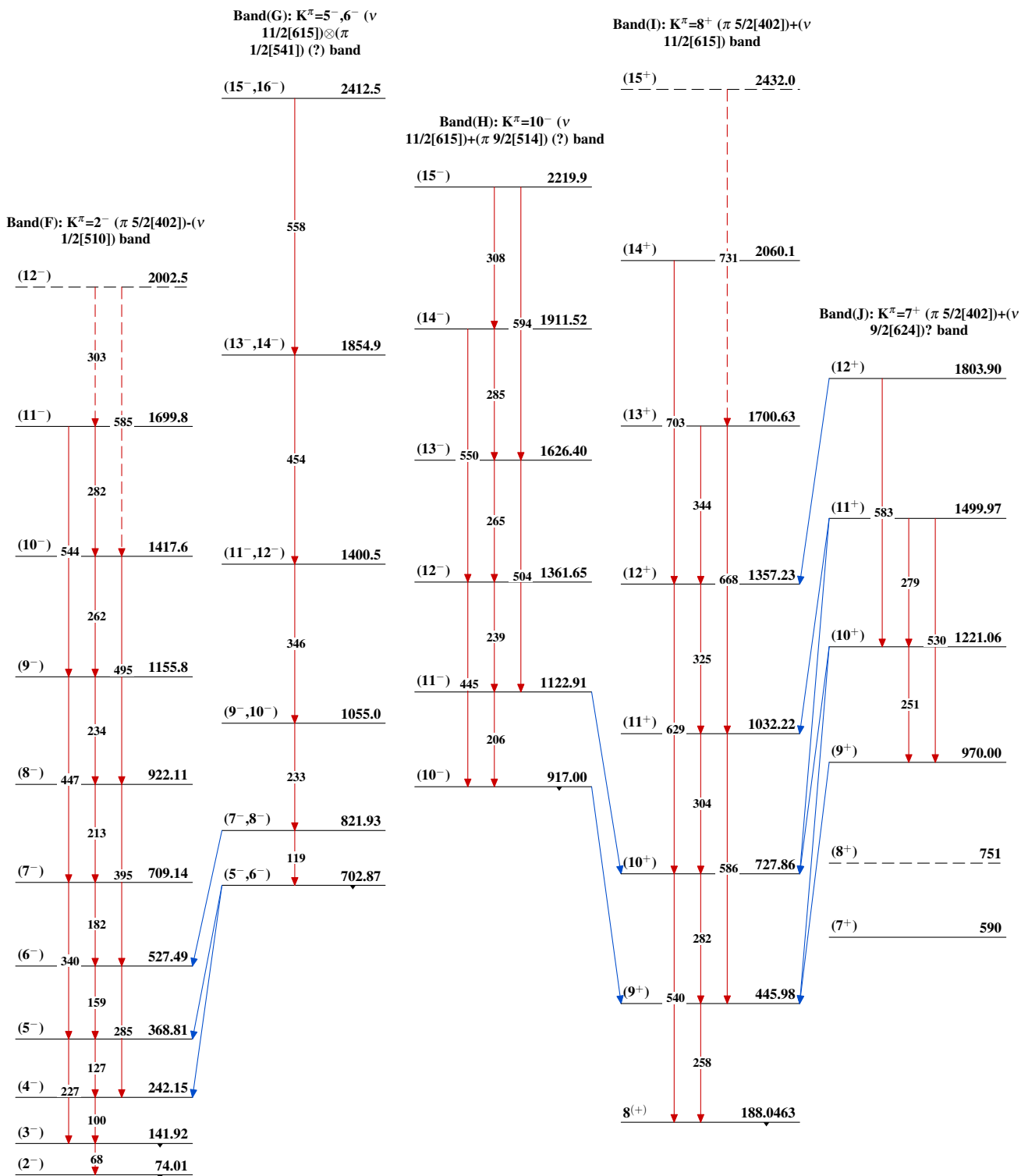
Band(D): $K^\pi=6^- (\pi 5/2[402])+(\nu 7/2[503])?$ band

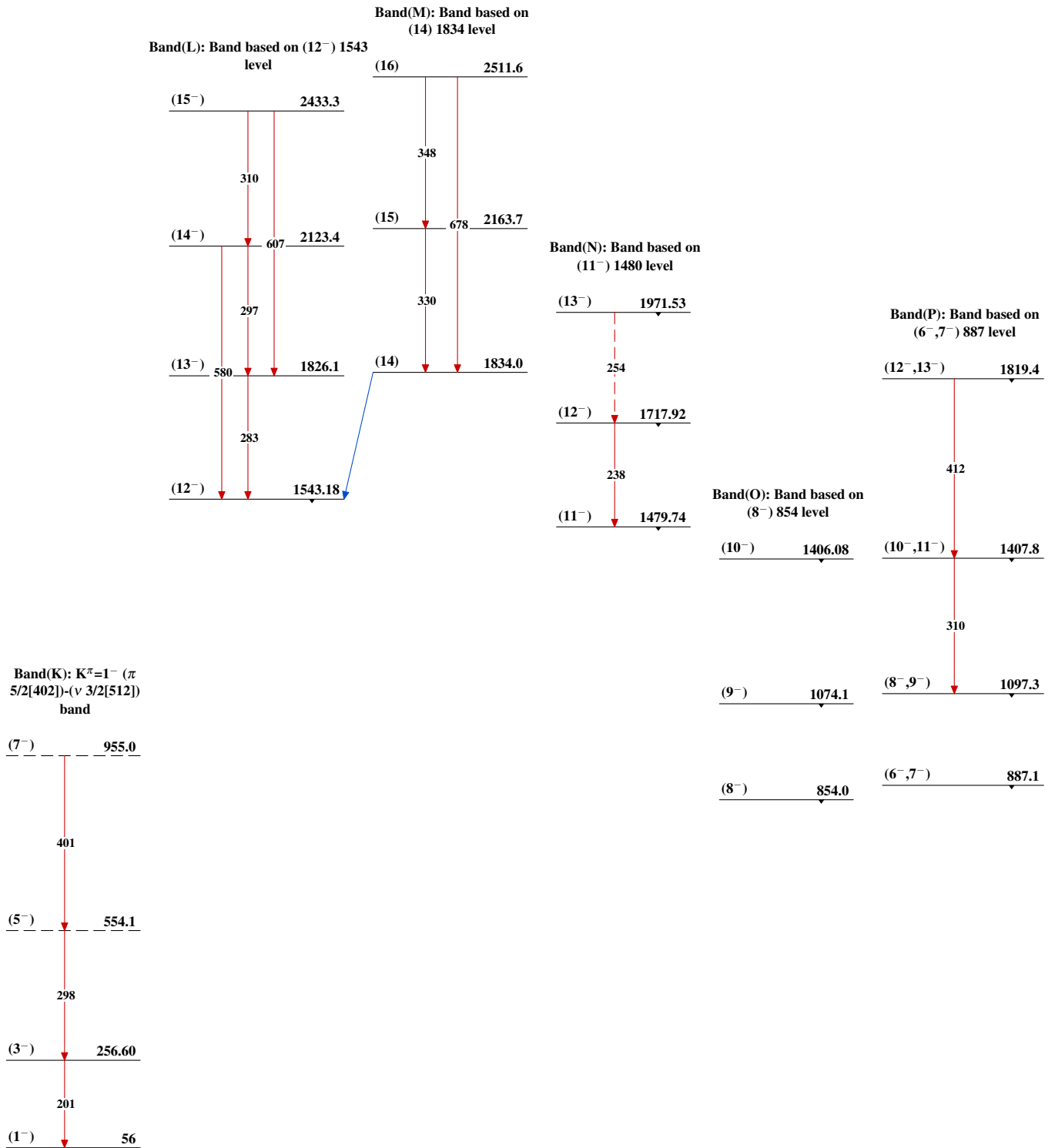


Band(E): $K^\pi=8^+ (\nu 7/2[503])+(\pi 9/2[514])$ (?) band

 $^{184}_{75}\text{Re}_{109}$

Adopted Levels, Gammas (continued)



Adopted Levels, Gammas (continued)

Adopted Levels, Gammas (continued)

**Band(R): $K^\pi=3^+$ (π
5/2[402])-(ν
11/2[615])? band**

(6⁺) 741

**Band(Q): $K^\pi=1^-$ (π
5/2[402])-(ν 7/2[503])?
band**

(4⁻) 693

(5⁺) 590

(3⁻) 581

(2⁻) 498

(4⁺) 474

(1⁻) 440

$^{184}_{75}\text{Re}_{109}$