Adopted Levels, Gammas

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh	NDS 75,199 (1995)	31-May-1995

Q(β^-)=−7.57×10^3 *5*; S(n)=1.008×10^4 *4*; S(p)=4.67×10^3 *4*; Q(α)=3.84×10^3 *4* 2012Wa38
Note: Current evaluation has used the following Q record −7330 syst 9880 syst 4530 syst 3900 syst 1993Au05,1993Au07.
Uncertainties are: 410(Q(β^-)), 390(S(n)), 340(S(p)), 290(Q(α)).
Nuclear structure calculations (levels, moments etc.): 1994Al23, 1994Be02, 1992Ca08, 1990Wu04, 1988Ra33, 1988Mc04, 1987Gu06, 1985Vo04, 1984Di01, 1983Ba47, 1982Ra24, 1980Gu17, 1979Ha44, 1972Sk04, 1972Gu22, 1971Fr02.
Additional information 1.

^{172}W Levels

Cross Reference (XREF) Flags

- A ^{172}Re ε decay (15 s)
- B ^{172}Re ε decay (55 s)
- C (HI,xnγ)

E(level)[†]	J$^\pi$[#]	$T_{1/2}$[‡]	XREF	Comments
0.0[@]	0$^+$	6.6 min *9*		%ε+%β^+=100 $T_{1/2}$: from 1990Me12. Others: 8.0 min *4* (1986Sz06), 6.5 min *10* (1971Na28), 6.7 min *5* (1970DeZF).
123.2[@] *1*	2$^+$	0.74 ns *6*	ABC	J$^\pi$: E2 γ to 0$^+$.
377.1[@] *2*	4$^+$	33.7 ps *24*	ABC	
727.6[@] *2*	6$^+$	6.8 ps *7*	ABC	
1146.8[@] *2*	8$^+$	2.61 ps *28*	A C	
1433.9[a] *4*	(4$^-$)	58 ps *20*	C	J$^\pi$: ΔJ=(0) γ to 4$^+$; ΔJ=2 E2 γ from (6$^-$).
1617.3[@] *2*	10$^+$	1.54 ps *23*	C	
1713.0[a] *4*	(6$^-$)	11 ps *1*	C	J$^\pi$: ΔJ=(0) γ to 6$^+$.
1762.2[&] *4*	(7$^-$)		C	
2074.2[a] *4*	(8$^-$)	6.9 ps *11*	C	
2105.6[&] *3*	(9$^-$)	2.2 ps *4*	C	J$^\pi$: ΔJ=1, dipole γ to 8$^+$.
2130.0[@] *3*	12$^+$	1.03 ps *16*	C	
2341.9[b] *3*	(9$^-$)	1.4 ps *2*	C	J$^\pi$: ΔJ=(1) γ to 8$^+$.
2475.9[c] *4*	(10$^-$)	<8.7 ps	C	J$^\pi$: ΔJ=(2) γ to (8$^-$).
2517.9[a] *4*	(10$^-$)		C	
2519.4[&] *3*	(11$^-$)	5.3 ps *7*	C	J$^\pi$: ΔJ=2 γ to (9$^-$) and ΔJ=(1), γ to 10$^+$.
2659.3[b] *3*	(11$^-$)	7.7 ps *20*	C	
2679.6[@] *4*	14$^+$	0.78 ps *21*	C	
2848.9[c] *4*	(12$^-$)		C	J$^\pi$: ΔJ=(2) γ to (10$^-$).
2992.3[&] *3*	(13$^-$)	<1.6 ps	C	
3064.1[b] *4*	(13$^-$)	5.4 ps *8*	C	
3256.4[@] *4*	16$^+$	0.50 ps *13*	C	
3292.6[c] *5*	(14$^-$)		C	
3511.3[&] *3*	(15$^-$)		C	
3554.2[b] *4*	(15$^-$)	<1.8 ps	C	
3804.0[c] *7*	(16$^-$)		C	
3854.4[@] *4*	18$^+$	0.40 ps *14*	C	
4067.4[&] *3*	(17$^-$)		C	

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Adopted Levels, Gammas (continued)

^{172}W Levels (continued)

E(level)[†]	J^{π}[#]	$T_{1/2}$[‡]	XREF	E(level)[†]	J^{π}[#]	XREF
4101.1[b] *4*	(17⁻)		C	5937.7[b] *7*	(23⁻)	C
4360.0[c] *7*	(18⁻)		C	5986.2[@] *5*	(24⁺)	C
4499.0[@] *4*	20⁺	0.31 ps *9*	C	6261.6[c] *10*	(24⁻)	C
4652.2[&] *3*	(19⁻)		C	6557.4[&] *5*	(25⁻)	C
4669.0[b] *4*	(19⁻)		C	6824.2[@] *5*	(26⁺)	C
4946.6[c] *7*	(20⁻)		C	7020.6[c] *12*	(26⁻)	C
5209.8[@] *5*	(22⁺)	0.27 ps *11*	C	7326.4[&] *7*	(27⁻)	C
5236.9[&] *3*	(21⁻)		C	7720.2[@] *5*	(28⁺)	C
5278.7[b] *4*	(21⁻)		C	8170.4[&] *9*	(29⁻)	C
5573.6[c] *9*	(22⁻)		C	8668.2[@] *7*	(30⁺)	C
5863.4[&] *4*	(23⁻)		C	9084.4[&] *10*	(31⁻)	C

[†] From least-squares fit to Eγ′s.

[‡] For excited levels, values are from RDDS method in (HI,xnγ).

[#] For levels above the first 2⁺ state, the assignments are generally from ΔJ=2, as indicated by γγ(θ) (DCO) and/or γ(θ). RUL for E2 and M2 transitions suggests mult=E2, assuming that $T_{1/2}$(level) is less than a few nanoseconds (typical timing resolution in γγ coin experiments). For negative-parity bands, the parity assignments are from stretched dipole (assumed as E1) transitions (from γ(θ) data) observed from first few members of these bands to the g.s. band. Similar negative parity bands are present in ^{174}W (1978Dr04) where parity is established from conversion electron data. J^{π} of levels for which no γγ(θ) are available are assigned on the basis of cascading transitions within a collective band. The J^{π}′s are assumed to increase monotonically as the excitation energy increases.

[@] Band(A): (π=+,α=0) g.s. band. From $T_{1/2}$ for band members up to 20⁺, 1991Mc04 deduce Q(transition) for each member. The Q values vary from 6.4 to 7.2.

[&] Band(B): (π=−,α=1) (octupole) band. Q(transition)=5.6 *4* (1991Mc04).

[a] Band(C): (π=−,α=0) (octupole) band. Q(transition)=6.7 *3*, 6.2 *5* (1991Mc04).

[b] Band(D): (π=−, α=1). Q(transition)=5.6 *3*, 5.2 *4* (1991Mc04). Possible configuration=((ν 5/2[642])(ν 5/2[523])) (1994Es01), signature partner of band starting at 10⁻, 2476.

[c] Band(E): (π=−,α=0). possible configuration=((ν 5/2[642])(ν 5/2[523])) (1994Es01), signature partner of band starting at 9⁻, 2342.

γ(^{172}W)

E_i(level)	J^{π}_i	E_{γ}[†]	I_{γ}[†]	E_f	J^{π}_f	Mult.[‡]	α[&]	Comments
123.2	2⁺	123.2 *1*	100	0.0	0⁺	E2	1.78	B(E2)(W.u.)=171 *15* Mult.: from K/L ratio and γγ(θ) in (HI,xnγ).
377.1	4⁺	253.9 *1*	100	123.2	2⁺	E2	0.143	B(E2)(W.u.)=245 *18*
727.6	6⁺	350.5 *1*	100	377.1	4⁺	E2	0.054	B(E2)(W.u.)=260 *30*
1146.8	8⁺	419.3 *1*	100	727.6	6⁺	E2	0.033	B(E2)(W.u.)=290 *30*
1433.9	(4⁻)	1056.0 *5*	100	377.1	4⁺	[E1]		B(E1)(W.u.)=3.2×10⁻⁶ *11*
1617.3	10⁺	470.5 *1*	100	1146.8	8⁺	E2	0.025	B(E2)(W.u.)=270 *40*
1713.0	(6⁻)	279.0 *2*	100 *5*	1433.9	(4⁻)	E2	0.106	B(E2)(W.u.)=300 *40*
		985.5 *5*	67 *8*	727.6	6⁺	[E1]		B(E1)(W.u.)=1.0×10⁻⁵ *1* I_{γ}: weighted average from different reaction studies.
1762.2	(7⁻)	615.1[b] *5*		1146.8	8⁺			I_{γ}: reported by 1978Dr04 only as a mixed (^{172}W+contaminant) line. But it is considered suspect (evaluator) in ^{172}W since its Iγ from Iγ(615γ)/Iγ(1034γ)=3.2 (1978Dr04) is large enough to be detected in other reactions.
		1034.5 *5*	100 *25*	727.6	6⁺			

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Adopted Levels, Gammas (continued)

$\gamma(^{172}W)$ (continued)

E_i(level)	J_i^π	E_γ[†]	I_γ[†]	E_f	J_f^π	Mult.[‡]	Comments
2074.2	(8⁻)	361.1 *2*	100	1713.0	(6⁻)	#	B(E2)(W.u.)=220 *40*
2105.6	(9⁻)	343.3 *5*	39 *4*	1762.2	(7⁻)	[E2]	B(E2)(W.u.)=260 *60*
		958.8 *2*	100 *7*	1146.8	8⁺	@	B(E1)(W.u.)=8.2×10⁻⁵ *14*
2130.0	12⁺	512.6 *5*	100	1617.3	10⁺	E2	B(E2)(W.u.)=270 *50*
2341.9	(9⁻)	1195.0 *2*	100	1146.8	8⁺	@	B(E1)(W.u.)=9.0×10⁻⁵ *11*
2475.9	(10⁻)	401.6 *2*	100	2074.2	(8⁻)	#	B(E2)(W.u.)>110
2517.9	(10⁻)	443.7[a] *2*	100[a]	2074.2	(8⁻)	#	
2519.4	(11⁻)	413.8 *2*	100 *3*	2105.6	(9⁻)	#	B(E2)(W.u.)=76 *11*
		902.3 *2*	101 *6*	1617.3	10⁺	@	B(E1)(W.u.)=2.8×10⁻⁵ *4*
2659.3	(11⁻)	317.4 *2*	100 *4*	2341.9	(9⁻)	#	B(E2)(W.u.)=260 *70*
		1041.8 *5*	48 *9*	1617.3	10⁺	[E1]	B(E1)(W.u.)=7.8×10⁻⁶ *19*
2679.6	14⁺	549.6 *1*	100	2130.0	12⁺	E2	B(E2)(W.u.)=250 *70*
2848.9	(12⁻)	189.5 *5*	100 *5*	2659.3	(11⁻)	#	
		331.0 *5*	17 *8*	2517.9	(10⁻)		
		372.9 *2*	100 *5*	2475.9	(10⁻)	#	
2992.3	(13⁻)	472.9 *1*	100 *5*	2519.4	(11⁻)	(E2)#	B(E2)(W.u.)>180
		862.2 *2*	44 *4*	2130.0	12⁺	[E1]	B(E1)(W.u.)>6×10⁻⁵
3064.1	(13⁻)	214.4 *5*		2848.9	(12⁻)		
		404.7 *2*	100 *6*	2659.3	(11⁻)	#	B(E2)(W.u.)=160 *30*
3256.4	16⁺	576.8 *1*	100	2679.6	14⁺	E2	B(E2)(W.u.)=310 *90*
3292.6	(14⁻)	229[b]		3064.1	(13⁻)		
		443.7[a] *2*	100[a]	2848.9	(12⁻)	#	
3511.3	(15⁻)	519.1 *1*	100 *4*	2992.3	(13⁻)	#	
		832.0 *5*		2679.6	14⁺		
3554.2	(15⁻)	490.0 *2*	100	3064.1	(13⁻)	#	B(E2)(W.u.)>190
3804.0	(16⁻)	511.4 *5*	100	3292.6	(14⁻)	#	
3854.4	18⁺	598.0 *1*	100	3256.4	16⁺	E2	B(E2)(W.u.)=330 *120*
4067.4	(17⁻)	556.1 *1*	100	3511.3	(15⁻)	#	
4101.1	(17⁻)	546.7 *2*	100	3554.2	(15⁻)	#	
4360.0	(18⁻)	556.0 *2*	100	3804.0	(16⁻)	#	
4499.0	20⁺	644.6 *1*	100	3854.4	18⁺	E2	B(E2)(W.u.)=290 *90*
4652.2	(19⁻)	584.8[a] *1*	100[a]	4067.4	(17⁻)	#	
4669.0	(19⁻)	567.7[a] *2*	100[a]	4101.1	(17⁻)	#	
4946.6	(20⁻)	586.6 *2*	100	4360.0	(18⁻)	#	
5209.8	(22⁺)	710.8 *2*	100	4499.0	20⁺	#	B(E2)(W.u.)=200 *90*
5236.9	(21⁻)	567.7[a] *2*	<43[a]	4669.0	(19⁻)		
		584.8[a] *1*	<100[a]	4652.2	(19⁻)		
5278.7	(21⁻)	610.0 *5*	100 *25*	4669.0	(19⁻)	#	
		626.5[a] *2*	<400[a]	4652.2	(19⁻)	#	
5573.6	(22⁻)	627.0 *5*	100	4946.6	(20⁻)	#	
5863.4	(23⁻)	626.5[a] *2*	100[a]	5236.9	(21⁻)	#	
5937.7	(23⁻)	659.0 *5*		5278.7	(21⁻)		
5986.2	(24⁺)	776.4 *2*	100	5209.8	(22⁺)	#	
6261.6	(24⁻)	688.0 *5*	100	5573.6	(22⁻)	#	
6557.4	(25⁻)	694.0 *2*	100	5863.4	(23⁻)		
6824.2	(26⁺)	838.0 *1*	100	5986.2	(24⁺)	#	
7020.6	(26⁻)	759.0 *5*	100	6261.6	(24⁻)		

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Adopted Levels, Gammas (continued)

$\gamma(^{172}W)$ (continued)

E_i(level)	J^π_i	E_γ[†]	I_γ[†]	E_f	J^π_f
7326.4	(27^-)	769.0 *5*	100	6557.4	(25^-)
7720.2	(28^+)	896.0 *1*	100	6824.2	(26^+)
8170.4	(29^-)	844.0 *5*		7326.4	(27^-)
8668.2	(30^+)	948.0 *5*		7720.2	(28^+)
9084.4	(31^-)	914.0 *5*		8170.4	(29^-)

[†] From (HI,xnγ).

[‡] From $\gamma(\theta)$, $\gamma\gamma(\theta)$ and RUL (for E2 and M2).

[#] $\gamma(\theta)$ and/or $\gamma\gamma(\theta)$ consistent with ΔJ=2. RUL (for E2 and M2) suggests E2.

[@] $\gamma(\theta)$ and $\gamma\gamma(\theta)$ consistent with ΔJ=1, dipole and forbids ΔJ=2.

[&] 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] Multiply placed with undivided intensity.

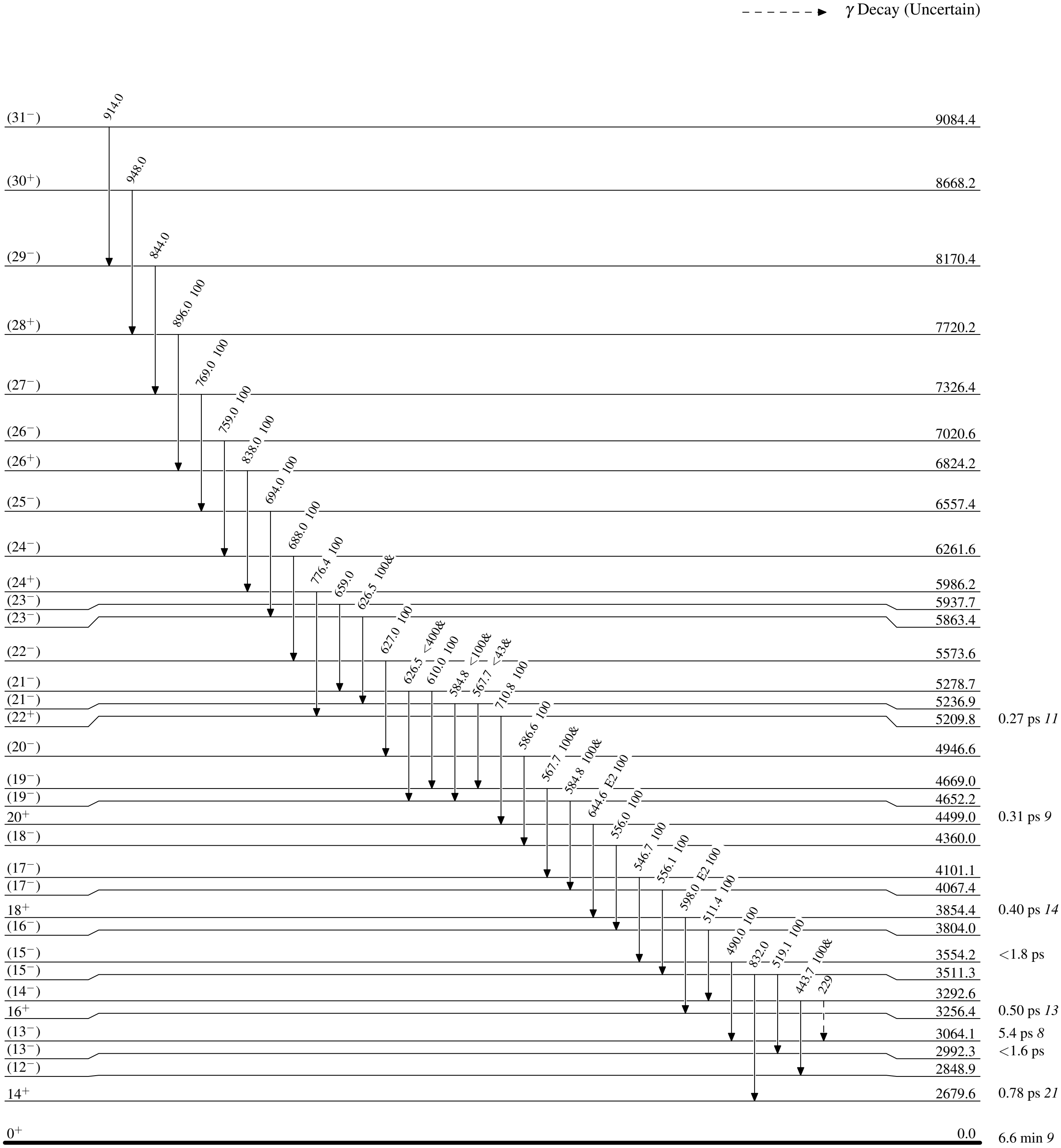
[b] Placement of transition in the level scheme is uncertain.

Adopted Levels, Gammas

Legend

Level Scheme

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given



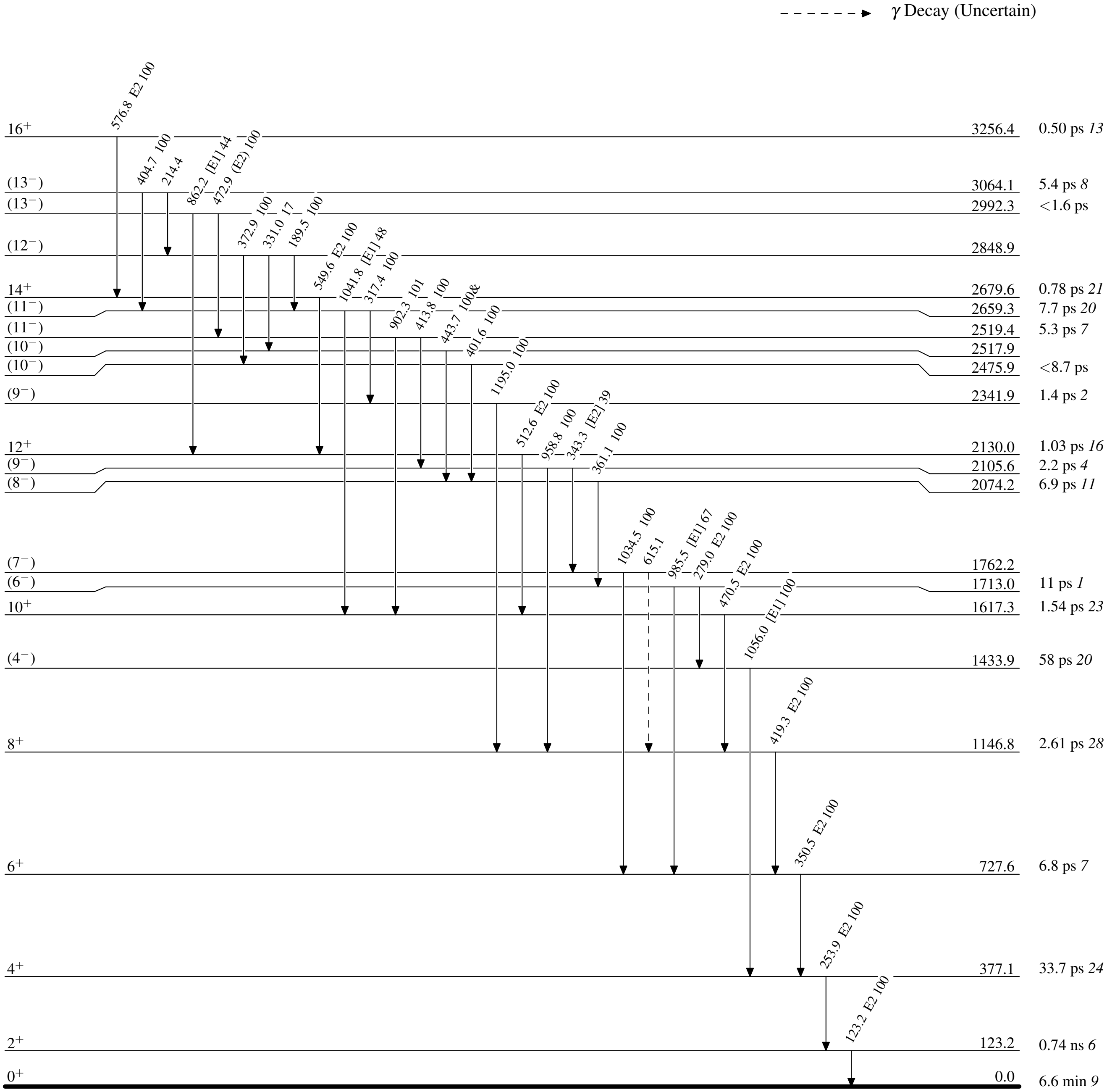
$^{172}_{74}W_{98}$

Adopted Levels, Gammas

Level Scheme (continued)

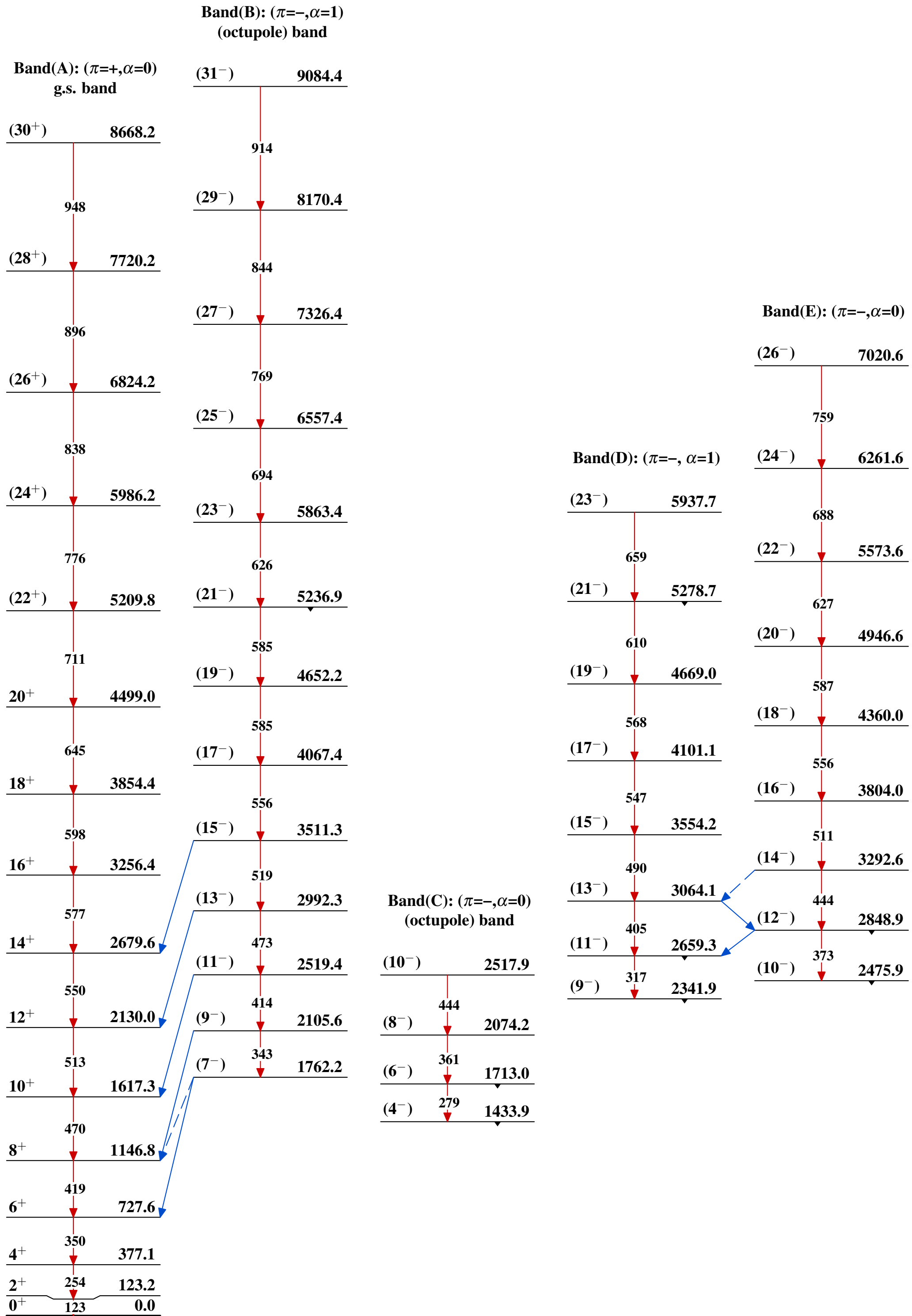
Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given

Legend



$^{172}_{74}W_{98}$

Adopted Levels, Gammas



$^{172}_{74}W_{98}$