

Adopted Levels, Gammas

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	Coral M. Baglin, E. A. Mccutchan		NDS 151, 334 (2018)	30-Jun-2018

Q(β⁻)=-5840 40; S(n)=7870 30; S(p)=4240 40; Q(α)=3960 40 2017Wa10

S(2n)=18310 30; S(2p)=6950 40 (2017Wa10).

Identification: cross bombardments, excitation functions for ³⁶Ar, ³⁸Ar on ¹³⁶Ba, ¹³⁸Ba, ¹³³Cs; γX coin (1990Me12). Others: 1971Na28, 1987Sz03.

¹⁷¹W Levels

Cross Reference (XREF) Flags

- A ¹⁷¹Re ε decay
- B ¹⁵⁵Gd(²⁰Ne,4nγ)
- C ¹⁴⁶Nd(³⁰Si,5nγ)

E(level) [†]	J ^{π‡}	T _{1/2}	XREF	Comments
0.0 [@]	(5/2 ⁻)	2.38 min 4	A C	%ε+%β ⁺ =100 α decay not observed (%α≈1×10 ⁻⁷ estimated from extrapolation of log Q(α) versus log T _{1/2} (α)). J ^π : 0.0-102.0 and 102.0-233.4 level spacings in ¹⁷¹ W match expectations for rotational band with J=5/2 bandhead. Based on regional systematics, there are two candidates (5/2[523] and 5/2[642]) for ¹⁷¹ W g.s., and three (5/2 ⁻ 1/2[541], 5/2[402], and 9/2[514]) for ¹⁷¹ Re g.s. Only 5/2[523] for ¹⁷¹ W g.s. and 9/2[514] for ¹⁷¹ Re g.s., however, are consistent with the allowed ε branches from ¹⁷¹ Re to the 7/2 (log ft=4.9) and 9/2 (log ft=5.3) rotational states in ¹⁷¹ W (1987Ru05). T _{1/2} : from 1990Me12. Other values: 2.46 min 14 (1987Sz03), 2.5 min 2 (1992HeZV). Other: 1971Na28.
101.86 ^{&} 8	(7/2 ⁻)		A C	J ^π : M1 γ to (5/2 ⁻); 7/2 ⁻ consistent with band assignment.
133.4	(3/2 ⁻)		A	E(level): from ¹⁷¹ Re ε decay. J ^π : M1 γ to (5/2 ⁻); 133.3 level (π=(-)) and 207.6 level (π=(+)) can be assigned to hole-excitation configurations related to the 3/2[521] and 3/2[651] orbitals.
182.8 ^b 6	(11/2 ⁺)		C	
183.1 ^a 6	(13/2 ⁺) [#]		BC	
207.6	(5/2 ⁺)		A	E(level): from ¹⁷¹ Re ε decay. J ^π : E1 γ to (7/2 ⁻); see comment with 133.3 level.
233.17 [@] 8	(9/2 ⁻)		A C	J ^π : (M1) γ to (7/2 ⁻); ΔJ=2 γ to (5/2 ⁻); 9/2 ⁻ consistent with band assignment.
389.26 ^{&} 11	(11/2 ⁻)		C	
390.8 ^b 6	(15/2 ⁺)		C	
395.4 ^a 6	(17/2 ⁺) [#]		BC	
548.23 [@] 12	(13/2 ⁻)		C	
568.4	(7/2 ⁻)		A	E(level): from ¹⁷¹ Re ε decay. J ^π : log ft=4.8 from (9/2 ⁻); γ to (3/2 ⁻). Might belong to rotational band built on the ν 5/2[512] orbital.
736.12 ^{&} 13	(15/2 ⁻)		C	
738.9 ^a 6	(21/2 ⁺) [#]		BC	
739.2 ^b 6	(19/2 ⁺)		C	
914.84 [@] 15	(17/2 ⁻)		C	
1066.0	(7/2 ⁻)		A	E(level): from ¹⁷¹ Re ε decay. J ^π : log ft=5.0 from (9/2 ⁻); γ to (3/2 ⁻). 7/2[514] orbital expected near 1 MeV.

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Adopted Levels, Gammas (continued) ^{171}W Levels (continued)

<u>E(level)[†]</u>	<u>J^π[‡]</u>	<u>XREF</u>
1131.02 ^{&} 17	(19/2 ⁻)	C
1189.5 ^a 6	(25/2 ⁺) [#]	BC
1197.0 ^b 6	(23/2 ⁺)	C
1332.13 [@] 18	(21/2 ⁻)	C
1576.9 ^{&} 3	(23/2 ⁻)	C
1721.8 ^a 6	(29/2 ⁺) [#]	BC
1738.1 ^b 6	(27/2 ⁺)	C
1785.23 [@] 21	(25/2 ⁻)	C
2070.0 ^{&} 3	(27/2 ⁻)	C
2083.7 ^d 11	(25/2 ⁻)	C
2249.83 [@] 23	(29/2 ⁻)	C
2311.4 ^a 6	(33/2 ⁺) [#]	BC
2343.1 ^b 6	(31/2 ⁺)	C
2460.8 ^d 11	(29/2 ⁻)	C
2600.5 ^c 3	(31/2 ⁻)	C
2616.0 ^{&} 3	(31/2 ⁻)	C
2737.04 [@] 25	(33/2 ⁻)	C
2871.8 ^d 4	(33/2 ⁻)	C
2935.0 ^a 6	(37/2 ⁺) [#]	BC
2999.2 ^b 6	(35/2 ⁺)	C
3069.4 ^c 3	(35/2 ⁻)	C
3187.6 ^{&} 3	(35/2 ⁻)	C
3274.2 [@] 3	(37/2 ⁻)	C
3376.3 ^d 4	(37/2 ⁻)	C
3577.2 ^a 6	(41/2 ⁺) [#]	BC
3617.8 ^c 4	(39/2 ⁻)	C
3698.1 ^b 6	(39/2 ⁺)	C
3809.6 ^{&} 4	(39/2 ⁻)	C
3874.7 [@] 4	(41/2 ⁻)	C
3954.7 ^e 6	(41/2)	C
3968.1 ^d 4	(41/2 ⁻)	C
4248.5 ^c 4	(43/2 ⁻)	C
4250.7 ^a 7	(45/2 ⁺) [#]	BC
4429.2 ^b 6	(43/2 ⁺)	C
4478.8 ^{&} 4	(43/2 ⁻)	C
4542.7 [@] 4	(45/2 ⁻)	C
4631.4 ^d 5	(45/2 ⁻)	C
4648.7 ^e 7	(45/2)	C
4948.2 ^c 4	(47/2 ⁻)	C
4982.8 ^a 7	(49/2 ⁺) [#]	C
5180.8 ^b 7	(47/2 ⁺)	C
5195.5 ^{&} 4	(47/2 ⁻)	C
5272.9 [@] 4	(49/2 ⁻)	C
5352.3 ^d 5	(49/2 ⁻)	C
5435.7 ^e 9	(49/2)	C
5707.2 ^c 4	(51/2 ⁻)	C

Continued on next page (footnotes at end of table)

Adopted Levels, Gammas (continued) ^{171}W Levels (continued)

<u>E(level)[†]</u>	<u>J^π[‡]</u>	<u>XREF</u>	<u>E(level)[†]</u>	<u>J^π[‡]</u>	<u>XREF</u>	<u>E(level)[†]</u>	<u>J^π[‡]</u>	<u>XREF</u>
5785.1 ^a 7	(53/2 ⁺) [#]	C	6773.4 ^{&} 7	(55/2 ⁻)	C	7791.6 [@] 9	(61/2 ⁻)	C
5957.0 ^b 8	(51/2 ⁺)	C	6774.0 ^b 9	(55/2 ⁺)	C	7877.3 ^d 6	(61/2 ⁻)	C
5959.4 ^{&} 4	(51/2 ⁻)	C	6894.1 [@] 7	(57/2 ⁻)	C	8364.5 ^c 7	(63/2 ⁻)	C
6057.1 [@] 4	(53/2 ⁻)	C	6967.8 ^d 5	(57/2 ⁻)	C	8590.4 ^a 8	(65/2 ⁺) [#]	C
6127.8 ^d 5	(53/2 ⁻)	C	7412.5 ^c 5	(59/2 ⁻)	C	8754.6 [@] 10	(65/2 ⁻)	C
6526.8 ^c 5	(55/2 ⁻)	C	7595.3 ^a 8	(61/2 ⁺) [#]	C	9776.6 [@] 11	(69/2 ⁻)	C
6657.3 ^a 7	(57/2 ⁺) [#]	C	7650.4 ^{&} 9	(59/2 ⁻)	C			

[†] From a least-squares fit to E_γ, by evaluators.

[‡] Values given without comment are from (³⁰Si,5n_γ), based on transition multipolarities and deduced band structure.

[#] From cascade of stretched E2 transitions forming band similar to i_{13/2} bands in odd-N hafnium isotopes (1983Ar09).

[@] Band(A): 5/2[523], α=+1/2 g.s. band. E band; becomes EAB band at high J. Low-J member energies almost degenerate with those in 5/2[642], α=-1/2 band and with spin J-1 levels in signature partner band.

[&] Band(a): 5/2[523], α=-1/2 band. F band; becomes EAC or FBC band at J=35/2. See comment on signature partner band.

^a Band(B): 5/2[642], α=+1/2 band. A band; becomes ABC band.

^b Band(b): 5/2[642], α=-1/2 band. B band; becomes BAD band. See comment on 5/2[523], α=+1/2 band.

^c Band(C): FAB, α=-1/2 band. (ν 5/2[523])(ν 5/2[642])(ν 5/2[642]) 3-quasiparticle band.

^d Band(D): Possible 1/2[521], α=+1/2 band. G band; becomes GAB band. α=-1/2 partner not observed, consistent with large signature splitting expected for Ω=1/2.

^e Band(E): rotational sequence. Lowest energy member feeds (37/2⁺) state; weakly populated band.

Adopted Levels, Gammas (continued)

E _i (level)	J ^π _i	γ(¹⁷¹ W)		E _f	J ^π _f	Mult. [†]	α [@]	I _(γ+ce)	Comments
		E _γ [‡]	I _γ [‡]						
101.86	(7/2 ⁻)	101.9 1	100	0.0	(5/2 ⁻)	M1	4.50		Mult.: from ε decay.
133.4	(3/2 ⁻)	133.4 [#]	100 [#]	0.0	(5/2 ⁻)	M1 [#]	2.08		
207.6	(5/2 ⁺)	105.6 [#]	42 [#] 11	101.86	(7/2 ⁻)	E1 [#]	0.326		
		207.6 [#]	100 [#] 21	0.0	(5/2 ⁻)	[E1]	0.0570		
233.17	(9/2 ⁻)	131.4 1	100 6	101.86	(7/2 ⁻)	(M1)	2.18		Mult.: from ε decay.
		233.1 1	49.2 8	0.0	(5/2 ⁻)	(E2)	0.186		
389.26	(11/2 ⁻)	156.4 2	100 5	233.17	(9/2 ⁻)				
		287.4 1	97.8 14	101.86	(7/2 ⁻)	(E2)	0.0967		
390.8	(15/2 ⁺)	207.73 ^a		183.1	(13/2 ⁺)				
		208.0 ^{&} 1	100.0 18	182.8	(11/2 ⁺)				
395.4	(17/2 ⁺)	(4.53 10)		390.8	(15/2 ⁺)	[M1]	1.74×10 ³ 13	8.3 11	E _γ : from energy difference between 348.42γ and 343.88γ. Existence of transition established by γγ coin in (³⁰ Si,5nγ).
		212.3 1	100.0 15	183.1	(13/2 ⁺)	(E2)	0.253		
548.23	(13/2 ⁻)	159.0 3	11.5 6	389.26	(11/2 ⁻)				
		315.0 1	100.0 20	233.17	(9/2 ⁻)	(E2)	0.0735		
		365.4 3	<14.1	182.8	(11/2 ⁺)				E _γ : transition feeds 182.8 and/or 183.1 level.
568.4	(7/2 ⁻)	360.9 [#]	19 [#] 1	207.6	(5/2 ⁺)	[E1]	0.01476		
		434.9 [#]	47 [#] 2	133.4	(3/2 ⁻)	[E2]	0.0300		
		466.4 [#]	31 [#] 3	101.86	(7/2 ⁻)	[M1]	0.0677		
		568.4 [#]	100 [#] 4	0.0	(5/2 ⁻)	[M1]	0.0405		
736.12	(15/2 ⁻)	187.7 2	4.3 9	548.23	(13/2 ⁻)				
		346.9 1	100.0 22	389.26	(11/2 ⁻)	(E2)	0.0556		
738.9	(21/2 ⁺)	343.5 1	100	395.4	(17/2 ⁺)	(E2)	0.0572		
739.2	(19/2 ⁺)	343.5 5	32 9	395.4	(17/2 ⁺)	(M1)	0.1522		
		348.4 1	100 22	390.8	(15/2 ⁺)	(E2)	0.0550		
914.84	(17/2 ⁻)	179.0 5	1.5 4	736.12	(15/2 ⁻)				
		366.6 1	100.0 20	548.23	(13/2 ⁻)	(E2)	0.0476		
		524.0 5	3.9 9	390.8	(15/2 ⁺)				
1066.0	(7/2 ⁻)	498.0 [#]	26 [#] 2	568.4	(7/2 ⁻)	[M1]	0.0571		
		933.9 [#]	20 [#] 4	133.4	(3/2 ⁻)				
		964.0 [#]	16 [#] 2	101.86	(7/2 ⁻)				
		1066.0 [#]	100 [#] 6	0.0	(5/2 ⁻)				
1131.02	(19/2 ⁻)	394.9 1	100	736.12	(15/2 ⁻)	(E2)	0.0388		
1189.5	(25/2 ⁺)	450.6 1	100	738.9	(21/2 ⁺)	(E2)	0.0273		
1197.0	(23/2 ⁺)	(7.59 12)		1189.5	(25/2 ⁺)	[M1]	374 19		E _γ : from energy difference between 458.19γ and 450.60γ in (³⁰ Si,5nγ). Ti(7.6):I _γ (457.8γ+458.2γ)=1.1 9:100.0 22.
		457.8 1		739.2	(19/2 ⁺)				
		458.2 2		738.9	(21/2 ⁺)				

Adopted Levels, Gammas (continued)

$\gamma(^{171}\text{W})$ (continued)

$E_i(\text{level})$	J_i^π	E_γ^\dagger	I_γ^\ddagger	E_f	J_f^π	Mult. [†]	$\alpha^@$	Comments
1332.13	(21/2 ⁻)	201.0 5 417.3 1		1131.02 (19/2 ⁻) 914.84 (17/2 ⁻)		(E2)	0.0334	
1576.9	(23/2 ⁻)	445.9 2	100	1131.02 (19/2 ⁻)		(E2)	0.0281	
1721.8	(29/2 ⁺)	532.3 1	100	1189.5 (25/2 ⁺)		(E2)	0.0180	
1738.1	(27/2 ⁺)	(16.41 14)	0.019 11	1721.8 (29/2 ⁺)		[M1]	165 5	E_γ : from energy difference between 548.71 γ and 532.29 γ in (³⁰ Si,5n γ).
		541.1 1 548.5 7	100.0 24 13.5 18	1197.0 (23/2 ⁺) 1189.5 (25/2 ⁺)		[M1]	0.0444	
1785.23	(25/2 ⁻)	208.0 & 5 453.1 1	100.0 20	1576.9 (23/2 ⁻) 1332.13 (21/2 ⁻)		(E2)	0.0269	
2070.0	(27/2 ⁻)	493.1 1	100	1576.9 (23/2 ⁻)		(E2)	0.0217	
2249.83	(29/2 ⁻)	464.6 1	100	1785.23 (25/2 ⁻)		(E2)	0.0253	
2311.4	(33/2 ⁺)	589.6 1	100.0 17	1721.8 (29/2 ⁺)		(E2)	0.01410	
2343.1	(31/2 ⁺)	(31.79)		2311.4 (33/2 ⁺)				E_γ : from energy difference between 621.38 γ and 589.59 γ in (³⁰ Si,5n γ).
		605.0 1 621.5 10	100 3	1738.1 (27/2 ⁺) 1721.8 (29/2 ⁺)		(E2)	0.01327	
2460.8	(29/2 ⁻)	377.1 1	100	2083.7 (25/2 ⁻)		(E2)	0.0440	
2600.5	(31/2 ⁻)	530.7 3	100	2070.0 (27/2 ⁻)		(E2)	0.0181	
2616.0	(31/2 ⁻)	546.0 1	100	2070.0 (27/2 ⁻)				
2737.04	(33/2 ⁻)	487.2 1	100	2249.83 (29/2 ⁻)		(E2)	0.0224	
2871.8	(33/2 ⁻)	411.0 10 622.0 5	100 7 33 3	2460.8 (29/2 ⁻) 2249.83 (29/2 ⁻)		(E2)	0.0348 6	
2935.0	(37/2 ⁺)	623.6 1	100	2311.4 (33/2 ⁺)		(E2)	0.01237	
2999.2	(35/2 ⁺)	656.1 1	100	2343.1 (31/2 ⁺)		(E2)	0.01102	
3069.4	(35/2 ⁻)	453.4 1 468.9 1	47 3 100 3	2616.0 (31/2 ⁻) 2600.5 (31/2 ⁻)		(E2)	0.0269	
3187.6	(35/2 ⁻)	571.5 1 587.2 1	100 5 93 5	2616.0 (31/2 ⁻) 2600.5 (31/2 ⁻)		(E2)	0.01517	
3274.2	(37/2 ⁻)	537.2 2	100	2737.04 (33/2 ⁻)		(E2)	0.01760	
3376.3	(37/2 ⁻)	504.5 1 639.0 5	100 3 25.4 25	2871.8 (33/2 ⁻) 2737.04 (33/2 ⁻)		(E2)	0.0205	
3577.2	(41/2 ⁺)	642.2 1	100	2935.0 (37/2 ⁺)				
3617.8	(39/2 ⁻)	548.4 1	100	3069.4 (35/2 ⁻)		(E2)	0.01674	
3698.1	(39/2 ⁺)	698.9 1	100	2999.2 (35/2 ⁺)		(E2)		
3809.6	(39/2 ⁻)	622.0 1	100	3187.6 (35/2 ⁻)		(E2)	0.01245	
3874.7	(41/2 ⁻)	600.5 1	100	3274.2 (37/2 ⁻)		(E2)	0.01350	
3954.7	(41/2)	1019.7 1	100	2935.0 (37/2 ⁺)				
3968.1	(41/2 ⁻)	591.8 2 694.0 5	100.0 24 <22	3376.3 (37/2 ⁻) 3274.2 (37/2 ⁻)		(E2)	0.01397	
4248.5	(43/2 ⁻)	630.7 1	100	3617.8 (39/2 ⁻)		(E2)	0.01206	
4250.7	(45/2 ⁺)	673.5 1	100	3577.2 (41/2 ⁺)		(E2)	0.01039	
4429.2	(43/2 ⁺)	731.1 1	100	3698.1 (39/2 ⁺)		(E2)		

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Adopted Levels, Gammas (continued)

$\gamma(^{171}\text{W})$ (continued)

$E_i(\text{level})$	J_i^π	E_γ^\dagger	I_γ^\ddagger	E_f	J_f^π	Mult. [†]	$\alpha^@$
4478.8	(43/2 ⁻)	669.2 1	100	3809.6	(39/2 ⁻)	(E2)	0.01054
4542.7	(45/2 ⁻)	668.0 1	100	3874.7	(41/2 ⁻)	(E2)	0.01058
4631.4	(45/2 ⁻)	663.3 1	100	3968.1	(41/2 ⁻)	(E2)	0.01075
4648.7	(45/2)	694.2 5		3954.7	(41/2)		
		1071.4 3		3577.2	(41/2 ⁺)		
4948.2	(47/2 ⁻)	699.7 2	100	4248.5	(43/2 ⁻)	(E2)	
4982.8	(49/2 ⁺)	732.1 1	100	4250.7	(45/2 ⁺)	(E2)	
5180.8	(47/2 ⁺)	751.6 3	100	4429.2	(43/2 ⁺)	(E2)	
5195.5	(47/2 ⁻)	716.7 2	100	4478.8	(43/2 ⁻)	(E2)	
5272.9	(49/2 ⁻)	730.2 1	100	4542.7	(45/2 ⁻)	(E2)	
5352.3	(49/2 ⁻)	720.9 1	100	4631.4	(45/2 ⁻)	(E2)	
5435.7	(49/2)	787.0 5	100	4648.7	(45/2)		
5707.2	(51/2 ⁻)	759.0 1	100	4948.2	(47/2 ⁻)	(E2)	
5785.1	(53/2 ⁺)	802.3 1	100	4982.8	(49/2 ⁺)	(E2)	
5957.0	(51/2 ⁺)	776.2 3	100	5180.8	(47/2 ⁺)	(E2)	
5959.4	(51/2 ⁻)	763.9 1	100	5195.5	(47/2 ⁻)	(E2)	
6057.1	(53/2 ⁻)	784.2 2	100	5272.9	(49/2 ⁻)		
6127.8	(53/2 ⁻)	775.5 1	100	5352.3	(49/2 ⁻)	(E2)	
6526.8	(55/2 ⁻)	819.6 1	100	5707.2	(51/2 ⁻)	(E2)	
6657.3	(57/2 ⁺)	872.2 2	100	5785.1	(53/2 ⁺)	(E2)	
6773.4	(55/2 ⁻)	814.0 5	100	5959.4	(51/2 ⁻)	(E2)	
6774.0	(55/2 ⁺)	817.0 5	100	5957.0	(51/2 ⁺)		
6894.1	(57/2 ⁻)	837.0 5	100	6057.1	(53/2 ⁻)		
6967.8	(57/2 ⁻)	840.0 2	100	6127.8	(53/2 ⁻)		
7412.5	(59/2 ⁻)	885.7 2	100	6526.8	(55/2 ⁻)	(E2)	
7595.3	(61/2 ⁺)	938.0 3	100	6657.3	(57/2 ⁺)	(E2)	
7650.4	(59/2 ⁻)	877.0 5	100	6773.4	(55/2 ⁻)		
7791.6	(61/2 ⁻)	897.5 5	100	6894.1	(57/2 ⁻)	(E2)	
7877.3	(61/2 ⁻)	909.5 3	100	6967.8	(57/2 ⁻)		
8364.5	(63/2 ⁻)	952.0 5	100	7412.5	(59/2 ⁻)		
8590.4	(65/2 ⁺)	995.1 2	100	7595.3	(61/2 ⁺)		
8754.6	(65/2 ⁻)	963.0 5	100	7791.6	(61/2 ⁻)		
9776.6	(69/2 ⁻)	1022.0 5	100	8754.6	(65/2 ⁻)		

† From $^{146}\text{Nd}(^{30}\text{Si},5n\gamma)$, except where noted. Stretched Q transitions are assigned as (E2), and D intraband transitions as (M1).

‡ From $^{146}\text{Nd}(^{30}\text{Si},5n\gamma)$, except as noted.

From ^{171}Re ε 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.

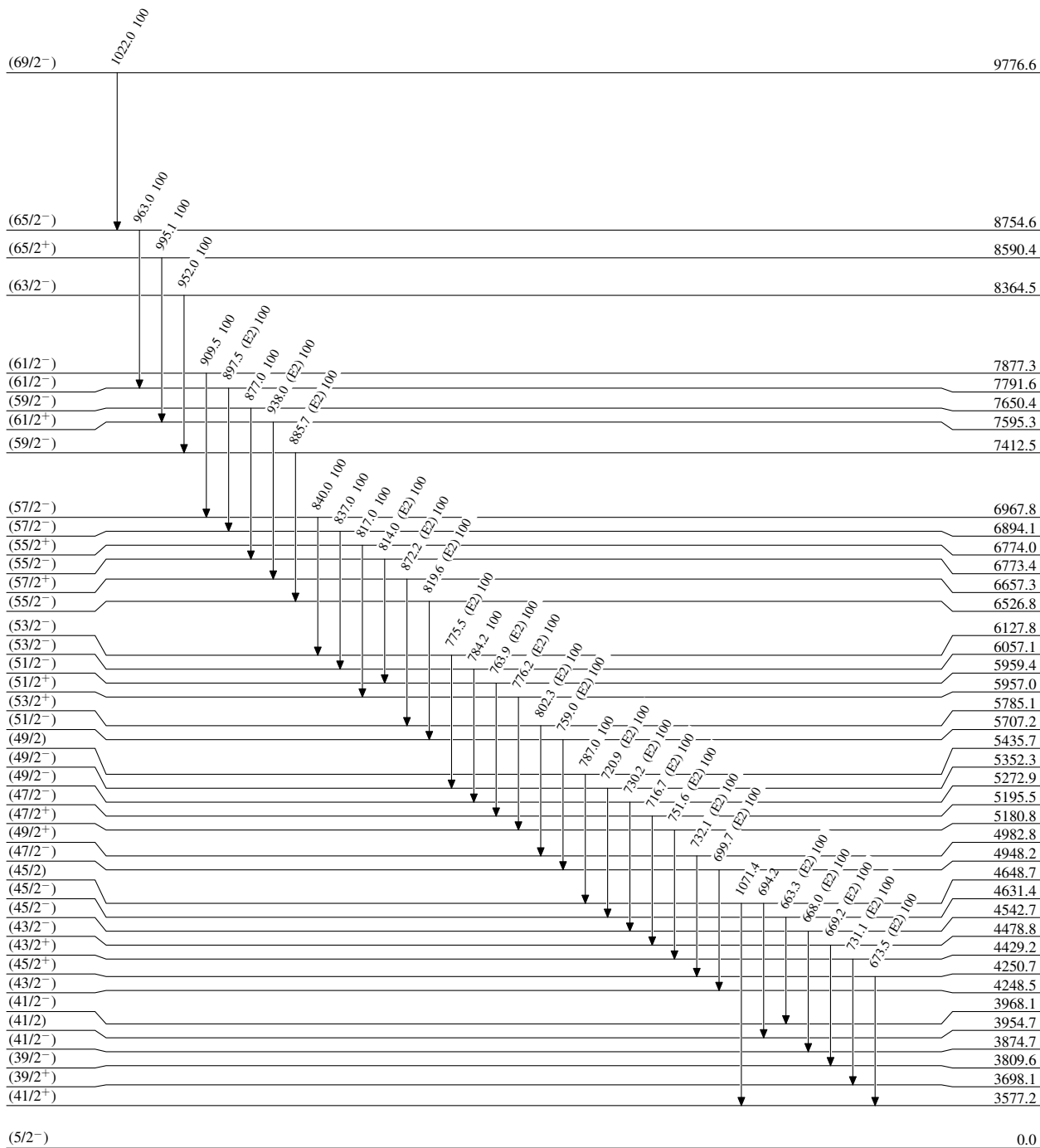
& Multiply placed.

^a Placement of transition in the level scheme is uncertain.

Adopted Levels, Gammas

Level Scheme

Intensities: Relative photon branching from each level



2.38 min 4

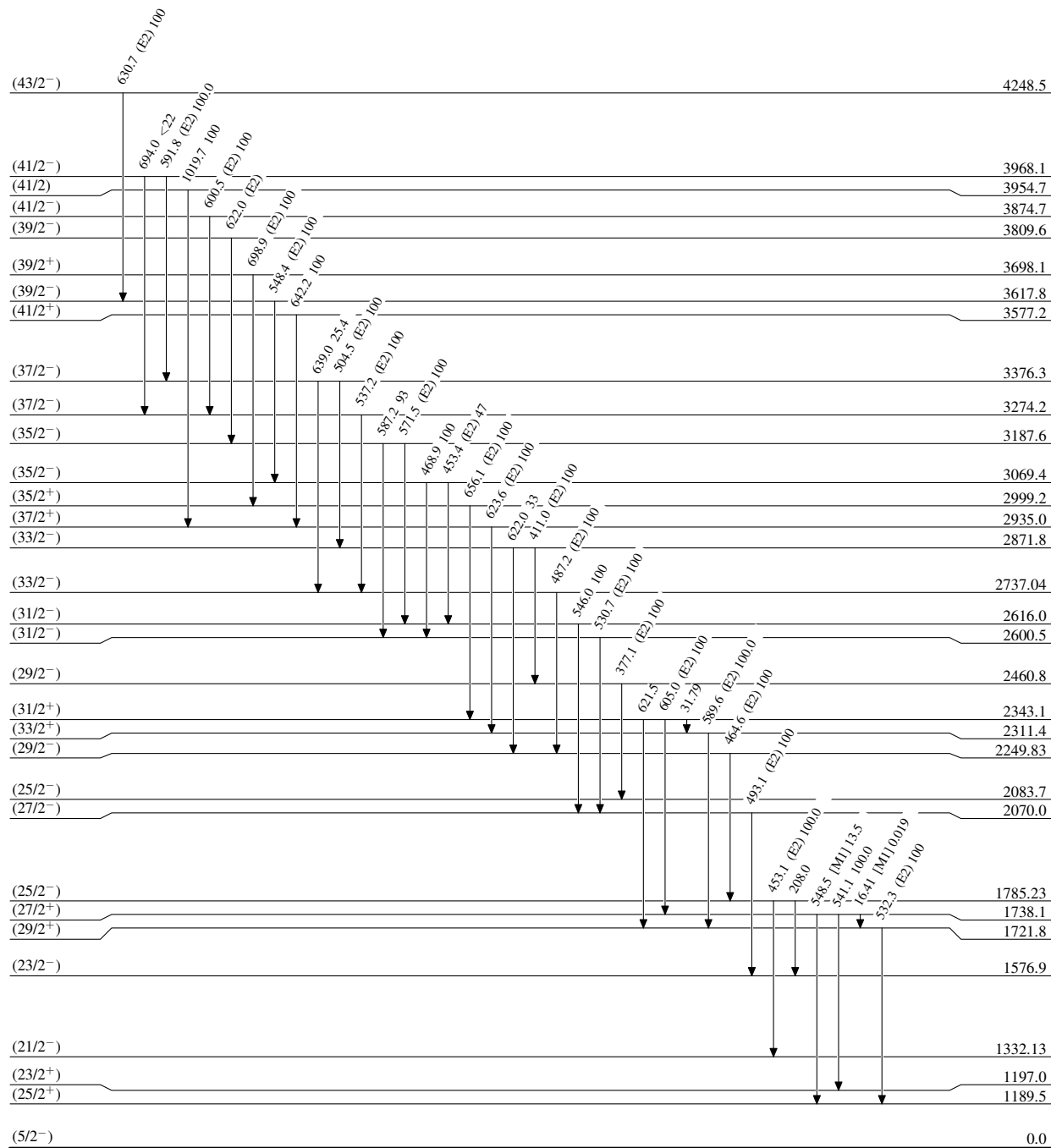
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

-----▶ γ Decay (Uncertain)



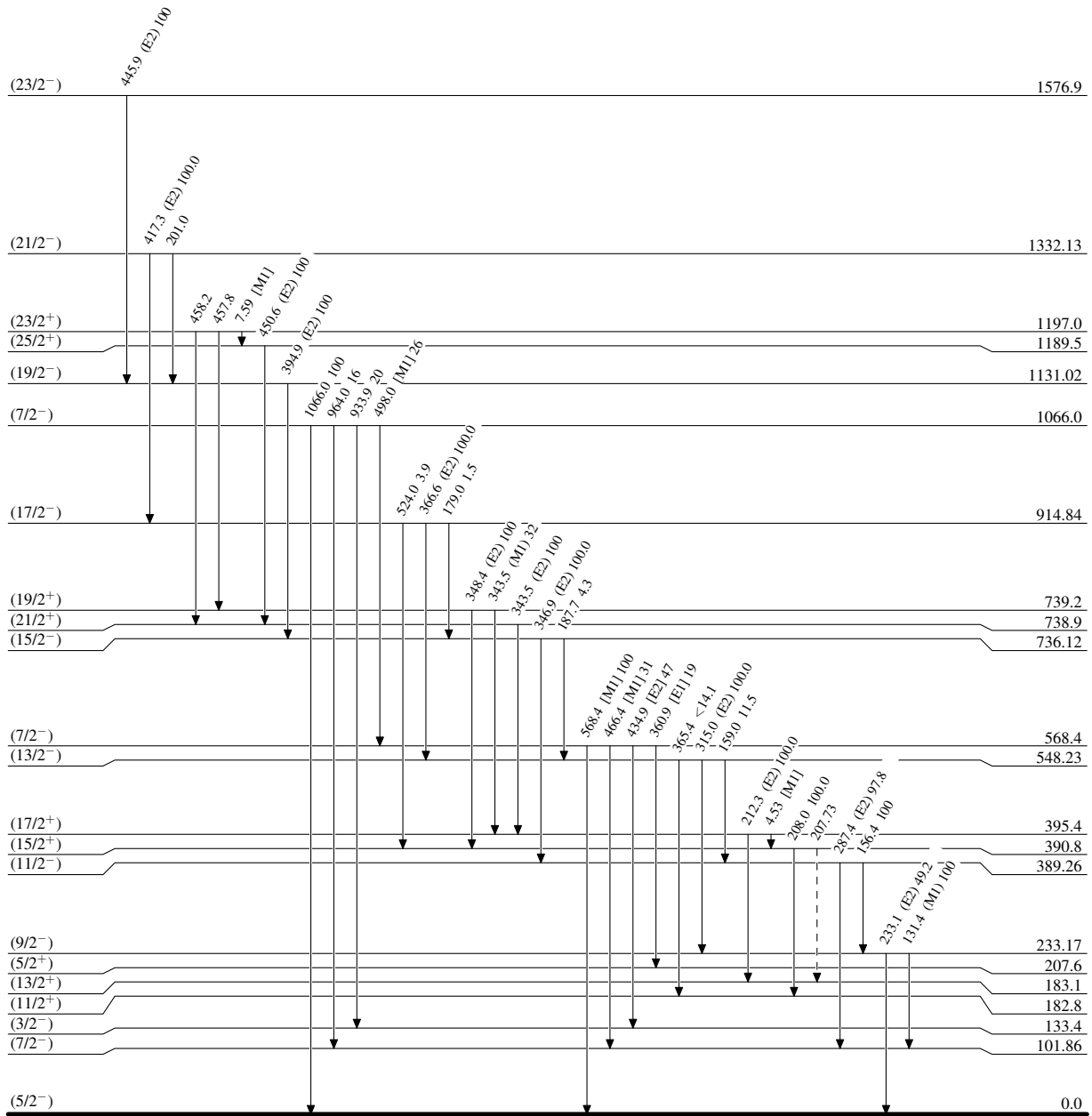
Adopted Levels, Gammas

Legend

Level Scheme (continued)

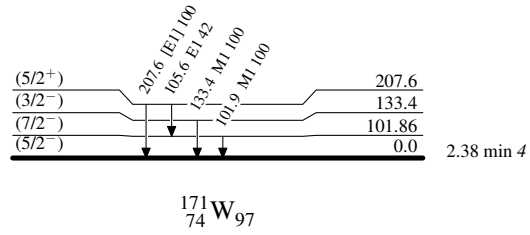
Intensities: Relative photon branching from each level

-----► γ Decay (Uncertain)

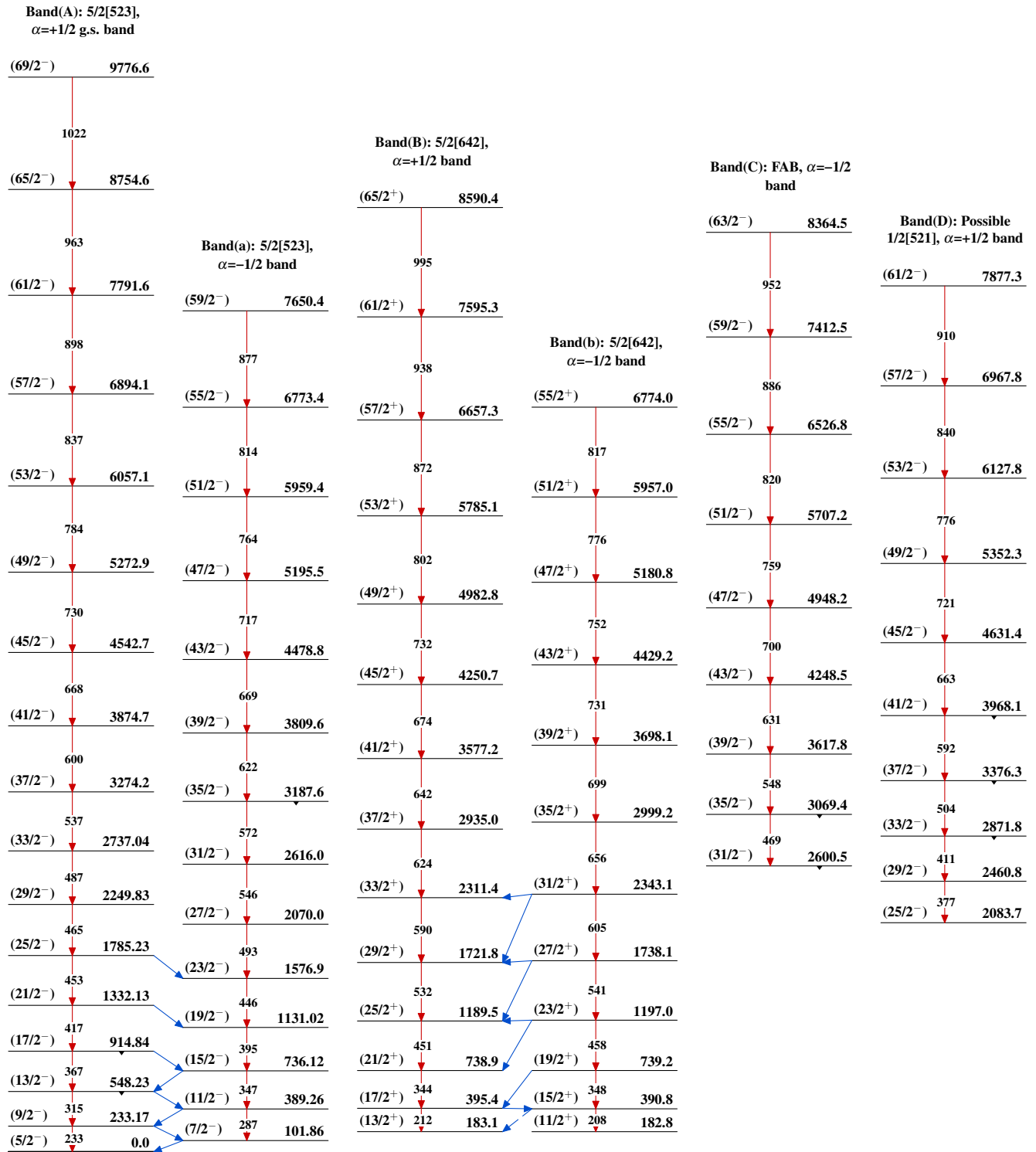


Adopted Levels, Gammas**Level Scheme (continued)**

Intensities: Relative photon branching from each level



Adopted Levels, Gammas



Adopted Levels, Gammas (continued)