^{187}W β^- decay 1979Ya14,1976Br09,1966Re01

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	M. S. Basunia	NDS 110, 999 (2009)	1-Nov-2008

Parent: ^{187}W: E=0.0; $J^\pi=3/2^-$; $T_{1/2}$=24.000 h *4*; Q(β^-)=1310.9 *13*; %β^- decay=100.0

Measurements: 1986Ha21, 1983Si18, 1979Ya14, 1976Br09, 1974HeYW, 1970He14, 1969GuZW, 1966Wi17, 1966Re01, 1965Se03, 1965Fu08, 1965Bi07, 1963Ha26, 1963Ma08, 1963Mi15, 1962Bi08, 1962St21, 1960Ar03, 1960Dz04, 1960Ga11, 1958Ve35, 1957Ma16, 1957Du49, 1953Co11, and 1952Mu45.

The ^{187}W β^- decay scheme is a synthesis of several papers which are not fully consistent. The intense transitions agree well in most references, but considerable disagreement exists for many weak transitions in observation and placement in the decay scheme.

^{187}Re Levels

E(level)†	J^π‡	$T_{1/2}$	Comments
0.0	$5/2^+$		
134.247 *6*	$7/2^+$		
206.252 *7*	$9/2^-$	555.3 ns *17*	$T_{1/2}$: from 1972Gu03 (479γ)(72γ)t. Other values: 526 ns *12* (1949Bu09), 550 ns *50* (1949Mc29), 568 ns *12* (1964Ha51), 557 ns *12* (1963Ko19), 570 ns *5* (1963Wa16), 505 ns *13* (1965Br26), and 550 ns *20* (1971Ni01).
303.13 *8*	$9/2^+$		
511.768 *7*	$1/2^+$		
581.99 *3*	$(5/2^+)$		
589.145 *16*	$3/2^+$		
618.370 *8*	$(3/2^+)$	<50 ps	$T_{1/2}$: from 1974Da31 B(ce(K) 107γ)t.
625.517 *8*	$(1/2^+)$	540 ps *11*	$T_{1/2}$: Weighted average of 534 ps *20* (1973SaZD B(618γ)$T_{1/2}$), 530 ps *50* (1966Pe03), 520 ps *30* (1969An17), 550 ps *20* (1971Be82), and 548 ps *20* (1974Da31).
647.31 *25*	$5/2^+$		
685.797 *7*	$5/2^-$	11.5 ps *21*	$T_{1/2}$: Weighted average of 10 ps *3* from 1974Da31 B(ce(K) 686γ) and 13 ps *3* (1967Be62). Other value: 5.9 ps (1973SaZD).
718.73? *4*			
767.8? *4*	$(7/2^+)$		
772.876 *19*	$(3/2^+)$		
816.562 *19*	$(5/2^+)$		
826.84 *12*	$(3/2^+,5/2^+)$		
844.7 *4*	$(9/2^+)$		
864.556 *10*	$3/2^+$		
879.456 *20*	$(5/2^+)$		
933.62? *14*	$(5/2^-,7/2^+)$		
960.17 *5*	$(5/2^+)$		
969.3? *4*	$(3/2^+,5/2,7/2^+)$		
1000.93? *12*	$(5/2^-,7/2^+)$		
1003.14? *5*			
1190.46 *5*	$(5/2^+)$		
1220.8 *3*			
1230.12 *4*	$(3/2^+,5/2^+)$		

† From a least-squares adjustment to the γ-ray energies.
‡ From Adopted Levels.

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β^- radiations

E(decay)	E(level)	Iβ^-[†#]	Log *ft*	Comments
(80.8 *13*)	1230.12	0.041 *14*	6.75 *15*	av Eβ=21.28 *46*
(90.1 *13*)	1220.8	0.00021 *7*	9.18 *15*	av Eβ=23.79 *47*
(120.4 *13*)	1190.46	0.015 *6*	7.71 *18*	av Eβ=32.08 *47*
433 *4*	960.17	0.0205 *12*	9.03 *3*	av Eβ=100.76 *55*
433 *4*	879.456	0.550 *4*	7.893 *7*	av Eβ=126.95 *57* Iβ^-: other value: 0.52 *6* from 1970He14.
450 *4*	864.556	0.751 *17*	7.806 *12*	av Eβ=131.89 *57* Iβ^-: other value: 0.67 *8* from 1970He14.
(484.1 *13*)	826.84	0.0126 *12*	9.70 *5*	av Eβ=144.52 *58*
(494.3 *13*)	816.562	0.051 *12*	9.12 *11*	av Eβ=148.00 *58*
539 *2*	772.876	5.10 *4*	7.243 *6*	av Eβ=162.93 *59* Iβ^-: other value: 4.2 *4* from 1970He14.
622 *2*	685.797	66.2 *3*	6.350 *5*	av Eβ=193.42 *61* Iβ^-: other value: 53.1 *16* from 1970He14.
682 *4*	625.517	4.3 *10*	7.67 *11*	av Eβ=215.02 *62* Iβ^-: other value: 5.2 *5* from 1970He14.
687 *2*	618.370	5.4 *10*	7.59 *8*	av Eβ=217.61 *62* Iβ^-: other value: 5.2 *5* from 1970He14.
1178 *8*	134.247	2.2[‡] *10*	9.9[1u] *7*	av Eβ=401.69 *65* Iβ^-: From decay scheme. 0.7 *10* (1970He14).
1312 *2*	0.0	16.9 *9*	8.081 *24*	av Eβ=457.08 *70* Iβ^-: other value: 25.1 *24* from 1970He14.

† From decay scheme except where indicated. Direct measurement from $\beta\gamma$ coincidence measurements of 1970He14 agree well with these results and are given in comments.

‡ From 1970He14, except otherwise noted.

Absolute intensity per 100 decays.

$\gamma(^{187}Re)$

Iγ normalization: from Σ I(γ+ce) to g.s.=83.1 *6*; 1999Mb04 deduced the %g.s. feeding = 16.9 *6* from measured %Iγ of 134.2γ, 551.5γ, 618.4γ, 625.5γ, 685.8γ, and 772.9γ.

Experimental and theoretical Auger-electron and x-ray intensities are given below. The Auger-electron intensities from 1966Wi17 and the Kα_1 x ray intensity from 1960Ga11 are compared with the theoretical values from 1986BrZQ.

Auger-electron[a]

energy	transition	Intensity experiment	Intensity theory
46.37	KL_1L_1	1.0 1	1.00
46.91	KL_1L_2	1.50 15	1.51
47.41	KL_2L_2	0.10 5	0.10
48.35	KL_1L_3	0.9 1	1.00
48.91	KL_2L_3	1.70 15	1.85
50.32	KL_3L_3	0.8 1	0.88
56.18	KL_1M_1+KL_1M_2	0.80 15	0.72
56.65	KL_1M_3+KL_2M_1	0.69 15	0.48
57.25	KL_2M_3	0.55 15	0.35
57.76	KL_2M_4	0.39 20	0.02
58.19	KL_3LM_1+KL_3M_2	0.75 20	0.49
58.69	KL_3M_3	0.7 2	0.33
60.57	KL_3N	0.61 20	0.22
66.1	KM_2N_2+KM_2M_3+KM_3M_3	0.30 15	0.08

x-ray[b]

59.72	Kα_2 x ray	--	7.25 19
61.14	Kα_1 x ray	11.0 5	12.6 4
69.21	Kβ_1 x ray	--	4.22 12
71.47	Kβ_2 x ray	--	1.07 4

[a] multiply by 0.106 3 for absolute intensity per 100 decays.
This normalization is based on the decay scheme (26.3 5 K-vacancies per 100 decays) and table 8 in 1986BrZQ. The normalization factor 0.089 8 is obtained from the relative KL_1L_2+KL_1L_3+KL_3L_3 intensities of 1960Ga11.

[b] multiply by 1.0 for absolute intensity per 100 decays.

Summary of $\gamma\gamma(\theta)$ results

Cascade(spin sequence)	A_2	A_4	$\delta\times$	Reference
72-134	-0.23	+0.09 5		1958Be22
5/2(E1)7/2(M1+E2)5/2	+0.010 11			1959Ka09
	-0.047 24	0.00 4		1963Mi10
	-0.022 15	-0.04 4		1966Gu12

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	-0.035 23	0.003 32			1971Ni01
	-0.006 2				1972Ke34
	-0.066 11	0.030 23			1983Si18
	-0.002 1	-0.004 3	+0.182 +3-4		1979Ya14
480-72	-0.12 3				1963Ko19
5/2(E2)9/2(E1)7/2	-0.071 5				1963Wa16
	-0.116 3	-0.003 6	E1 pure		1979Ya14
551-134	-0.015				1959Ka09
5/2(E1)7/2(M1+E2)5/2	+0.316 18	-0.086 27			1960Ar03
	-0.034 17	-0.007 30			1963Mi10
	-0.024 13	+0.03 2			1966Gu12
	-0.028 15	+0.012 17			1970Na15
	-0.026 22	+0.003 27			1971Ni01
	-0.058 19	-0.023 39			1983Si18
	-0.019 3	-0.002 4	+0.202 +14-4		1979Ya14
246-618	+0.284 18	-0.007 30	0.5<δ(1)<5.0		1979Ya14
3/2(M1+E2)3/2(M1+E2)5/2			or -2.0<δ(1)<-0.2		
480-(72)-134	-0.04 3				1959Kl90
	-0.001 4	-0.004 6	+0.134 +37-38		1979Ya14

*Mixing ratio for the second transition except where indicated

E_γ [†]	I_γ [†o]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[m]	δ[n]	α[q]	Comments
7.1[a] *3*	0.011 *3*	625.517	(1/2$^+$)	618.370	(3/2$^+$)	M1(+E2)	≤0.03	6.6×10^2 *20*	α(M)=5.2×10^2 *15*; α(N+..)=1.5×10^2 *4* α(N)=1.2×10^2 *4*; α(O)=20 *6*; α(P)=1.16 *16* I_γ: deduced using Ti(7γ)/Ti(625γ)=1.87 *24* (1970He14) and α=660 *20*. Other: Iγ=0.014 *7* (1983Si18). Mult.: M1:M2:M3=100:<20:<5 from 1966Wi17. δ: from 1966Wi17.
[x]16.45[db] *16*	0.028[h] *17*								
29.23 *3*	0.018[h] *4*	618.370	(3/2$^+$)	589.145	3/2$^+$	[M1]		32.8	α(L)=25.4 *4*; α(M)=5.81 *9*; α(N+..)=1.661 *24* α(N)=1.408 *21*; α(O)=0.236 *4*; α(P)=0.01721 *25*
36.38[a] *3*	0.027[i] *3*	618.370	(3/2$^+$)	581.99	(5/2$^+$)	M1+E2	0.12 *5*	23 *6*	α(L)=18 *5*; α(M)=4.2 *11*; α(N+..)=1.2 *3* α(N)=1.0 *3*; α(O)=0.16 *4*; α(P)=0.00891 *16* I_γ: from 1966Wi17 and adopted α value. Other values: 0.066 *4* (1983Si18), <0.08 (1976Br09); I(γ+ce)=0.2% (1965Bi07) corresponds to Iγ=0.03. The adopted Iγ is consistent with the intensity balance through lower levels. This transition was placed deexciting the 625 level by 1976Br09 and 1979Ya14 but it is too intense to feed the 589 level. The placement is consistent with the ceγ coincidence arguments of 1965Bi07 and confirmed by 1986Ha21.

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^{187}W β^- decay 1979Ya14,1976Br09,1966Re01 (continued)

$\gamma(^{187}Re)$ (continued)

E_γ[†]	I_γ[†o]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[m]	δ[n]	α[q]	$I_{(\gamma+ce)}$[p]	Comments
										Mult.: L1:L2:L3:M=100:19 *3*:18 *2*:32 *2*, α(L1)exp=12.1 *3*. Weighted average of values from 1962Bi08, 1965Bi07, and 1966Wi17. Other measurement: 1971Br45. Other measurement: 1971Br45. δ: Deduced by the evaluator from α(L1)exp=12.1 *3*.
40.75[dfbs] *20*	0.007[h] *2*	1000.93?	$(5/2^-,7/2^+)$	960.17	$(5/2^+)$	[E1,M1]		7 *6*		α(L)=5 *5*; α(M)=1.2 *11*; α(N+..)=0.3 *3* α(N)=0.28 *25*; α(O)=0.05 *5*; α(P)=0.003 *4*
43.66[b] *5*	0.007[h] *2*	816.562	$(5/2^+)$	772.876	$(3/2^+)$	[M1]		10.04		α(L)=7.76 *12*; α(M)=1.77 *3*; α(N+..)=0.508 *8* α(N)=0.430 *7*; α(O)=0.0722 *11*; α(P)=0.00526 *8*
65.4[e@]		647.31	$5/2^+$	581.99	$(5/2^+)$	[M1,E2]		14 *11*		α(L)=10 *9*; α(M)=2.6 *21*; α(N+..)=0.7 *6* α(N)=0.6 *5*; α(O)=0.09 *7*; α(P)=0.0009 *7* I_γ: this transition was reported by 1986Ha21 with Iγ=0.76 *3*. This intensity is too large to be consistent with the decay scheme. Presumably either a misprint or an unrecognized impurity is present.
70.2[#df]	0.02[#]	581.99	$(5/2^+)$	511.768	$1/2^+$	[E2]		17.50	0.4[l] *CA*	ce(L)/(γ+ce)=0.715 *7*; ce(M)/(γ+ce)=0.182 *4*; ce(N+)/(γ+ce)=0.0493 *10* ce(N)/(γ+ce)=0.0431 *9*; ce(O)/(γ+ce)=0.00611 *12*; ce(P)/(γ+ce)=9.90×10^{-6} *19* I_γ: From calculated I(γ+ce)=0.4. E_γ: this transition was inferred from ceγ coincidence data of 1965Bi07. The total intensity was reported equal to the 582 transition intensity.
72.002[‡] *4*	40.8 *1*	206.252	$9/2^-$	134.247	$7/2^+$	E1(+M2)	−0.008 *11*	0.960 *15*		α(K)= 0.722 *14*; α(L)= 0.141 *10*; α(M)= 0.0322 *25*; α(N+..)= 0.0093 *11* Mult.: L1:L2:L3:M1:M2:M3:M4:M5:N1:N23:O1=100:42 *2*:47 *3*:25 *4*:12 *2*:15 *1*:3.5 *9*: 2.0 *7*:8.7 *9*:4.5 *9*:2.7 *9*, α(K)exp=0.722 *21*, α(L1)exp=0.080

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^{187}W β^- decay 1979Ya14,1976Br09,1966Re01 (continued)

$\gamma(^{187}Re)$ (continued)

E_γ [†]	I_γ [†o]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[m]	δ[n]	α[q]	Comments
									16, α(L2)exp=0.032 *6*, α(L3)exp=0.033 *5*. Weighted average of measurements from 1960Ga11, 1962Bi08, 1962St21, 1963Ha26, 1964Se11, 1965Ba25, 1965Bi07, 1966Wi17, 1970He14, 1971Br45, and 1979Ya14. 20% uncertainty has been assumed when not explicitly given.
77.37 *5*	0.026 *6*	589.145	3/2$^+$	511.768	1/2$^+$	M1		10.77	α: from 1993Zh27. α(K)exp=0.765 *9* (1993Zh27). α(K)=8.90 *13*; α(L)=1.450 *21*; α(M)=0.332 *5*; α(N+..)=0.0949 *14* α(N)=0.0804 *12*; α(O)=0.01351 *19*; α(P)=0.000986 *14* Mult.: α(L1)exp=1.4 *5* from 1971Br45.
93.22[dfs] *4*	0.018[h] *3*	718.73?		625.517	(1/2$^+$)	[M1,E2]		5.9 *5*	α(K)=3.1 *22*; α(L)=2.1 *13*; α(M)=0.5 *4*; α(N+..)=0.15 *10* α(N)=0.13 *8*; α(O)=0.019 *11*; α(P)=0.00033 *25* α: for an [E1], α=0.459 *7*.
100.38[dfbs] *24*	0.032[h] *3*	718.73?		618.370	(3/2$^+$)	[M1,E2]		4.6 *6*	α(K)=2.5 *17*; α(L)=1.6 *9*; α(M)=0.39 *24*; α(N+..)=0.11 *7* α(N)=0.09 *6*; α(O)=0.014 *8*; α(P)=0.00027 *20* α: for an [E1], α=0.379 *6*.
103.8[#]	0.032[#j] *1*	685.797	5/2$^-$	581.99	(5/2$^+$)	[E1]		0.348	α(K)=0.283 *4*; α(L)=0.0500 *7*; α(M)=0.01147 *16*; α(N+..)=0.00318 *5* α(N)=0.00273 *4*; α(O)=0.000428 *6*; α(P)=2.18×10^{-5} *3*
106.596[‡] *13*	0.093 *2*	618.370	(3/2$^+$)	511.768	1/2$^+$	M1+E2	0.9 *2*	3.81 *15*	α(K)=2.3 *4*; α(L)=1.14 *16*; α(M)=0.28 *4*; α(N+..)=0.078 *11* α(N)=0.067 *10*; α(O)=0.0101 *13*; α(P)=0.00025 *4* Mult.: K:L1:L2:L3:N=0.70 *7*:0.16 *2*:<0.03:<0.03:<0.04, from 1966Wi17. α(K)exp=2.3 *4*, α(L)exp=0.47 *12* from 1965Bi07, 1971Br45. Other measurement: 1962Bi08. δ: Deduced by the evaluator from α(K)exp=2.3 *4*. α(L)exp=0.47 *12* gives 0.27 *14*.
106.596[r‡s] *13*	0.093[r] *2*	879.456	(5/2$^+$)	772.876	(3/2$^+$)	[E2]		3.19	α(K)=0.754 *11*; α(L)=1.84 *3*; α(M)=0.469 *7*; α(N+..)=0.1273 *18* α(N)=0.1113 *16*; α(O)=0.01588 *23*; α(P)=6.66×10^{-5} *10*
113.746[‡] *8*	0.277[h] *4*	625.517	(1/2$^+$)	511.768	1/2$^+$	M1		3.57	α(K)=2.96 *5*; α(L)=0.475 *7*; α(M)=0.1087 *16*; α(N+..)=0.0311 *5* α(N)=0.0264 *4*; α(O)=0.00443 *7*; α(P)=0.000323 *5* Mult.: K:L1:L2:M1:N1=1.3 *1*:0.35 *4*:<0.04:0.07 *2*:<0.04 from 1966Wi17. α(K)exp=2.4 *3*, weighted average of 1965Bi07 and 1971Br45. Other measurement: 1962Bi08.
115.5[#]	0.017[#j] *1*	960.17	(5/2$^+$)	844.7	(9/2$^+$)	[E2]		2.33	α(K)=0.646 *9*; α(L)=1.274 *18*; α(M)=0.324 *5*; α(N+..)=0.0880 *13* α(N)=0.0769 *11*; α(O)=0.01100 *16*; α(P)=5.52×10^{-5} *8*
123.66[dfbs] *12*	0.009[h] *2*	1003.14?		879.456	(5/2$^+$)	[M1,E2]		2.3 *6*	α(K)=1.4 *9*; α(L)=0.7 *3*; α(M)=0.16 *8*; α(N+..)=0.044 *20* α(N)=0.039 *18*; α(O)=0.0058 *23*; α(P)=0.00015 *11* α: for an [E1], α=0.222 *4*.

^{187}W β^- decay 1979Ya14,1976Br09,1966Re01 (continued)

$\gamma(^{187}Re)$ (continued)

E_γ[†]	I_γ[†o]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[m]	δ[n]	α[q]	Comments
134.247[‡] *7*	31.2 *4*	134.247	7/2$^+$	0.0	5/2$^+$	M1+E2	+0.167 *7*	2.20	α(K)=1.81 *3*; α(L)=0.305 *5*; α(M)=0.0702 *10*; α(N+..)=0.0200 *3* α(N)=0.01700 *25*; α(O)=0.00283 *4*; α(P)=0.000197 *3* I_γ: The Limitation of Relative Statistical Weight (LWM) of 31.09 *12* and 30.71 *10* (1999Mb04) and also 32.43 *15* (1976Br09). Weighted average 31.16 *7*. δ: Weighted average of +0.175 *6* (Coul Ex.) and +0.160 *6* (1973Kr05). Mult.: K:L1:L2:L3:M:N:O=1752 *35*:268 *5*:34.1 *7*:10:66 *7*:16 *2*:5 *2*, α(K)exp=1.84 *4*, α(L)exp=0.27 *4*, α(M)exp=0.075 *15*. Weighted average of values from 1960Ga11, 1962Bi08, 1964No08, 1964Se11, 1966As02, 1966Wi17, 1970He14, 1971Br45, and 1979Ya14. 20% uncertainty assumed when not given by authors. Other measurements: 1953Co11, 1957Be56, 1957Du49, 1957Mc34, 1958Ve35, 1959Kl90, 1962St21, 1963Ha26, and 1966As02.
138.50[d f b s] *5*	0.016 *6*	1003.14?		864.556	3/2$^+$	[M1,E2]		1.6 *5*	α(K)=1.1 *7*; α(L)=0.42 *15*; α(M)=0.10 *4*; α(N+..)=0.028 *11* α(N)=0.024 *10*; α(O)=0.0037 *12*; α(P)=0.00011 *8* α: for an [E1], α=0.165 *2*.
141.22[c]	0.024[c]	826.84	(3/2$^+$,5/2$^+$)	685.797	5/2$^-$	[E1]		0.1572	α(K)=0.1292 *18*; α(L)=0.0217 *3*; α(M)=0.00496 *7*; α(N+..)=0.001383 *20* α(N)=0.001185 *17*; α(O)=0.000188 *3*; α(P)=1.039×10^{-5} *15*
147.3[e @]		772.876	(3/2$^+$)	625.517	(1/2$^+$)	[M1,E2]		1.3 *4*	α(K)=0.9 *6*; α(L)=0.33 *10*; α(M)=0.08 *3*; α(N+..)=0.022 *8* α(N)=0.019 *7*; α(O)=0.0029 *8*; α(P)=9.E−5 *7*
154.4[#]	0.050[#] *2*	772.876	(3/2$^+$)	618.370	(3/2$^+$)	[M1,E2]		1.1 *4*	α(K)=0.8 *5*; α(L)=0.27 *8*; α(M)=0.066 *21*; α(N+..)=0.018 *6* α(N)=0.016 *5*; α(O)=0.0024 *6*; α(P)=8.E−5 *6*
165.7[d f s] *4*	0.003 *1*	933.62?	(5/2$^-$,7/2$^+$)	767.8?	(7/2$^+$)				
168.5 *4*	0.009 *3*	303.13	9/2$^+$	134.247	7/2$^+$	M1+E2	+0.168 *7*	1.155 *18*	α(K)=0.951 *15*; α(L)=0.1573 *25*; α(M)=0.0361 *6*; α(N+..)=0.01032 *17* α(N)=0.00875 *14*; α(O)=0.001461 *23*; α(P)=0.0001034 *17* δ: From adopted gammas.
178.8[#]	0.04[#] *2*	864.556	3/2$^+$	685.797	5/2$^-$	[E1]		0.0857	α(K)=0.0708 *10*; α(L)=0.01156 *17*; α(M)=0.00264 *4*; α(N+..)=0.000739 *11* α(N)=0.000631 *9*; α(O)=0.0001014 *15*; α(P)=5.88×10^{-6} *9*

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^{187}W β^- decay 1979Ya14,1976Br09,1966Re01 (continued)

$\gamma(^{187}Re)$ (continued)

E_γ[†]	I_γ[†o]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[m]	δ[n]	α[q]	Comments
191.1[e@]		816.562	(5/2$^+$)	625.517	(1/2$^+$)	[E2]		0.373	α(K)=0.191 *3*; α(L)=0.1381 *20*; α(M)=0.0346 *5*; α(N+..)=0.00948 *14* α(N)=0.00826 *12*; α(O)=0.001205 *17*; α(P)=1.638×10^{-5} *23*
198.34 *12*	0.006 *2*	816.562	(5/2$^+$)	618.370	(3/2$^+$)	[M1,E2]		0.54 *21*	α(K)=0.39 *23*; α(L)=0.108 *11*; α(M)=0.026 *4*; α(N+..)=0.0073 *9* α(N)=0.0062 *9*; α(O)=0.00097 *6*; α(P)=4.E−5 *3*
201.3[e@]		826.84	(3/2$^+$,5/2$^+$)	625.517	(1/2$^+$)	[M1,E2]		0.51 *20*	α(K)=0.38 *22*; α(L)=0.103 *9*; α(M)=0.025 *4*; α(N+..)=0.0069 *8* α(N)=0.0059 *8*; α(O)=0.00092 *5*; α(P)=3.9×10^{-5} *25*
206.247[‡] *19*	0.46 *5*	206.252	9/2$^-$	0.0	5/2$^+$	M2+E3	−0.07 *1*	3.35	α(K)=2.53 *4*; α(L)=0.622 *9*; α(M)=0.1503 *22*; α(N+..)=0.0431 *6* α(N)=0.0367 *6*; α(O)=0.00605 *9*; α(P)=0.000395 *6* I_γ: using limitation of weighted average (LWM) of 0.52 *1* (1976Br09) and 0.419 *8* (1999Mb04). Mult.: α(K)exp=2.47 *6* (1979Ya14); α(K)exp=1.94 *11* and α(L)exp=0.462 *24* (1993Mi29). Other: 17 *5* (1971Br45). K:L1:L23:M:N=2.0 *2*:0.48 *18*:<0.06:0.27 *5*:0.06 *3* from 1966Wi17, 1962Bi08. δ: ≤0.1 (1993Mi29).
208.29 *16*	0.003 *1*	826.84	(3/2$^+$,5/2$^+$)	618.370	(3/2$^+$)	[M1,E2]		0.46 *19*	α(K)=0.34 *20*; α(L)=0.091 *6*; α(M)=0.0218 *23*; α(N+..)=0.0061 *6* α(N)=0.0052 *5*; α(O)=0.00082 *3*; α(P)=3.6×10^{-5} *23*
239.13[&] *8*	0.30 *1*	864.556	3/2$^+$	625.517	(1/2$^+$)	M1+E2	−0.53 *16*	0.38 *3*	α(K)=0.31 *3*; α(L)=0.0575 *9*; α(M)=0.01338 *20*; α(N+..)=0.00380 *6* α(N)=0.00323 *5*; α(O)=0.000529 *10*; α(P)=3.3×10^{-5} *4* I_γ: Weighted average of 0.32 *1* (1976Br09) and 0.0290 *8* (1999Mb04). Mult.: α(K)exp=0.31 *2* from weighted average of values in 1965Bi07, 1970He14, 1971Br45, and 1979Ya14. K:L1=0.31 *2*:0.08 *3* from 1966Wi17. Other measurement: 1962Bi08.
246.20[&] *4*	0.41 *3*	864.556	3/2$^+$	618.370	(3/2$^+$)	M1+E2	+0.50 *15*	0.359 *25*	α(K)=0.290 *24*; α(L)=0.0528 *9*; α(M)=0.01225 *18*; α(N+..)=0.00348 *6* α(N)=0.00296 *5*; α(O)=0.000486 *10*; α(P)=3.1×10^{-5} *3* I_γ: using limitation of weighted average (LWM) of 0.44 *1* (1976Br09) and 0.379 *8* (1999Mb04). Mult.: from α(K)exp=0.28 *3*, weighted average of values in 1965Bi07, 1970He14, 1971Br45, and 1979Ya14. K:L1=0.24 *4*:0.08 *3* from 1966Wi17. Other measurement: 1962Bi08.
261[#]	0.04[#] *1*	772.876	(3/2$^+$)	511.768	1/2$^+$	[M1,E2]		0.24 *11*	α(K)=0.19 *11*; α(L)=0.042 *4*; α(M)=0.0100 *5*; α(N+..)=0.00282 *18* α(N)=0.00242 *12*; α(O)=0.00038 *5*; α(P)=1.9×10^{-5} *12*

$^{187}_{75}Re_{112}$-8

^{187}W β^- decay 1979Ya14,1976Br09,1966Re01 (continued)

$\gamma(^{187}Re)$ (continued)

E_γ[†]	I_γ[†o]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[m]	α[q]	Comments
262.7[#]	0.04[#] *1*	844.7	(9/2$^+$)	581.99	(5/2$^+$)	[E2]	0.1321	α(K)=0.0821 *12*; α(L)=0.0380 *6*; α(M)=0.00939 *14*; α(N+..)=0.00259 *4* α(N)=0.00224 *4*; α(O)=0.000334 *5*; α(P)=7.48×10^{-6} *11* I_γ: value is consistent with no β feeding to this level but inconsistent with B(E2) to this level in Coulomb excitation.
275.61 *12*	0.008 *2*	864.556	3/2$^+$	589.145	3/2$^+$	[M1,E2]	0.21 *10*	α(K)=0.16 *9*; α(L)=0.035 *4*; α(M)=0.0084 *7*; α(N+..)=0.00236 *22* α(N)=0.00202 *17*; α(O)=0.00032 *5*; α(P)=1.7×10^{-5} *11*
(303)	0.0017 *3*	303.13	9/2$^+$	0.0	5/2$^+$	E2	0.0855	α(K)=0.0566 *8*; α(L)=0.0221 *3*; α(M)=0.00542 *8*; α(N+..)=0.001497 *21* α(N)=0.001296 *19*; α(O)=0.000195 *3*; α(P)=5.28×10^{-6} *8* E_γ,I_γ: From adopted gammas.
345.7[e@]		1190.46	(5/2$^+$)	844.7	(9/2$^+$)	[E2]	0.0583	α(K)=0.0404 *6*; α(L)=0.01367 *20*; α(M)=0.00333 *5*; α(N+..)=0.000924 *13* α(N)=0.000798 *12*; α(O)=0.0001215 *17*; α(P)=3.85×10^{-6} *6*
352.86 *17*	0.0057 *22*	864.556	3/2$^+$	511.768	1/2$^+$	[M1,E2]	0.10 *5*	α(K)=0.08 *5*; α(L)=0.016 *4*; α(M)=0.0038 *8*; α(N+..)=0.00109 *23* α(N)=0.00093 *19*; α(O)=0.00015 *4*; α(P)=9.E−6 *5*
374.31[dfs] *14*	0.009 *3*	1190.46	(5/2$^+$)	816.562	(5/2$^+$)	[M1,E2]	0.09 *5*	α(K)=0.07 *4*; α(L)=0.014 *4*; α(M)=0.0032 *7*; α(N+..)=0.00091 *22* α(N)=0.00078 *18*; α(O)=0.00013 *4*; α(P)=7.E−6 *5*
375.93[dfs] *13*	0.013 *3*	581.99	(5/2$^+$)	206.252	9/2$^-$	[M2]	0.454	α(K)=0.359 *5*; α(L)=0.0726 *11*; α(M)=0.01713 *24*; α(N+..)=0.00491 *7* α(N)=0.00417 *6*; α(O)=0.000694 *10*; α(P)=4.78×10^{-5} *7* E_γ: this transition was previously unplaced. 1965Bi07 reported a 448-keV transition deexciting the 582 level which was poorly resolved in ceγ (NaI) coincidence. No 448γ transition has been observed.
454.92 *2*	0.109 *5*	589.145	3/2$^+$	134.247	7/2$^+$	E2	0.0278	α(K)=0.0206 *3*; α(L)=0.00544 *8*; α(M)=0.001304 *19*; α(N+..)=0.000364 *5* α(N)=0.000313 *5*; α(O)=4.88×10^{-5} *7*; α(P)=2.03×10^{-6} *3* I_γ: Weighted average of 0.108 *7* (1976Br09) and 0.113 *10* (1999Mb04). Mult.: α(K)exp≈0.015 from 1971Br45.
479.53 *1*	80.1 *3*	685.797	5/2$^-$	206.252	9/2$^-$	E2	0.0243	α(K)=0.0183 *3*; α(L)=0.00461 *7*; α(M)=0.001102 *16*; α(N+..)=0.000308 *5* α(N)=0.000265 *4*; α(O)=4.14×10^{-5} *6*; α(P)=1.80×10^{-6} *3* Mult.: K:L1:L2:L3:M=5.9 *2*:0.85 *8*:0.43 *6*:0.27 *4*:0.35 *2* from 1966Wi17. α(K)exp=0.0177 *9*, weighted average of values from 1970He14, 1971Br45, and 1979Ya14. Other measurements: 1953Co11, 1957Du49, 1958Ve35, 1960Ga11, 1962Bi08, and 1963Ha26.
484.15 *3*	0.063 *3*	618.370	(3/2$^+$)	134.247	7/2$^+$	[E2]	0.0237	α(K)=0.01785 *25*; α(L)=0.00447 *7*; α(M)=0.001069 *15*; α(N+..)=0.000299 *5* α(N)=0.000257 *4*; α(O)=4.02×10^{-5} *6*; α(P)=1.763×10^{-6} *25*
491.2[#s]	0.09[#] *3*	625.517	(1/2$^+$)	134.247	7/2$^+$			E_γ: 492.80 *20* in 1986Ha21 not placed in the decay scheme.
511.76 *1*	2.43 *4*	511.768	1/2$^+$	0.0	5/2$^+$	E2	0.0206	α(K)=0.01572 *22*; α(L)=0.00378 *6*; α(M)=0.000900 *13*; α(N+..)=0.000252 *4* α(N)=0.000216 *3*; α(O)=3.41×10^{-5} *5*; α(P)=1.558×10^{-6} *22* I_γ: Using Limitation of weighted average of 2.364 *25* (1976Br09) and

$^{187}_{75}Re_{112}$-9

^{187}W β^- decay 1979Ya14,1976Br09,1966Re01 (continued)

$\gamma(^{187}Re)$ (continued)

E_γ [†]	I_γ [†o]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[m]	δ[n]	α[q]	$I_{(\gamma+ce)}$[p]	Comments
										2.460 *15* (1999Mb04). Mult.: α(K)exp=0.020 *2*, weighted average of values from 1966Wi17, 1970He14, and 1971Br45. K:L=3.6 from 1962Bi08. Other measurement: 1979Ya14.
551.55 *1*	18.48[k] *7*	685.797	5/2$^-$	134.247	7/2$^+$	E1(+M2)	+0.001 *5*	0.00599		α(K)=0.00503 *7*; α(L)=0.000747 *11*; α(M)=0.0001690 *24*; α(N+..)=4.80×10^{-5} *7* α(N)=4.07×10^{-5} *6*; α(O)=6.75×10^{-6} *10*; α(P)=4.65×10^{-7} *7* Mult.: α(K)exp=0.0048 *2*, from weighted average of 0.00484 *21* (1993Mi29), 0.0054 *6* (1979Ya14), 0.0048 *6* (1970He14), and 0.0040 *1* (1971Br45). δ: ≤0.019 (1993Mi29).
564.62 *19*	0.044 *16*	1190.46	(5/2$^+$)	625.517	(1/2$^+$)	[E2]		0.01629		α(K)=0.01260 *18*; α(L)=0.00283 *4*; α(M)=0.000670 *10*; α(N+..)=0.000188 *3* α(N)=0.0001613 *23*; α(O)=2.56×10^{-5} *4*; α(P)=1.255×10^{-6} *18*
573.71[d f s] *14*	0.0019 *6*	1220.8		647.31	5/2$^+$					
576.31 *8*	0.024 *3*	879.456	(5/2$^+$)	303.13	9/2$^+$	[E2]		0.01552		α(K)=0.01204 *17*; α(L)=0.00267 *4*; α(M)=0.000632 *9*; α(N+..)=0.0001773 *25* α(N)=0.0001520 *22*; α(O)=2.41×10^{-5} *4*; α(P)=1.201×10^{-6} *17*
[x]578.72[d] *11*	0.0035 *13*									
582[#]	0.394[#]	581.99	(5/2$^+$)	0.0	5/2$^+$	[E2]		0.01517	0.4[l] *CA*	ce(K)/(γ+ce)=0.01161 *16*; ce(L)/(γ+ce)=0.00256 *4*; ce(M)/(γ+ce)=0.000605 *9*; ce(N+)/(γ+ce)=0.0001698 *24* ce(N)/(γ+ce)=0.0001455 *21*; ce(O)/(γ+ce)=2.31×10^{-5} *4*; ce(P)/(γ+ce)=1.158×10^{-6} *17* I_γ: From calculated I(γ+ce)=0.4.
589.06[&] *5*	0.452 *5*	589.145	3/2$^+$	0.0	5/2$^+$	M1(+E2)		0.036 *22*		α(K)=0.030 *19*; α(L)=0.0048 *23*; α(M)=0.0011 *5*; α(N+..)=0.00031 *15* α(N)=0.00027 *12*; α(O)=4.4×10^{-5} *22*; α(P)=3.2×10^{-6} *21* I_γ: Weighted average of 0.446 *9* (1976Br09) and 0.456 *7* (1999Mb04). Mult.: from α(K)exp=0.03 *8* (1979Ya14).

$^{187}_{75}Re_{112}$-10

^{187}W β^- decay 1979Ya14,1976Br09,1966Re01 (continued)

$\gamma(^{187}Re)$ (continued)

E_γ [†]	I_γ [†o]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[m]	δ[n]	α[q]	Comments
612.9 *4*	0.008 *4*	1230.12	$(3/2^+,5/2^+)$	618.370	$(3/2^+)$	[M1,E2]		0.025 *12*	α(K)=0.020 *10*; α(L)=0.0034 *12*; α(M)=0.0008 *3*; α(N+..)=0.00023 *8* α(N)=0.00019 *7*; α(O)=3.2×10^{-5} *12*; α(P)=2.1×10^{-6} *11*
618.37 *1*	22.80[k] *9*	618.370	$(3/2^+)$	0.0	$5/2^+$	M1+E2	−0.50 *25*	0.031 *4*	α(K)=0.026 *3*; α(L)=0.0041 *4*; α(M)=0.00093 *9*; α(N+..)=0.000266 *25* α(N)=0.000225 *21*; α(O)=3.8×10^{-5} *4*; α(P)=2.7×10^{-6} *4* Mult.: α(K)exp=0.0282 *8*, weighted average of 0.0290 *9* (1993Mi29), 0.0257 *21* (1979Ya14), 0.027 *3* (1971Br45), and 0.026 *3* (1970He14). Other: 2.6 (1965Bi07). α(L)exp=0.0039 *16* (1979Ya14) and 0.00424 *21* (1993Mi29). δ: 0.37 *6* (1993Mi29).
625.52 *1*	3.958[k] *18*	625.517	$(1/2^+)$	0.0	$5/2^+$	E2		0.01284	α(K)=0.01007 *15*; α(L)=0.00212 *3*; α(M)=0.000500 *7*; α(N+..)=0.0001406 *20* α(N)=0.0001204 *17*; α(O)=1.92×10^{-5} *3*; α(P)=1.007×10^{-6} *15* Mult.: α(K)exp=0.0108 *7*, weighted average of values from 0.0109 *8* (1993Mi29), 0.011 *11* (1979Ya14), 0.009 *3* (1971Br45), and 0.011 *2* (1970He14).
638.65[r] *13*	0.012[r] *4*	772.876	$(3/2^+)$	134.247	$7/2^+$	[M1,E2]		0.022 *11*	α(K)=0.018 *9*; α(L)=0.0031 *11*; α(M)=0.00071 *24*; α(N+..)=0.00020 *7* α(N)=0.00017 *6*; α(O)=2.9×10^{-5} *11*; α(P)=1.9×10^{-6} *10*
638.65[rs] *13*	0.012[r] *4*	844.7	$(9/2^+)$	206.252	$9/2^-$	[E1]		0.00442	α(K)=0.00372 *6*; α(L)=0.000547 *8*; α(M)=0.0001236 *18*; α(N+..)=3.51×10^{-5} *5* α(N)=2.98×10^{-5} *5*; α(O)=4.96×10^{-6} *7*; α(P)=3.46×10^{-7} *5*
641.1[#]	0.11[#] *4*	1230.12	$(3/2^+,5/2^+)$	589.145	$3/2^+$	[M1+E2]		0.022 *10*	α(K)=0.018 *9*; α(L)=0.0031 *11*; α(M)=0.00070 *24*; α(N+..)=0.00020 *7* α(N)=0.00017 *6*; α(O)=2.8×10^{-5} *11*; α(P)=1.9×10^{-6} *10*
647.30 *25*	0.003 *1*	647.31	$5/2^+$	0.0	$5/2^+$	[M1,E2]		0.022 *10*	α(K)=0.018 *9*; α(L)=0.0030 *11*; α(M)=0.00069 *24*; α(N+..)=0.00020 *7* α(N)=0.00017 *6*; α(O)=2.8×10^{-5} *10*; α(P)=1.9×10^{-6} *10*
682.34 *20*	0.025 *25*	816.562	$(5/2^+)$	134.247	$7/2^+$	[M1,E2]		0.019 *9*	α(K)=0.016 *8*; α(L)=0.0026 *10*; α(M)=0.00060 *21*; α(N+..)=0.00017 *6* α(N)=0.00014 *5*; α(O)=2.4×10^{-5} *9*; α(P)=1.6×10^{-6} *8*

$^{187}_{75}Re_{112}$-11

^{187}W β^- decay 1979Ya14,1976Br09,1966Re01 (continued)

$\gamma(^{187}Re)$ (continued)

E_γ [†]	I_γ [†o]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[m]	δ[n]	α[q]	Comments
685.81 *1*	100.00[k] *27*	685.797	5/2$^-$	0.0	5/2$^+$	E1(+M2)	−0.008 *13*	0.00384	α(K)=0.00323 *5*; α(L)=0.000472 *8*; α(M)=0.0001068 *18*; α(N+..)=3.03×10^{-5} *5* α(N)=2.58×10^{-5} *5*; α(O)=4.29×10^{-6} *7*; α(P)=3.02×10^{-7} *5* Mult.: α(K)exp=0.0034 *2*, weighted average of 0.0034 *2* (1993Mi29), 0.0032 *4* (1979Ya14), 0.0036 *7* (1971Br45), 0.0033 *3* (1970He14), and 0.0038 *8* (1966Wi17). Other measurements: 1953Co11, 1958Ve35, 1962Bi08, 1963Ha26, and 1965Ba25. δ: ≤0.08 (1993Mi29).
693.06 *22*	0.005 *3*	826.84	(3/2$^+$,5/2$^+$)	134.247	7/2$^+$	[M1,E2]		0.018 *8*	α(K)=0.015 *7*; α(L)=0.0025 *9*; α(M)=0.00057 *20*; α(N+..)=0.00016 *6* α(N)=0.00014 *5*; α(O)=2.3×10^{-5} *9*; α(P)=1.6×10^{-6} *8*
727.22[gcs]	0.13[c]	933.62?	(5/2$^-$,7/2$^+$)	206.252	9/2$^-$	[E1,E2]		0.006 *3*	α(K)= 0.0051 *22*; α(L)= 0.0009 *4*
730.32[s]	<0.06	864.556	3/2$^+$	134.247	7/2$^+$	[E2]		0.00909	α(K)=0.00726 *11*; α(L)=0.001408 *20*; α(M)=0.000329 *5*; α(N+..)=9.28×10^{-5} *13* α(N)=7.93×10^{-5} *12*; α(O)=1.281×10^{-5} *18*; α(P)=7.29×10^{-7} *11*
745.21[&] *2*	1.107 *9*	879.456	(5/2$^+$)	134.247	7/2$^+$	M1(+E2)	0.4 *5*	0.020 *4*	α(K)=0.017 *4*; α(L)=0.0026 *5*; α(M)=0.00059 *11*; α(N+..)=0.00017 *3* α(N)=0.000144 *25*; α(O)=2.4×10^{-5} *5*; α(P)=1.8×10^{-6} *4* I_γ: Weighted average of 1.109 *13* (1976Br09) and 1.112 *7* (1999Mb04). Mult.: α(K)exp=0.020 *6* from 1970He14. Other: 0.021 *15* from 1979Ya14. δ: Deduced by the evaluator from α(K)exp=0.020 *6* (1970He14).
767.4[dfs] *8*	0.0057 *22*	767.8?	(7/2$^+$)	0.0	5/2$^+$	[M1,E2]		0.014 *6*	α(K)=0.012 *6*; α(L)=0.0019 *7*; α(M)=0.00044 *16*; α(N+..)=0.00013 *5* α(N)=0.00011 *4*; α(O)=1.8×10^{-5} *7*; α(P)=1.2×10^{-6} *6*
772.87[&] *2*	15.12[k] *6*	772.876	(3/2$^+$)	0.0	5/2$^+$	M1+E2	0.41 *+47−41*	0.018 *4*	α(K)=0.015 *3*; α(L)=0.0024 *4*; α(M)=0.00054 *9*; α(N+..)=0.00015 *3* α(N)=0.000130 *22*; α(O)=2.2×10^{-5} *4*; α(P)=1.6×10^{-6} *4* Mult.: α(K)exp=0.0166 *5*, weighted average of 0.0167 *5* (1993Mi29), 0.0155 *19* (1979Ya14), 0.018 *4* (1971Br45), and 0.015 *3* (1970He14). K:L:M=1.2 *6*:0.20 *3*:0.05 *1* from 1966Wi17. Other measurements: 1958Ve35, 1962Bi08, and

$^{187}_{75}Re_{112}$-12

^{187}W β^- decay 1979Ya14,1976Br09,1966Re01 (continued)

$\gamma(^{187}Re)$ (continued)

E_γ[†]	I_γ[†o]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[m]	δ[n]	α[q]	Comments
									1963Ha26.
									δ: from 1979Ya14. Other: ≤0.32 (1993Mi29).
794.80[gcs]	0.08[c]	1000.93?	(5/2$^-$,7/2$^+$)	206.252	9/2$^-$	[E1,E2]		0.0053 *24*	α(K)= 0.0043 *19*; α(L)= 0.0007 *3*
816.56 *2*	0.046 *8*	816.562	(5/2$^+$)	0.0	5/2$^+$	[M1,E2]		0.012 *5*	α(K)=0.010 *5*; α(L)=0.0016 *6*; α(M)=0.00038 *13*; α(N+..)=0.00011 *4*
									α(N)=9.E−5 *4*; α(O)=1.5×10^{-5} *6*; α(P)=1.1×10^{-6} *5*
									I_γ: Weighted average of 0.0361 *25* (1976Br09) and 0.052 *2* (1999Mb04).
825.95 *25*	0.00085 *13*	960.17	(5/2$^+$)	134.247	7/2$^+$	[M1,E2]		0.012 *5*	α(K)=0.010 *5*; α(L)=0.0016 *6*; α(M)=0.00037 *13*; α(N+..)=0.00010 *4*
									α(N)=9.E−5 *3*; α(O)=1.5×10^{-5} *6*; α(P)=1.0×10^{-6} *5*
826.65 *25*	0.00085 *13*	826.84	(3/2$^+$,5/2$^+$)	0.0	5/2$^+$	[M1,E2]		0.012 *5*	α(K)=0.010 *5*; α(L)=0.0016 *6*; α(M)=0.00036 *13*; α(N+..)=0.00010 *4*
									α(N)=9.E−5 *3*; α(O)=1.5×10^{-5} *6*; α(P)=1.0×10^{-6} *5*
835.55[gcs]	0.03[c]	969.3?	(3/2$^+$,5/2,7/2$^+$)	134.247	7/2$^+$	[M1,E2]		0.012 *5*	α(K)=0.010 *4*; α(L)=0.0015 *6*; α(M)=0.00035 *12*; α(N+..)=0.00010 *4*
									α(N)=9.E−5 *3*; α(O)=1.4×10^{-5} *6*; α(P)=1.0×10^{-6} *5*
844.7 *5*	0.0009 *5*	844.7	(9/2$^+$)	0.0	5/2$^+$	[E2]		0.00667	α(K)=0.00540 *8*; α(L)=0.000981 *14*; α(M)=0.000228 *4*; α(N+..)=6.44×10^{-5} *9*
									α(N)=5.49×10^{-5} *8*; α(O)=8.95×10^{-6} *13*; α(P)=5.42×10^{-7} *8*
864.55 *1*	1.233[k] *7*	864.556	3/2$^+$	0.0	5/2$^+$	M1(+E2)	−0.05 *9*	0.0150 *3*	α(K)=0.01253 *22*; α(L)=0.00191 *4*; α(M)=0.000435 *8*; α(N+..)=0.0001246 *21*
									α(N)=0.0001055 *18*; α(O)=1.78×10^{-5} *3*; α(P)=1.325×10^{-6} *23*
									Mult.: α(K)exp=0.15 *3* from weighted average of values in 1966Wi17, 1970He14, 1971Br45, and 1979Ya14.
879.44[&] *5*	0.514 *3*	879.456	(5/2$^+$)	0.0	5/2$^+$	E2		0.00614	α(K)=0.00498 *7*; α(L)=0.000891 *13*; α(M)=0.000206 *3*; α(N+..)=5.85×10^{-5} *9*
									α(N)=4.98×10^{-5} *7*; α(O)=8.14×10^{-6} *12*; α(P)=5.00×10^{-7} *7*
									I_γ: Weighted average of 0.519 *6* (1976Br09) and 0.512 *4* (1999Mb04).
									Mult.: α(K)exp=0.11 *3* from weighted average of values in 1966Wi17, 1970He14, and 1971Br45.
933.80[gcs]	0.04[c]	933.62?	(5/2$^-$,7/2$^+$)	0.0	5/2$^+$				
960.17 *5*	0.0048 *3*	960.17	(5/2$^+$)	0.0	5/2$^+$	[M1,E2]		0.008 *4*	α(K)=0.007 *3*; α(L)=0.0011 *4*; α(M)=0.00025 *9*; α(N+..)=7.2×10^{-5} *24*
									α(N)=6.1×10^{-5} *21*; α(O)=1.0×10^{-5} *4*; α(P)=7.E−7 *3*
968.78[gcs]	0.14[c]	969.3?	(3/2$^+$,5/2,7/2$^+$)	0.0	5/2$^+$	[M1,E2]		0.008 *4*	α(K)=0.007 *3*; α(L)=0.0011 *4*; α(M)=0.00025 *9*;

^{187}W β^- decay 1979Ya14,1976Br09,1966Re01 (continued)

$\gamma(^{187}Re)$ (continued)

E_γ [†]	I_γ [†o]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[m]	α[q]	Comments
								α(N+..)=7.0×10^{-5} *24* α(N)=5.9×10^{-5} *20*; α(O)=1.0×10^{-5} *4*; α(P)=7.E−7 *3*
1000.82[gcs]	0.015[c]	1000.93?	(5/2$^-$,7/2$^+$)	0.0	5/2$^+$	[E1,M1]	0.006 *5*	α(K)=0.005 *4*; α(L)=0.0008 *6*; α(M)=0.00018 *13*; α(N+..)=5.E−5 *4* α(N)=4.E−5 *3*; α(O)=7.E−6 *6*; α(P)=5.E−7 *4*
1056.24 *5*	0.00082 *22*	1190.46	(5/2$^+$)	134.247	7/2$^+$	[M1,E2]	0.0067 *25*	α(K)=0.0055 *21*; α(L)=0.0009 *3*; α(M)=0.00020 *7*; α(N+..)=5.7×10^{-5} *19* α(N)=4.8×10^{-5} *16*; α(O)=8.E−6 *3*; α(P)=5.8×10^{-7} *23*
1086.6[s]	<0.0003	1220.8		134.247	7/2$^+$			
1095.9[s]	<0.0003	1230.12	(3/2$^+$,5/2$^+$)	134.247	7/2$^+$	[M1,E2]	0.0061 *22*	α(K)=0.0051 *19*; α(L)=0.0008 *3*; α(M)=0.00018 *6*; α(N+..)=5.2×10^{-5} *17* α(N)=4.4×10^{-5} *14*; α(O)=7.4×10^{-6} *25*; α(P)=5.3×10^{-7} *21*
1190.38 *12*	0.00079 *9*	1190.46	(5/2$^+$)	0.0	5/2$^+$	[M1,E2]	0.0051 *17*	α(K)=0.0042 *15*; α(L)=0.00065 *21*; α(M)=0.00015 *5*; α(N+..)=4.7×10^{-5} *14* α(N)=3.6×10^{-5} *11*; α(O)=6.0×10^{-6} *19*; α(P)=4.4×10^{-7} *16*; α(IPF)=4.5×10^{-6} *9*
1220.80 *25*	0.00063 *19*	1220.8		0.0	5/2$^+$			
1230.10 *4*	0.0048 *5*	1230.12	(3/2$^+$,5/2$^+$)	0.0	5/2$^+$			

† From 1976Br09, except otherwise noted.
‡ From 1966Re01.
# From 1986Ha21.
@ From 1986Ha21.
& Weighted average of 1966Re01 and 1976Br09.
[a] From 1983Si18.
[b] Weighted average of 1983Si18 and 1976Br09.
[c] From 1979Ya14.
[d] Tentative assignment to ^{187}W decay by 1976Br09 on the basis of approximate half-life.
[e] Observed only in coincidence.
[f] Placed in the decay scheme by the evaluator on the basis of energy sums.
[g] Observed only by 1979Ya14 and not confirmed by 1986Ha21.
[h] Weighted average of 1983Si18 and 1976Br09.
[i] Weighted average of 1983Si18 and 1986Ha21.
[j] From 1986Ha21.
[k] From 1999Mb04.
[l] From ceγ data of 1965Bi07, the intensity of the 70.2γ and 582γ deexciting the 582 level are about equal. The total intensity for these transitions has been calculated assuming an intensity balance at the 582 level.

$^{187}_{75}Re_{112}$-14

^{187}W β^- decay 1979Ya14,1976Br09,1966Re01 (continued)

$\gamma(^{187}Re)$ (continued)

[m] From ce measurements of 1963Ha26, 1966Wi17, 1970He14, 1971Br45, and 1979Ya14. Ice′s of 1966Wi17 and 1971Br45 have been renormalized to α(K)(480)=0.0183 (E2 theory) and compared to the adopted γ ray intensities.

[n] From 1973Kr05, except otherwise noted.

[o] For absolute intensity per 100 decays, multiply by 0.332 *5*.

[p] Absolute intensity per 100 decays.

[q] 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.

[r] Multiply placed with undivided intensity.

[s] Placement of transition in the level scheme is uncertain.

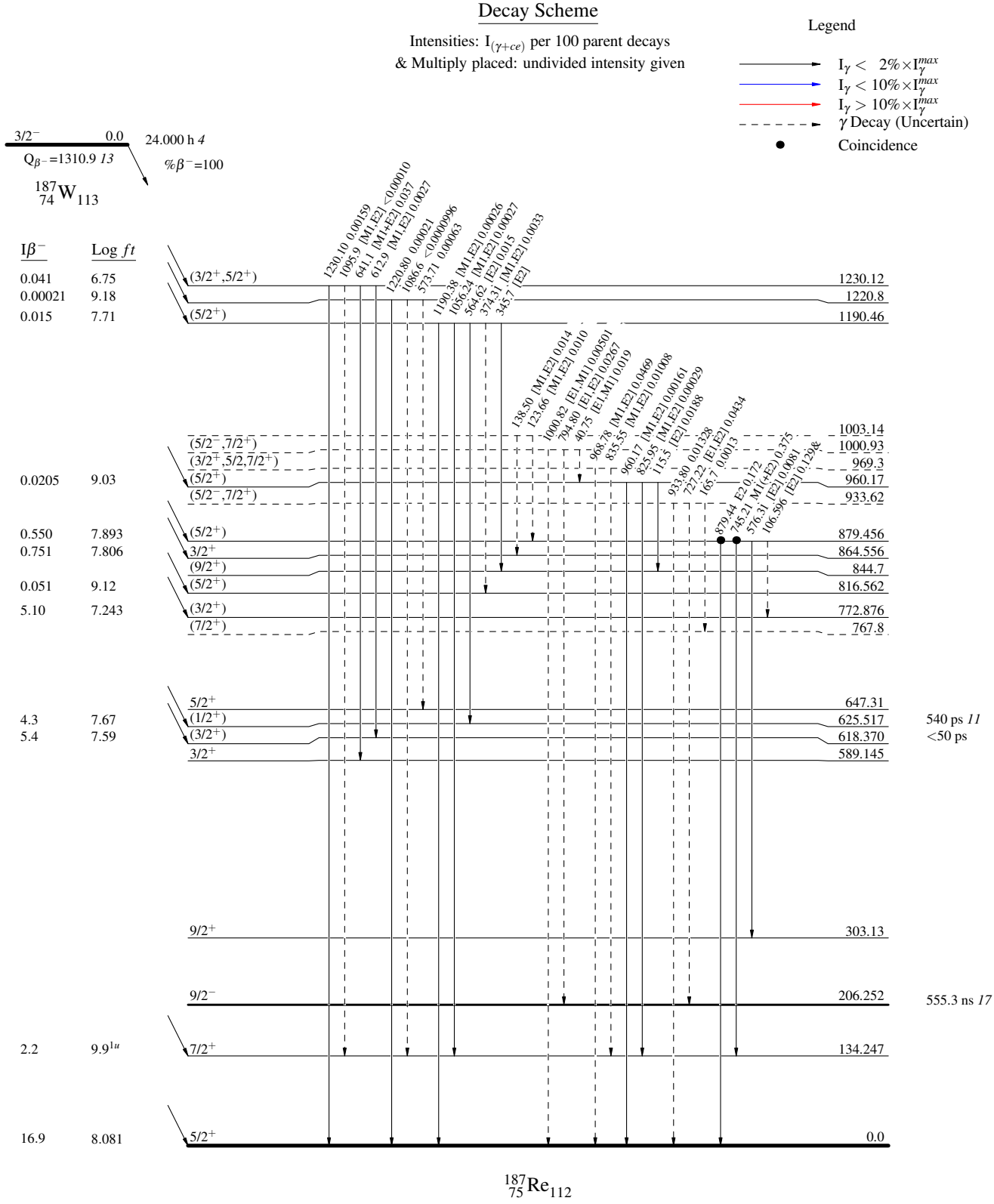
[x] γ ray not placed in level scheme.

$^{187}_{75}Re_{112}$-15

^{187}W β^- decay 1979Ya14,1976Br09,1966Re01

Decay Scheme

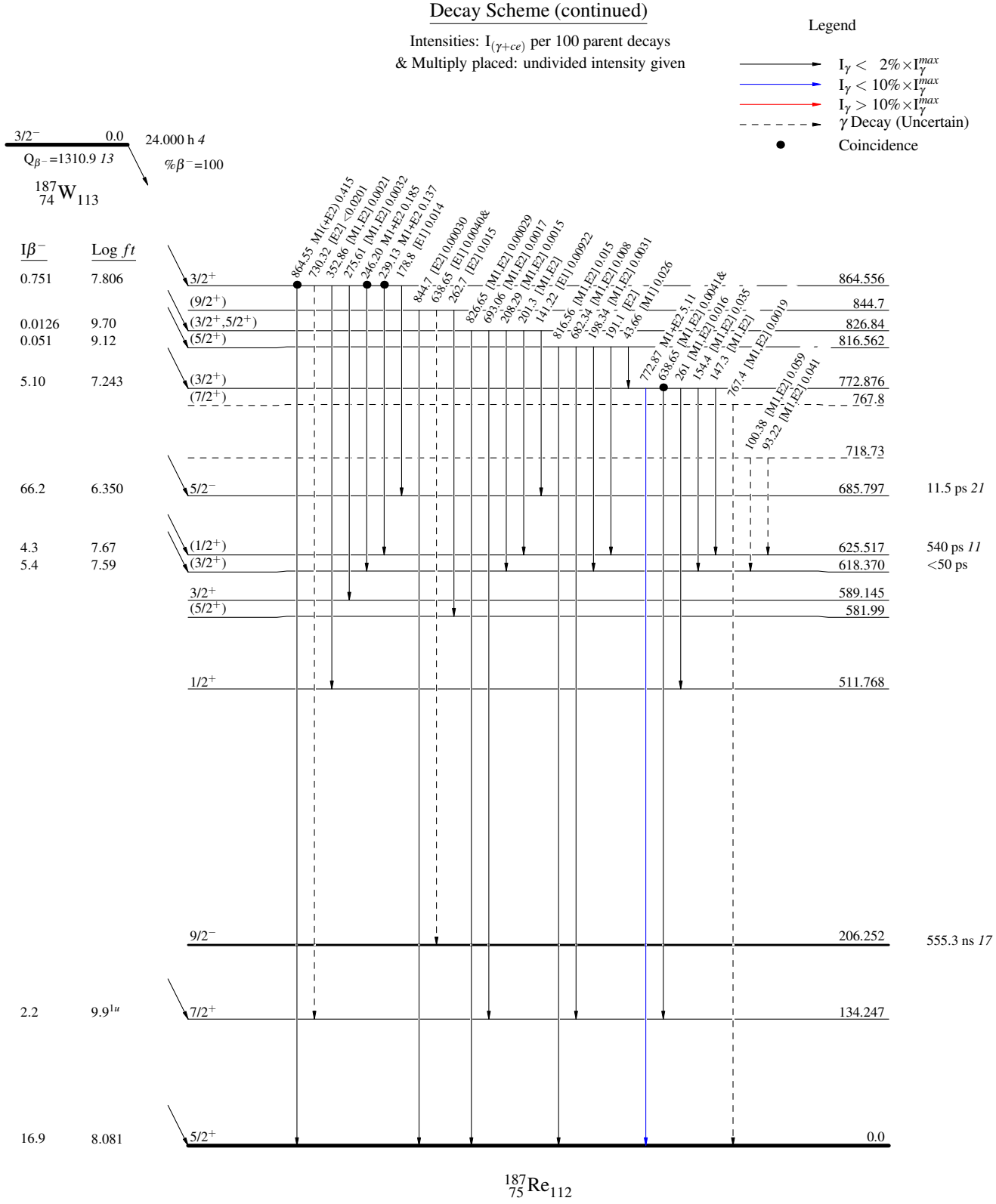
Intensities: $I_{(\gamma+ce)}$ per 100 parent decays
& Multiply placed: undivided intensity given



^{187}W β^- decay 1979Ya14,1976Br09,1966Re01

Decay Scheme (continued)

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays
& Multiply placed: undivided intensity given



$^{187}_{75}Re_{112}$

^{187}W β^- decay 1979Ya14,1976Br09,1966Re01

Decay Scheme (continued)

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays
& Multiply placed: undivided intensity given