

Adopted Levels, Gammas

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Coral M. Baglin	NDS 109, 2033 (2008)	1-Jun-2022

$Q(\beta^-) = -4.43 \times 10^3$ 4; $S(n) = 7.43 \times 10^3$ 4; $S(p) = 4.93 \times 10^3$ 5; $Q(\alpha) = 3.15 \times 10^3$ 4 [2021Wa16](#)

Other reactions:

$^{160}\text{Gd}(^{16}\text{O}, 7n\gamma)$, E=110-134 MeV ([1982Pe10](#) and [1983Pe21](#)): γ -ray multiplicities for high-spin state deexcitation; Ge(Li) and 12 NaI detectors.

$^{164}\text{Dy}(^{12}\text{C}, 7n\gamma)$, E=118 MeV ([1981Hj01](#)): γ -ray multiplicities for high-spin state deexcitation; Ge(Li) and 8 scin detectors; 9 transitions in 5/2[642] band and 5 transitions in 5/2[523] band.

$^{174}\text{Yb}(\alpha, 9n\gamma)$, $^{176}\text{Hf}(\alpha, 11n\gamma)$ ([1983Ma32](#)): neutron multiplicities at high excitation.

Activities of 1.87 h 3 ([1951Wi08](#)) and 1.5 h ([1961Me05](#)) were assigned to ^{169}Hf , but not found in subsequent experiments ([1966Ha23](#), [1969Ar23](#), [1970Ch17](#)).

 ^{169}Hf Levels

Band structure is adopted from [2001Sc49](#). The orbitals involved in the band labels are as follows: 5/2[642] (A,B); 3/2[651] (C,D); 5/2[523] (E,F); 5/2[512] (G,H); 1/2[521] (M,N).

Cross Reference (XREF) Flags

- A ^{169}Ta ε decay
- B $^{159}\text{Tb}(^{14}\text{N}, 4n\gamma)$
- C $^{130}\text{Te}(^{44}\text{Ca}, 5n\gamma)$,
- D $^{96}\text{Zr}(^{76}\text{Ge}, 3n\gamma)$

E(level) [†]	$J\pi^{\ddagger}$	$T_{1/2}^{\#}$	XREF	Comments
0.0 [@]	5/2 ⁻	3.24 min 4	ABCD	$\% \varepsilon + \% \beta^+ = 100$ J^π : $\log ft < 4.5$ to ^{169}Lu (492.9 level) ($\pi = -$); systematics of N=97 nuclei support assignment of 5/2[523] Nilsson orbital to ^{169}Hf (g.s.) and 7/2[523] to ^{169}Lu (492.9 level). $T_{1/2}$: weighted average of 3.2 min 1 (1969Ar23), 3.3 min 3 (1970Ar01), 3.26 min 5 (1970Ch17), 3.2 min 1 (1973FoYE), 3.25 min 10 (1973Me09).
28.80 ^b 4	(7/2) ⁺	82 ns +40-15	ABCD	J^π : E1 γ to 5/2 ⁻ . Coincidence data (prompt and delayed) support assignment of 28.8, 34.7, and 38.2 levels as 7/2 ⁺ , 9/2 ⁺ , and 5/2 ⁺ members of the expected 5/2[642] band. The inverted spin sequence and proximity of the levels can be explained by Coriolis effects. $T_{1/2}$: from $\gamma\gamma(t)$ in $^{159}\text{Tb}(^{14}\text{N}, 4n\gamma)$ (1975Re05).
36.7 ^a 3	(9/2) ⁺		BCD	J^π : see comment with 28.8 level.
38.18 ^a 4	(5/2) ⁺		AB D	J^π : (E1) γ to 5/2 ⁻ ; see comment with 28.8 level.
59.16 ^c 8	(5/2) ⁻		B D	J^π : 5/2 ⁻ 5/2[512] consistent with position of level and structure of higher members of band (mixing ratios and g factors fit 5/2[512] better than 3/2[521]).
77.75 ^{&} 9	(7/2) ⁻		ABCD	
104.0 ^b 3	(11/2) ⁺		BCD	
144.6 ^a 3	(13/2) ⁺		BCD	
158.79 ^d 8	(7/2) ⁻		B D	
177.14 [@] 7	(9/2) ⁻		ABCD	
288.73 ^c 10	(9/2) ⁻		B D	
302.66 ^{&} 11	(11/2) ⁻		BCD	

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Adopted Levels, Gammas (continued) ^{169}Hf Levels (continued)

E(level) [†]	J ^π [‡]	XREF	E(level) [†]	J ^π [‡]	T _{1/2} [#]	XREF
311.1 ^b 3	(15/2 ⁺)	BCD	3065.7 ^{&} 3	(35/2 ⁻)		CD
363.3 ^a 3	(17/2 ⁺)	BCD	3107.2 ^e 6	(29/2 ⁺)		D
442.86 ^d 11	(11/2 ⁻)	B D	3134.3 ^h 6	(31/2 ⁻)		D
444.21 [@] 11	(13/2 ⁻)	BCD	3179.8 ^d 4	(35/2 ⁻)		D
613.81 ^{&} 13	(15/2 ⁻)	BCD	3220.6 [@] 4	(37/2 ⁻)		CD
622.17 ^c 13	(13/2 ⁻)	B D	3395.6 ^f 7	(31/2 ⁺)		D
641.8 ^b 3	(19/2 ⁺)	BCD	3425.1 ^g 7	(33/2 ⁻)		D
689.5 ^a 3	(21/2 ⁺)	BCD	3453.4 ^a 4	(41/2 ⁺)		BCD
790.42 [@] 14	(17/2 ⁻)	BCD	3471.6 ⁱ 6	(37/2 ⁻)		D
820.47 ^d 14	(15/2 ⁻)	B D	3514.9 ^c 4	(37/2 ⁻)		D
998.02 ^{&} 17	(19/2 ⁻)	BCD	3588.5 ^b 5	(39/2 ⁺)	0.29 ps 19	CD
1028.5 ^c 4	(17/2 ⁻)	D	3672.2 ^{&} 4	(39/2 ⁻)		CD
1079.8 ^b 3	(23/2 ⁺)	BCD	3700.0 ^e 7	(33/2 ⁺)		D
1112.9 ^a 3	(25/2 ⁺)	BCD	3728.8 ^h 7	(35/2 ⁻)		D
1201.61 [@] 16	(21/2 ⁻)	BCD	3768.5 ^d 4	(39/2 ⁻)		D
1443.18 ^{&} 17	(23/2 ⁻)	BCD	3832.9 [@] 4	(41/2 ⁻)		CD
1472.5 ^c 4	(21/2 ⁻)	D	4020.2 ^f 7	(35/2 ⁺)		D
1607.9 ^b 3	(27/2 ⁺)	BCD	4041.2 ^j 5	(41/2 ⁺)		D
1618.2 ^a 3	(29/2 ⁺)	BCD	4041.4 ^g 7	(37/2 ⁻)		D
1662.19 [@] 18	(25/2 ⁻)	BCD	4053.3 ⁱ 7	(41/2 ⁻)		D
1734.2 ^f 3	(15/2 ⁺)	D	4141.0 ^a 5	(45/2 ⁺)	0.29 ps 5	CD
1867.1 ^e 5	(17/2 ⁺)	D	4155.9 ^c 5	(41/2 ⁻)		D
1908.7 ^c 4	(25/2 ⁻)	D	4320.6 ^{&} 4	(43/2 ⁻)	0.20 ps +11-7	CD
1940.85 ^{&} 20	(27/2 ⁻)	BCD	4343.3 ^b 5	(43/2 ⁺)	0.20 ps +13-9	CD
1953.1 ^g 4	(21/2 ⁻)	D	4350.4 ^e 7	(37/2 ⁺)		D
2012.7 ^f 5	(19/2 ⁺)	D	4361.0 ^h 7	(39/2 ⁻)		D
2127.1 ⁱ 5	(25/2 ⁻)	D	4441.8 ^d 5	(43/2 ⁻)		D
2141.0 ^h 5	(23/2 ⁻)	D	4510.5 [@] 5	(45/2 ⁻)	0.23 ps 4	CD
2153.66 [@] 23	(29/2 ⁻)	BCD	4685.3 ^f 8	(39/2 ⁺)		D
2187.9 ^a 4	(33/2 ⁺)	BCD	4688.0 ^g 8	(41/2 ⁻)		D
2191.5 ^e 5	(21/2 ⁺)	D	4706.0 ⁱ 9	(45/2 ⁻)		D
2210.8 ^b 3	(31/2 ⁺)	BCD	4729.7 ^j 5	(45/2 ⁺)		D
2357.6 ^g 5	(25/2 ⁻)	D	4827.6 ^c 6	(45/2 ⁻)		D
2380.3 ^c 4	(29/2 ⁻)	D	4882.1 ^a 5	(49/2 ⁺)		CD
2384.2 ^f 5	(23/2 ⁺)	D	5020.9 ^h 8	(43/2 ⁻)		D
2484.23 ^{&} 23	(31/2 ⁻)	BCD	5027.3 ^e 8	(41/2 ⁺)		D
2525.3 ⁱ 4	(29/2 ⁻)	D	5034.9 ^{&} 5	(47/2 ⁻)	0.21 ps +10-14	CD
2597.6 ^h 6	(27/2 ⁻)	D	5131.9 ^b 5	(47/2 ⁺)	0.15 ps 5	CD
2597.7 ^e 6	(25/2 ⁺)	D	5174.0 ^d 5	(47/2 ⁻)		D
2667.3 [@] 3	(33/2 ⁻)	CD	5250.5 [@] 5	(49/2 ⁻)	0.13 ps +5-4	CD
2683.9 ^d 5	(31/2 ⁻)	D	5361.6 ^g 8	(45/2 ⁻)		D
2803.5 ^a 4	(37/2 ⁺)	BCD	5371.2 ^f 8	(43/2 ⁺)		D
2840.5 ^f 6	(27/2 ⁺)	D	5424.6 ⁱ 9	(49/2 ⁻)		D
2857.1 ^g 6	(29/2 ⁻)	D	5495.7 ^j 5	(49/2 ⁺)		D
2874.5 ^b 4	(35/2 ⁺)	BCD	5544.4 ^c 7	(49/2 ⁻)		D
2914.2 ^c 4	(33/2 ⁻)	D	5688.9 ^a 5	(53/2 ⁺)	0.055 ps 21	CD
2969.4 ⁱ 5	(33/2 ⁻)	D	5711.6 ^h 8	(47/2 ⁻)		D

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Adopted Levels, Gammas (continued) ^{169}Hf Levels (continued)

E(level) [†]	J ^π [‡]	T _{1/2} [#]	XREF	E(level) [†]	J ^π [‡]	XREF
5817.7 ^{&} 5	(51/2 ⁻)	0.11 ps 3	CD	8514.5 ^a 6	(65/2 ⁺)	CD
5956.0 ^d 7	(51/2 ⁻)		D	8539.1 ^{&} 6	(63/2 ⁻)	CD
5957.6 ^b 6	(51/2 ⁺)	0.14 ps 10	CD	8568.8 ^d 10	(63/2 ⁻)	D
6046.0 [@] 6	(53/2 ⁻)	0.049 ps 21	CD	8717.6 ^b 8	(63/2 ⁺)	D
6077.4 ^g 8	(49/2 ⁻)		D	8784.9 [@] 7	(65/2 ⁻)	CD
6097.8 ^f 9	(47/2 ⁺)		D	8996.8 ⁱ 12	(65/2 ⁻)	D
6212.7 ⁱ 10	(53/2 ⁻)		D	9054.1 ^j 8	(65/2 ⁺)	D
6309.3 ^j 5	(53/2 ⁺)		D	9405.2 ^{&} 8	(67/2 ⁻)	D
6326.3 ^c 9	(53/2 ⁻)		D	9574.7 ^a 7	(69/2 ⁺)	CD
6455.3 ^h 9	(51/2 ⁻)		D	9719.2 ^b 9	(67/2 ⁺)	D
6565.2 ^a 6	(57/2 ⁺)	0.11 ps +4-6	CD	9826.8 [@] 7	(69/2 ⁻)	CD
6667.6 ^{&} 6	(55/2 ⁻)		CD	9995.5 ⁱ 13	(69/2 ⁻)	D
6790.0 ^d 8	(55/2 ⁻)		D	10294.5 ^{&} 9	(71/2 ⁻)	D
6830.1 ^b 6	(55/2 ⁺)		CD	10676.7 ^a 7	(73/2 ⁺)	CD
6854.2 ^g 9	(53/2 ⁻)		D	10917.5 [@] 7	(73/2 ⁻)	CD
6895.2 [@] 6	(57/2 ⁻)	0.09 ps 4	CD	11005.6 ⁱ 14	(73/2 ⁻)	D
7076.3 ⁱ 11	(57/2 ⁻)		D	11231.9 ^{&} 10	(75/2 ⁻)	D
7170.6 ^j 6	(57/2 ⁺)		D	11807.4 ^a 8	(77/2 ⁺)	D
7179.8 ^c 9	(57/2 ⁻)		D	12034.8 [@] 8	(77/2 ⁻)	D
7509.1 ^a 6	(61/2 ⁺)	0.09 ps 3	CD	12221.3 ^{&} 10	(79/2 ⁻)	D
7581.3 ^{&} 6	(59/2 ⁻)		CD	12955.6 ^a 9	(81/2 ⁺)	CD
7677.0 ^d 9	(59/2 ⁻)		D	13140.8 [@] 13	(81/2 ⁻)	D
7751.5 ^b 7	(59/2 ⁺)		CD	13272.3 ^{&} 11	(83/2 ⁻)	D
7806.5 [@] 6	(61/2 ⁻)	0.11 ps 6	CD	14115.7 ^a 10	(85/2 ⁺)	D
8009.8 ⁱ 12	(61/2 ⁻)		D	14277.8 [@] 17	(85/2 ⁻)	D
8088.7 ^j 7	(61/2 ⁺)		D	14385.0 ^{&} 12	(87/2 ⁻)	D
8099.1 ^c 10	(61/2 ⁻)		D	15294.5 ^a 11	(89/2 ⁺)	CD

[†] From least-squares fit to E γ , omitting the 825 γ from the 1941 level (which fits its placement poorly) and assigning 1 keV uncertainty to E γ data for which the authors gave no uncertainty.

[‡] Based on coincidence data, rotational structure, and γ -ray multipolarities in $^{159}\text{Tb}(^{14}\text{N},4n\gamma)$, except where noted. Note that the evaluator has added parentheses to values given by 2001Sc49 in many cases.

[#] From DSAM in ($^{44}\text{Ca},5n\gamma$), except as noted.

[@] Band(A): 5/2[523] $\alpha=+1/2$ band (2001Sc49). A=10.8, B=9.5 (5/2, 7/2, 9/2, 11/2 levels). E band; becomes EAB band at $\hbar\omega=260$ keV. A subsequent band crossing occurs at $\hbar\omega\approx 550$ keV; probably involves proton alignment, 1/2[541]⊗9/2[514] or 7/2[404]⊗1/2[660].

[&] Band(a): 5/2[523] $\alpha=-1/2$ band (2001Sc49). A=10.8, B=9.5 (5/2, 7/2, 9/2, 11/2 levels). F band; becomes FAB band at $\hbar\omega=270$ keV. A subsequent band crossing occurs at $\hbar\omega\approx 450$ keV; probably involves proton alignment, 1/2[541]⊗9/2[514] or 7/2[404]⊗1/2[660].

^a Band(B): 5/2[642] $\alpha=+1/2$ band (2001Sc49). A band; becomes ABC band at $\hbar\omega=310$ keV. Subsequent band crossing at $\hbar\omega\approx 565$ keV may involve an aligned proton pair (see 2001Sc49 for discussion of possible π orbitals).

^b Band(b): 5/2[642] $\alpha=-1/2$ band (2001Sc49). B band; becomes BAD band at $\hbar\omega=370$ keV.

^c Band(C): 5/2[512] $\alpha=+1/2$ band (2001Sc49). A=14.6, B=-8.4 (5/2, 7/2, 9/2, 11/2 levels). G band; becomes GAB band at $\hbar\omega=255$ keV. Band not observed in ($^{44}\text{Ca},5n\gamma$) (1991Ga18) or in ($^{50}\text{Ti},4n\gamma$) (1990IrZZ).

^d Band(c): 5/2[512] $\alpha=-1/2$ band (2001Sc49). H band; becomes HAB band at $\hbar\omega=255$ keV.

^e Band(D): $\pi=+$, $\alpha=+1/2$ 3-quasiparticle band (2001Sc49). Strongly-coupled band; lowest-energy level may not be bandhead. A

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Adopted Levels, Gammas (continued) ^{169}Hf Levels (continued)

- configuration of $(\nu 5/2[642]) \otimes (\pi 5/2[402]) \otimes (\pi 1/2[411])$ with $K^\pi = 1/2^+$ is very tentatively suggested in [2001Sc49](#).
- ^f Band(d): $\pi=+$, $\alpha=-1/2$ 3-quasiparticle band ([2001Sc49](#)). See comment on signature partner band.
- ^g Band(E): $\pi=-$, $\alpha=+1/2$ 3-quasiparticle band ([2001Sc49](#)). Strongly-coupled band; lowest-energy level may not be bandhead. Possible configuration= $(\nu 5/2[642]) \otimes (\pi 9/2[514]) \otimes (\pi 1/2[411])$ with $K^\pi = 15/2^-$; this is consistent with observed B(M1)/B(E2) for intraband transitions from levels; however, see [2001Sc49](#) for other possibilities.
- ^h Band(e): $\pi=-$, $\alpha=-1/2$ 3-quasiparticle band ([2001Sc49](#)). See comment on signature partner band.
- ⁱ Band(F): $\nu[(1/2[521])(5/2[642])^2]$, $\alpha=+1/2$ band ([2001Sc49](#)). MAB band. Participation of $(\nu 1/2[521])$ supported by similarity of Routhian with that for $1/2[521]$ band in ^{171}Hf for $300 < \hbar\omega < 475$. Band crossing at $\hbar\omega = 490$ keV may involve aligned proton pair.
- ^j Band(G): $\pi=+$, $\alpha=+1/2$ 3-quasineutron band ([2001Sc49](#)). Configuration= $\nu[(5/2[642])(1/2[521])(5/2[523])]$ (AMF band). In-band B(E2) values possibly enhanced by presence of coupling to $5/2[642]$ γ -vibration band.

Adopted Levels, Gammas (continued)

$\gamma(^{169}\text{Hf})$									
$E_i(\text{level})$	J_i^π	$E_\gamma^\dagger$	$I_\gamma^\ddagger$	E_f	J_f^π	Mult. [†]	$\delta^\ddagger$	α^b	Comments
28.80	(7/2) ⁺	28.80 [#] 4	100	0.0	5/2 ⁻	E1 [#]		2.00	B(E1)(W.u.)=3.7×10 ⁻⁵ 18
36.7	(9/2 ⁺)	(7.9 3)	100	28.80	(7/2) ⁺				E_γ : from level energy difference; γ not observed.
38.18	(5/2 ⁺)	38.18 [#] 4	100	0.0	5/2 ⁻	(E1) [#]		0.922	
59.16	(5/2 ⁻)	59.1 1	100	0.0	5/2 ⁻				
77.75	(7/2) ⁻	77.8 1	100	0.0	5/2 ⁻				
104.0	(11/2 ⁺)	67.3 1	100 20	36.7	(9/2 ⁺)				
		73.7 5	57 13	28.80	(7/2) ⁺				E_γ : weighted average of 74.1 2 from (⁴⁴ Ca,5n γ) and 73.2 2 from (¹⁴ N,4n γ).
144.6	(13/2 ⁺)	107.8 1	100	36.7	(9/2 ⁺)	(E2)		2.64	
158.79	(7/2 ⁻)	99.6 1	100 12	59.16	(5/2 ⁻)	(M1+E2)		3.90 9	E_γ ,Mult.: for doublet dominated by this transition.
		158.9 1	≤56 [@]	0.0	5/2 ⁻				
177.14	(9/2) ⁻	99.2 ^a 2	7.8 ^a 11	77.75	(7/2) ⁻	[M1,E2]		3.87 24	
		148.4 1	33.0 ^a 22	28.80	(7/2) ⁺	(E1)		0.1277	Mult.: D(+Q) from (¹⁴ N,4n γ); $\Delta\pi$ =(yes) from band structure.
		177.1 1	100.0 ^a 11	0.0	5/2 ⁻	(E2)		0.434	
288.73	(9/2 ⁻)	130.0 1	100 10	158.79	(7/2 ⁻)	(M1+E2)	-2 2	1.83 5	δ : -4.0≤ δ ≤-0.05 from $\gamma(\theta)$ in (¹⁴ N,4n γ). 0.35 10 based on branching and rotational model if K=5/2.
		229.3 3	60 6	59.16	(5/2 ⁻)	(E2)		0.183	
		288.5 2	18 3	0.0	5/2 ⁻				
302.66	(11/2) ⁻	125.3 ^a 2	8.5 ^a 18	177.14	(9/2) ⁻				
		225.0 1	100 ^a 4	77.75	(7/2) ⁻				
311.1	(15/2 ⁺)	166.5 1	63 ^a 4	144.6	(13/2 ⁺)	(M1+E2)	-0.8 1	0.78 3	Other I_γ : 112 11 in (¹⁴ N,4n γ).
		207.1 1	100.0 ^a 8	104.0	(11/2 ⁺)	(E2)		0.256	
363.3	(17/2 ⁺)	218.6 1	100	144.6	(13/2 ⁺)	(E2)		0.214	
442.86	(11/2 ⁻)	154.1 1	100 10	288.73	(9/2 ⁻)	(M1+E2)	-3 3	1.147 22	δ : -6.0≤ δ ≤-0.03 from $\gamma(\theta)$ in (¹⁴ N,4n γ). 0.22 7 based on branching and rotational model if K=5/2.
		284.1 1	57 9	158.79	(7/2 ⁻)	(E2)		0.0934	
444.21	(13/2) ⁻	141 ^{&}		302.66	(11/2) ⁻				
		267.1 1	100	177.14	(9/2) ⁻	(E2)		0.1129	
613.81	(15/2) ⁻	169.7 ^a 2	3.0 ^a 3	444.21	(13/2) ⁻				
		311.2 1	100 ^a 9	302.66	(11/2) ⁻	(E2)		0.0710	
622.17	(13/2 ⁻)	179.3 1	100 10	442.86	(11/2 ⁻)	(M1+E2)	≤0	0.753 13	δ : -10≤ δ ≤+0.02 from $\gamma(\theta)$ in (¹⁴ N,4n γ). 0.18 5 based on branching and rotational model if K=5/2.
		333.4 4	81 8	288.73	(9/2 ⁻)	(E2)		0.0580	
641.8	(19/2 ⁺)	278.5 1	39.2 ^a 17	363.3	(17/2 ⁺)	(M1+E2)	-1.0 5	0.16 4	
		330.8 1	100.0 ^a 7	311.1	(15/2 ⁺)	(E2)		0.0593	
689.5	(21/2 ⁺)	326.3 1	100	363.3	(17/2 ⁺)	(E2)		0.0618	
790.42	(17/2) ⁻	176 ^{&}		613.81	(15/2) ⁻				
		346.2 1	100 10	444.21	(13/2) ⁻	(E2)		0.0520	
		479 ^{&}		311.1	(15/2 ⁺)				
820.47	(15/2 ⁻)	198.3 1	≤340 [@]	622.17	(13/2) ⁻				

Adopted Levels, Gammas (continued)

$\gamma(^{169}\text{Hf})$ (continued)

$E_i(\text{level})$	J_i^π	$E_\gamma^{\dagger}$	$I_\gamma^{\ddagger}$	E_f	J_f^π	Mult. [†]	$\delta^{\ddagger}$	α^b	Comments
820.47	(15/2 ⁻)	377.6 1	100 10	442.86	(11/2 ⁻)	(E2)		0.0407	
998.02	(19/2 ⁻)	207.5 ^a 2	11.3 ^a 11	790.42	(17/2 ⁻)				
		384.5 2	100.0 ^a 17	613.81	(15/2 ⁻)	(E2)		0.0387	
		634 ^{&}		363.3	(17/2 ⁺)				
1028.5	(17/2 ⁻)	406.2 ^{&} 4	100	622.17	(13/2 ⁻)				
1079.8	(23/2 ⁺)	390.3 2	15.5 ^a 6	689.5	(21/2 ⁺)	(M1+E2)	-1.0 5	0.065 17	
		437.9 1	100 ^a 6	641.8	(19/2 ⁺)	(E2)		0.0272	
1112.9	(25/2 ⁺)	423.4 1	100	689.5	(21/2 ⁺)	(E2)		0.0298	
1201.61	(21/2 ⁻)	411.2 1	100	790.42	(17/2 ⁻)	(E2)		0.0322	
		560 ^{&}		641.8	(19/2 ⁺)				
1443.18	(23/2 ⁻)	241.4 ^a 2	1.4 ^a 3	1201.61	(21/2 ⁻)				
		445.2 1	100 ^a 9	998.02	(19/2 ⁻)	(E2)		0.0261	
		752 ^{&}		689.5	(21/2 ⁺)				
1472.5	(21/2 ⁻)	443.9 ^{&} 4	100	1028.5	(17/2 ⁻)				
1607.9	(27/2 ⁺)	495.1 2	13 ^a 3	1112.9	(25/2 ⁺)				
		528.0 1	100.0 ^a 7	1079.8	(23/2 ⁺)	(E2)		0.01689	
1618.2	(29/2 ⁺)	505.4 1	100	1112.9	(25/2 ⁺)	(E2)		0.0188	
1662.19	(25/2 ⁻)	460.6 1	100	1201.61	(21/2 ⁻)	(E2)		0.0239	
		583 ^{&}		1079.8	(23/2 ⁺)				
1734.2	(15/2 ⁺)	1092.8 ^{&} 4	82 ^{&} 18	641.8	(19/2 ⁺)				
		1290.1 ^{&} 4	45 ^{&} 9	444.21	(13/2 ⁻)				
		1370.5 ^{&} 4	≈9 ^{&}	363.3	(17/2 ⁺)				
		1423.0 ^{&} 4	100 ^{&} 18	311.1	(15/2 ⁺)				
1867.1	(17/2 ⁺)	132.9 ^{&} 4	100	1734.2	(15/2 ⁺)				
1908.7	(25/2 ⁻)	436.0 ^{&} 4	100 ^{&} 33	1472.5	(21/2 ⁻)				
		707.0 ^{&} 4	56 ^{&} 22	1201.61	(21/2 ⁻)				
1940.85	(27/2 ⁻)	278.9 ^a 2	6.7 ^a 7	1662.19	(25/2 ⁻)				
		497.6 2	100 ^a 17	1443.18	(23/2 ⁻)	(E2)		0.0196	
		825 ^{&}		1112.9	(25/2 ⁺)				E_γ : fits placement poorly; $E_\gamma=828$ expected from level energy difference.
1953.1	(21/2 ⁻)	873.6 ^{&} 4	100 ^{&} 11	1079.8	(23/2 ⁺)	(D)			
		1310.9 ^{&} 4	19 ^{&} 6	641.8	(19/2 ⁺)				
2012.7	(19/2 ⁺)	145.6 ^{&} 4	90 ^{&} 20	1867.1	(17/2 ⁺)				
		278.5 ^{&} 4	100 ^{&} 20	1734.2	(15/2 ⁺)				
2127.1	(25/2 ⁻)	1047.1 ^{&} 4	100	1079.8	(23/2 ⁺)				
2141.0	(23/2 ⁻)	187.9 ^{&} 4	100	1953.1	(21/2 ⁻)				
2153.66	(29/2 ⁻)	491.6 ^a 2	100	1662.19	(25/2 ⁻)	(E2)		0.0202	Other E_γ : 490.2 5 in (¹⁴ N,4n γ).
		546 ^{&}		1607.9	(27/2 ⁺)				

Adopted Levels, Gammas (continued)

$\gamma(^{169}\text{Hf})$ (continued)

$E_i(\text{level})$	J_i^π	E_γ [†]	I_γ [‡]	E_f	J_f^π	Mult. [†]	α ^b
2187.9	(33/2 ⁺)	569.7 2	100	1618.2	(29/2 ⁺)	(E2)	0.01404
2191.5	(21/2 ⁺)	178.8 4	100 13	2012.7	(19/2 ⁺)		
		324.4 4	31 6	1867.1	(17/2 ⁺)		
2210.8	(31/2 ⁺)	592.9 ^a 2	12.0 ^a 24	1618.2	(29/2 ⁺)		
		602.7 2	100 ^a 3	1607.9	(27/2 ⁺)	(E2)	0.01228
2357.6	(25/2 ⁻)	216.6 ^{&} 4	100 ^{&} 6	2141.0	(23/2 ⁻)		
		404.5 ^{&} 4	42 ^{&} 6	1953.1	(21/2 ⁻)		
2380.3	(29/2 ⁻)	471.4 ^{&} 4	100 ^{&} 25	1908.7	(25/2 ⁻)		
		718.0 ^{&} 4	67 ^{&} 25	1662.19	(25/2 ⁻)		
2384.2	(23/2 ⁺)	192.7 ^{&} 4	100 ^{&} 18	2191.5	(21/2 ⁺)		
		371.5 ^{&} 4	45 ^{&} 9	2012.7	(19/2 ⁺)		
2484.23	(31/2 ⁻)	330.6 ^a 2	23 ^a 4	2153.66	(29/2 ⁻)		
		543.5 2	100.0 ^a 24	1940.85	(27/2 ⁻)	(E2)	0.01573
		864 ^{&}		1618.2	(29/2 ⁺)		
2525.3	(29/2 ⁻)	398.0 ^{&} 4	33 ^{&} 11	2127.1	(25/2 ⁻)		
		917.3 ^{&} 4	100 ^{&} 11	1607.9	(27/2 ⁺)	D	
2597.6	(27/2 ⁻)	240.0 ^{&} 4	100 ^{&} 7	2357.6	(25/2 ⁻)		
		456.6 ^{&} 4	81 ^{&} 7	2141.0	(23/2 ⁻)		
2597.7	(25/2 ⁺)	213.5 ^{&} 4	100 ^{&} 11	2384.2	(23/2 ⁺)		
		406.2 ^{&} 4	22 ^{&} 6	2191.5	(21/2 ⁺)		
2667.3	(33/2 ⁻)	513.7 ^a 2	100	2153.66	(29/2 ⁻)		
2683.9	(31/2 ⁻)	1065.2 ^{&} 4	100	1618.2	(29/2 ⁺)		
2803.5	(37/2 ⁺)	615.6 2	100	2187.9	(33/2 ⁺)		
2840.5	(27/2 ⁺)	242.8 ^{&} 4	100 ^{&} 5	2597.7	(25/2 ⁺)		
		456.3 ^{&} 4	55 ^{&} 5	2384.2	(23/2 ⁺)		
2857.1	(29/2 ⁻)	259.5 ^{&} 4	100 ^{&} 9	2597.6	(27/2 ⁻)		
		499.5 ^{&} 4	27 ^{&} 9	2357.6	(25/2 ⁻)		
2874.5	(35/2 ⁺)	663.7 ^a 2	100 ^a 5	2210.8	(31/2 ⁺)		
		686.0 ^{ac} 2	22 ^a 7	2187.9	(33/2 ⁺)		
2914.2	(33/2 ⁻)	533.6 ^{&} 4	100 ^{&} 20	2380.3	(29/2 ⁻)		
		760.5 ^{&} 4	45 ^{&} 15	2153.66	(29/2 ⁻)		
2969.4	(33/2 ⁻)	443.9 ^{&} 4	100 ^{&} 10	2525.3	(29/2 ⁻)		
		758.8 ^{&} 4	53 ^{&} 5	2210.8	(31/2 ⁺)		
3065.7	(35/2 ⁻)	581.5 ^a 2	100	2484.23	(31/2 ⁻)		
3107.2	(29/2 ⁺)	266.7 ^{&} 4	100 ^{&} 11	2840.5	(27/2 ⁺)		
		509.5 ^{&} 4	61 ^{&} 11	2597.7	(25/2 ⁺)		
3134.3	(31/2 ⁻)	277.2 ^{&} 4	100 ^{&} 10	2857.1	(29/2 ⁻)		

Adopted Levels, Gammas (continued)

$\gamma(^{169}\text{Hf})$ (continued)

$E_i(\text{level})$	J_i^π	E_γ [†]	I_γ [‡]	E_f	J_f^π	Mult. [†]	α^b	Comments
3134.3	(31/2 ⁻)	536.7 ^{& 4}	65 ^{& 10}	2597.6	(27/2 ⁻)			
3179.8	(35/2 ⁻)	495.5 ^{& 4}	100 ^{& 38}	2683.9	(31/2 ⁻)			
		992.0 ^{& 4}	88 ^{& 38}	2187.9	(33/2 ⁺)			
3220.6	(37/2 ⁻)	553.3 ^{a 2}	100	2667.3	(33/2 ⁻)			
3395.6	(31/2 ⁺)	288.3 ^{& 4}	100 ^{& 7}	3107.2	(29/2 ⁺)			
		555.1 ^{& 4}	67 ^{& 20}	2840.5	(27/2 ⁺)			
3425.1	(33/2 ⁻)	290.8 ^{& 4}	100 ^{& 12}	3134.3	(31/2 ⁻)			
		568.0 ^{& 4}	47 ^{& 12}	2857.1	(29/2 ⁻)			
3453.4	(41/2 ⁺)	650.1 ^{a 2}	100	2803.5	(37/2 ⁺)			
3471.6	(37/2 ⁻)	502.2 ^{& 4}	100	2969.4	(33/2 ⁻)			
3514.9	(37/2 ⁻)	600.4 ^{& 4}	100 ^{& 11}	2914.2	(33/2 ⁻)			
		847.8 ^{& 4}	26 ^{& 11}	2667.3	(33/2 ⁻)			
3588.5	(39/2 ⁺)	714.0 ^{a 2}	100	2874.5	(35/2 ⁺)	[E2]	0.00834	B(E2)(W.u.)=1.9×10 ² 13
3672.2	(39/2 ⁻)	606.5 ^{a 2}	100	3065.7	(35/2 ⁻)			
3700.0	(33/2 ⁺)	304.5 ^{& 4}	100 ^{& 14}	3395.6	(31/2 ⁺)			
		592.8 ^{& 4}	86 ^{& 14}	3107.2	(29/2 ⁺)			
3728.8	(35/2 ⁻)	303.7 ^{& 4}	100 ^{& 12}	3425.1	(33/2 ⁻)			
		594.5 ^{& 4}	76 ^{& 12}	3134.3	(31/2 ⁻)			
3768.5	(39/2 ⁻)	588.3 ^{& 4}	93 ^{& 21}	3179.8	(35/2 ⁻)			
		703.1 ^{& 4}	57 ^{& 21}	3065.7	(35/2 ⁻)			
		964.9 ^{& 4}	100 ^{& 29}	2803.5	(37/2 ⁺)			
3832.9	(41/2 ⁻)	612.3 ^{a 2}	100	3220.6	(37/2 ⁻)			
4020.2	(35/2 ⁺)	320.2 ^{& 4}	100 ^{& 8}	3700.0	(33/2 ⁺)			
		624.6 ^{& 4}	77 ^{& 23}	3395.6	(31/2 ⁺)			
4041.2	(41/2 ⁺)	587.9 ^{& 4}	<50 ^{&}	3453.4	(41/2 ⁺)			
		1237.4 ^{& 4}	100 ^{& 33}	2803.5	(37/2 ⁺)			
4041.4	(37/2 ⁻)	312.6 ^{& 4}	100 ^{& 12}	3728.8	(35/2 ⁻)			
		616.3 ^{& 4}	76 ^{& 12}	3425.1	(33/2 ⁻)			
4053.3	(41/2 ⁻)	581.7 ^{& 4}	100	3471.6	(37/2 ⁻)			
4141.0	(45/2 ⁺)	687.8 ^{a 2}	100	3453.4	(41/2 ⁺)	[E2]	0.00906	B(E2)(W.u.)=230 40
4155.9	(41/2 ⁻)	640.9 ^{& 4}	100 ^{& 17}	3514.9	(37/2 ⁻)			
		935.4 ^{& 4}	24 ^{& 10}	3220.6	(37/2 ⁻)			
4320.6	(43/2 ⁻)	648.4 ^{a 2}	100	3672.2	(39/2 ⁻)	[E2]	0.01036	B(E2)(W.u.)=440 250
4343.3	(43/2 ⁺)	754.8 ^{a 2}	100	3588.5	(39/2 ⁺)	[E2]	0.00738	B(E2)(W.u.)=210 140
4350.4	(37/2 ⁺)	330.2 ^{& 4}	100 ^{& 21}	4020.2	(35/2 ⁺)			
		650.3 ^{& 4}	86 ^{& 14}	3700.0	(33/2 ⁺)			

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Adopted Levels, Gammas (continued)

$\gamma(^{169}\text{Hf})$ (continued)

$E_i(\text{level})$	J_i^π	$E_\gamma^\dagger$	$I_\gamma^\ddagger$	E_f	J_f^π	Mult. [†]	α^b	Comments
4361.0	(39/2 ⁻)	319.6 ^{& 4}	100 ^{& 17}	4041.4	(37/2 ⁻)			
		632.2 ^{& 4}	92 ^{& 17}	3728.8	(35/2 ⁻)			
4441.8	(43/2 ⁻)	673.0 ^{& 4}	100 ^{& 18}	3768.5	(39/2 ⁻)			
		988.4 ^{& 4}	29 ^{& 11}	3453.4	(41/2 ⁺)			
4510.5	(45/2 ⁻)	677.6 ^{a 2}	100	3832.9	(41/2 ⁻)	[E2]	0.00937	B(E2)(W.u.)=310 60
4685.3	(39/2 ⁺)	334.9 ^{& 4}	100 ^{& 10}	4350.4	(37/2 ⁺)			
		665.1 ^{& 4}	80 ^{& 30}	4020.2	(35/2 ⁺)			
4688.0	(41/2 ⁻)	327.0 ^{& 4}	100 ^{& 21}	4361.0	(39/2 ⁻)			
		646.6 ^{& 4}	89 ^{& 21}	4041.4	(37/2 ⁻)			
4706.0	(45/2 ⁻)	652.7 ^{& 4}	100	4053.3	(41/2 ⁻)			
4729.7	(45/2 ⁺)	588.9 ^{& 4}	<38 ^{&}	4141.0	(45/2 ⁺)			
		688.2 ^{& 4}	100 ^{& 38}	4041.2	(41/2 ⁺)			
		1276.2 4	75 25	3453.4	(41/2 ⁺)			
4827.6	(45/2 ⁻)	671.7 ^{& 4}	100	4155.9	(41/2 ⁻)			
4882.1	(49/2 ⁺)	741.2 ^{a 2}	100	4141.0	(45/2 ⁺)			
5020.9	(43/2 ⁻)	332.9 ^{& 4}	100 ^{& 13}	4688.0	(41/2 ⁻)			
		659.9 ^{& 4}	93 ^{& 20}	4361.0	(39/2 ⁻)			
5027.3	(41/2 ⁺)	342.0 ^{& 4}	100 ^{& 29}	4685.3	(39/2 ⁺)			
		676.9 ^{& 4}	71 ^{& 29}	4350.4	(37/2 ⁺)			
5034.9	(47/2 ⁻)	714.3 ^{a 2}	100	4320.6	(43/2 ⁻)	[E2]	0.00833	B(E2)(W.u.)=260 130
5131.9	(47/2 ⁺)	788.6 ^{a 2}	100	4343.3	(43/2 ⁺)	[E2]	0.00671	B(E2)(W.u.)=220 80
5174.0	(47/2 ⁻)	732.0 ^{& 4}	100 ^{& 15}	4441.8	(43/2 ⁻)			
		1033.2 ^{& 4}	24 ^{& 9}	4141.0	(45/2 ⁺)			
5250.5	(49/2 ⁻)	740.0 ^{a 2}	100	4510.5	(45/2 ⁻)	[E2]	0.00770	B(E2)(W.u.)=350 140
5361.6	(45/2 ⁻)	340.7 ^{& 4}	100 ^{& 33}	5020.9	(43/2 ⁻)			
		673.6 ^{& 4}	100 ^{& 33}	4688.0	(41/2 ⁻)			
5371.2	(43/2 ⁺)	343.9 ^{& 4}	100 ^{& 33}	5027.3	(41/2 ⁺)			
		685.9 ^{& 4}	83 ^{& 33}	4685.3	(39/2 ⁺)			
5424.6	(49/2 ⁻)	718.6 ^{& 4}	100	4706.0	(45/2 ⁻)			
5495.7	(49/2 ⁺)	765.7 ^{& 4}	100 ^{& 31}	4729.7	(45/2 ⁺)			
		1354.6 ^{& 4}	69 ^{& 23}	4141.0	(45/2 ⁺)			
5544.4	(49/2 ⁻)	716.8 ^{& 4}	100 ^{&}	4827.6	(45/2 ⁻)			
5688.9	(53/2 ⁺)	806.8 ^{a 2}	100	4882.1	(49/2 ⁺)	[E2]	0.00639	B(E2)(W.u.)=540 210
5711.6	(47/2 ⁻)	350.0 4	100 22	5361.6	(45/2 ⁻)			
		690.7 4	89 22	5020.9	(43/2 ⁻)			
5817.7	(51/2 ⁻)	782.8 ^{a 2}	100	5034.9	(47/2 ⁻)	[E2]	0.00682	B(E2)(W.u.)=320 90
5956.0	(51/2 ⁻)	782.0 ^{& 4}	100	5174.0	(47/2 ⁻)			

Adopted Levels, Gammas (continued)

$\gamma(^{169}\text{Hf})$ (continued)								
$E_i(\text{level})$	J_i^π	E_γ [†]	I_γ [‡]	E_f	J_f^π	Mult. [†]	α^b	Comments
5957.6	(51/2 ⁺)	825.7 ^a 2	100	5131.9	(47/2 ⁺)	[E2]	0.00608	B(E2)(W.u.)=190 140
6046.0	(53/2 ⁻)	795.5 ^a 2	100	5250.5	(49/2 ⁻)	[E2]	0.00658	B(E2)(W.u.)=7×10 ² 3
6077.4	(49/2 ⁻)	365.8 ^{&} 4	89 ^{&} 33	5711.6	(47/2 ⁻)			
		715.8 ^{&} 4	100 ^{&} 33	5361.6	(45/2 ⁻)			
6097.8	(47/2 ⁺)	726.6 ^{&} 4	100	5371.2	(43/2 ⁺)			
6212.7	(53/2 ⁻)	788.1 ^{&} 4	100	5424.6	(49/2 ⁻)			
6309.3	(53/2 ⁺)	813.3 ^{&} 4	100 ^{&} 24	5495.7	(49/2 ⁺)			
		1427.1 ^{&} 4	38 ^{&} 14	4882.1	(49/2 ⁺)			
6326.3	(53/2 ⁻)	781.9 ^{&} 4	100	5544.4	(49/2 ⁻)			
6455.3	(51/2 ⁻)	377.9 ^{&} 4	100 ^{&} 33	6077.4	(49/2 ⁻)			
		743.7 ^{&} 4	83 ^{&} 33	5711.6	(47/2 ⁻)			
6565.2	(57/2 ⁺)	876.3 ^a 2	100	5688.9	(53/2 ⁺)	[E2]	0.00536	B(E2)(W.u.)=180 70
6667.6	(55/2 ⁻)	849.9 ^a 2	100	5817.7	(51/2 ⁻)			
6790.0	(55/2 ⁻)	834.0 ^{&} 4	100	5956.0	(51/2 ⁻)			
6830.1	(55/2 ⁺)	872.5 ^a 2	100	5957.6	(51/2 ⁺)			
6854.2	(53/2 ⁻)	398.9 ^{&} 4	80 ^{&} 40	6455.3	(51/2 ⁻)			
		776.8 ^{&} 4	100 ^{&} 40	6077.4	(49/2 ⁻)			
6895.2	(57/2 ⁻)	849.2 ^a 2	100	6046.0	(53/2 ⁻)	[E2]	0.00573	B(E2)(W.u.)=260 120
7076.3	(57/2 ⁻)	863.6 ^{&} 4	100	6212.7	(53/2 ⁻)			
7170.6	(57/2 ⁺)	860.9 ^{&} 4	100 ^{&} 20	6309.3	(53/2 ⁺)			
		1482.1 ^{&} 4	<20 ^{&}	5688.9	(53/2 ⁺)			
7179.8	(57/2 ⁻)	853.5 ^{&} 4	100	6326.3	(53/2 ⁻)			
7509.1	(61/2 ⁺)	943.9 ^a 2	100	6565.2	(57/2 ⁺)	[E2]	0.00460	B(E2)(W.u.)=150 50
7581.3	(59/2 ⁻)	913.7 ^a 2	100	6667.6	(55/2 ⁻)			
7677.0	(59/2 ⁻)	887.0 ^{&} 4	100	6790.0	(55/2 ⁻)			
7751.5	(59/2 ⁺)	921.4 ^{&} 4	100	6830.1	(55/2 ⁺)			Other E _γ : 917.4 2 in (⁴⁴ Ca,5n _γ).
7806.5	(61/2 ⁻)	911.3 ^a 2	100	6895.2	(57/2 ⁻)	[E2]	0.00494	B(E2)(W.u.)=150 80
8009.8	(61/2 ⁻)	933.5 ^{&} 4	100	7076.3	(57/2 ⁻)			
8088.7	(61/2 ⁺)	918.1 ^{&} 4	100	7170.6	(57/2 ⁺)			
8099.1	(61/2 ⁻)	919.3 ^{&} 4	100	7179.8	(57/2 ⁻)			
8514.5	(65/2 ⁺)	1005.4 ^a 2	100	7509.1	(61/2 ⁺)			
8539.1	(63/2 ⁻)	957.8 ^a 2	100	7581.3	(59/2 ⁻)			
8568.8	(63/2 ⁻)	891.8 ^{&} 4	100	7677.0	(59/2 ⁻)			
8717.6	(63/2 ⁺)	966.1 ^{&} 4	100	7751.5	(59/2 ⁺)			
8784.9	(65/2 ⁻)	978.4 ^a 2	100	7806.5	(61/2 ⁻)			
8996.8	(65/2 ⁻)	987.0 ^{&} 4	100	8009.8	(61/2 ⁻)			
9054.1	(65/2 ⁺)	965.4 ^{&} 4	100	8088.7	(61/2 ⁺)			

Adopted Levels, Gammas (continued)

$\gamma(^{169}\text{Hf})$ (continued)

$E_i(\text{level})$	J_i^π	$E_\gamma^\dagger$	$I_\gamma^\ddagger$	E_f	J_f^π	Comments
9405.2	(67/2 ⁻)	866.1 ^{&} 4	100	8539.1	(63/2 ⁻)	E_γ : note that, in ¹³⁰ Te(⁴⁴ Ca,5n γ), $E_\gamma=1004.8$ 2 was proposed for this 67/2 to 63/2 transition.
9574.7	(69/2 ⁺)	1060.2 ^a 2	100	8514.5	(65/2 ⁺)	
9719.2?	(67/2 ⁺)	1001.6 ^c 4	100	8717.6	(63/2 ⁺)	
9826.8	(69/2 ⁻)	1041.9 ^a 2	100	8784.9	(65/2 ⁻)	
9995.5?	(69/2 ⁻)	998.7 ^{&c} 4	100	8996.8	(65/2 ⁻)	
10294.5	(71/2 ⁻)	889.3 ^{&} 4	100	9405.2	(67/2 ⁻)	Other E_γ : 1100.8 4 in (⁷⁶ Ge,3n γ).
10676.7	(73/2 ⁺)	1102.0 ^a 2	100	9574.7	(69/2 ⁺)	
10917.5?	(73/2 ⁻)	1090.7 ^{ac} 2	100	9826.8	(69/2 ⁻)	
11005.6?	(73/2 ⁻)	1010.1 ^{&c} 4	100	9995.5?	(69/2 ⁻)	
11231.9	(75/2 ⁻)	937.4 ^{&} 4	100	10294.5	(71/2 ⁻)	
11807.4	(77/2 ⁺)	1130.7 ^{&} 4	100	10676.7	(73/2 ⁺)	Other E_γ : 1146.0 2 in (⁴⁴ Ca,5n γ) (γ placed lower in cascade).
12034.8	(77/2 ⁻)	1117.3 ^{&} 4	100	10917.5?	(73/2 ⁻)	
12221.3	(79/2 ⁻)	989.4 ^{&} 4	100	11231.9	(75/2 ⁻)	
12955.6	(81/2 ⁺)	1148.2 ^{&} 4	100	11807.4	(77/2 ⁺)	
13140.8	(81/2 ⁻)	1106 ^{&} 1	100	12034.8	(77/2 ⁻)	
13272.3	(83/2 ⁻)	1051.0 ^{&} 4	100	12221.3	(79/2 ⁻)	Other E_γ : 1181.5 2 in (⁴⁴ Ca,5n γ) (γ placed lower in cascade).
14115.7	(85/2 ⁺)	1160.1 ^{&} 4	100	12955.6	(81/2 ⁺)	
14277.8	(85/2 ⁻)	1137 ^{&} 1	100	13140.8	(81/2 ⁻)	
14385.0	(87/2 ⁻)	1112.7 ^{&} 4	100	13272.3	(83/2 ⁻)	
15294.5	(89/2 ⁺)	1178.8 ^{&} 4	100	14115.7	(85/2 ⁺)	

[†] From ¹⁵⁹Tb(¹⁴N,4n γ), except where noted. $\Delta\pi=(\text{no})$ has been assigned to intraband Q and D(+Q) transitions.

[‡] Relative photon branching from each level; intensities are from ¹⁵⁹Tb(¹⁴N,4n γ), except as noted.

From ¹⁶⁹Ta ε decay.

@ Reported as upper limit because observed γ included possible contribution from a contaminant.

& From ⁹⁶Zr(⁷⁶Ge,3n γ).

^a From ¹³⁰Te(⁴⁴Ca,5n γ).

^b 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.

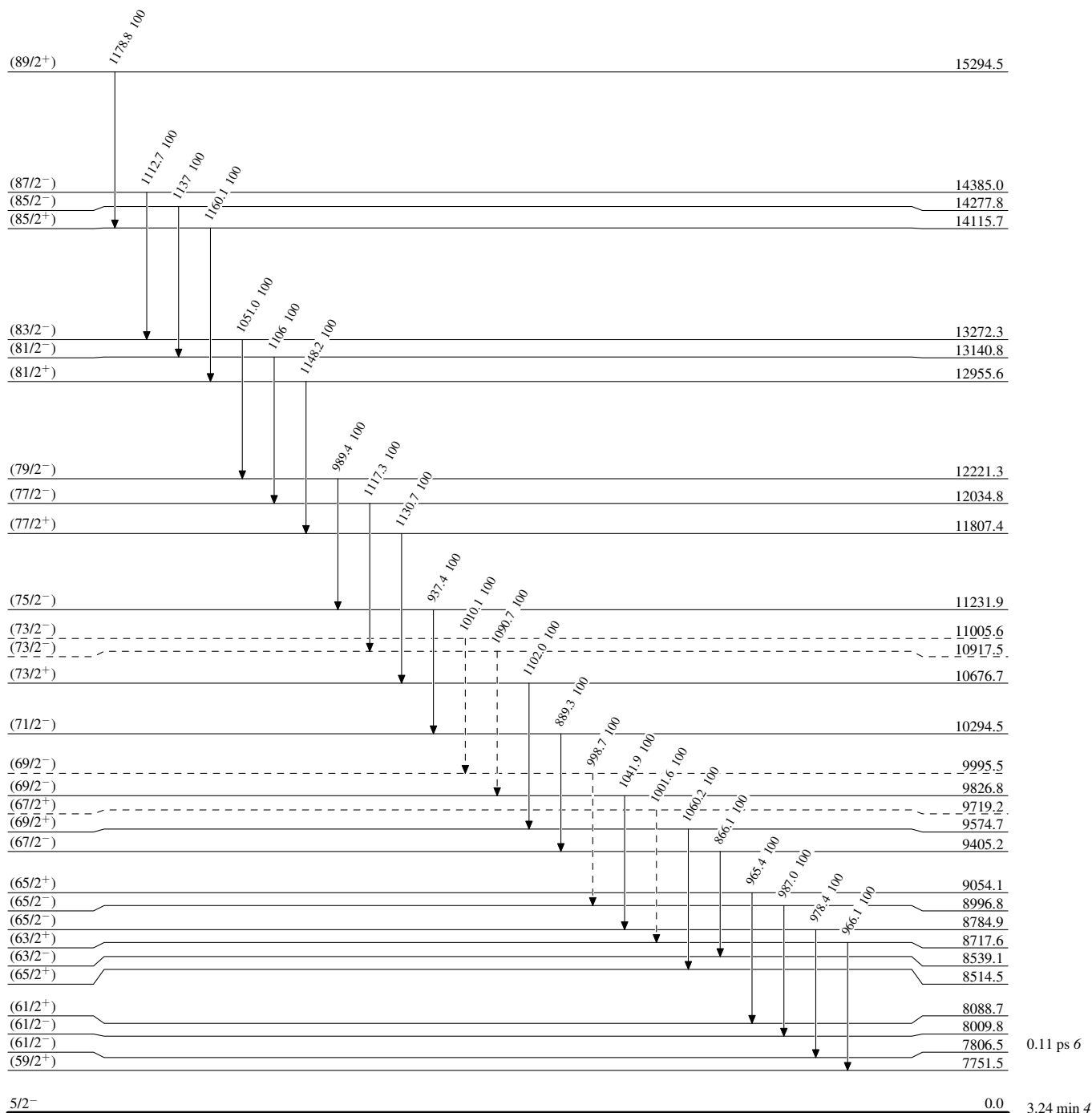
^c Placement of transition in the level scheme is uncertain.

Adopted Levels, Gammas

Legend

Level Scheme

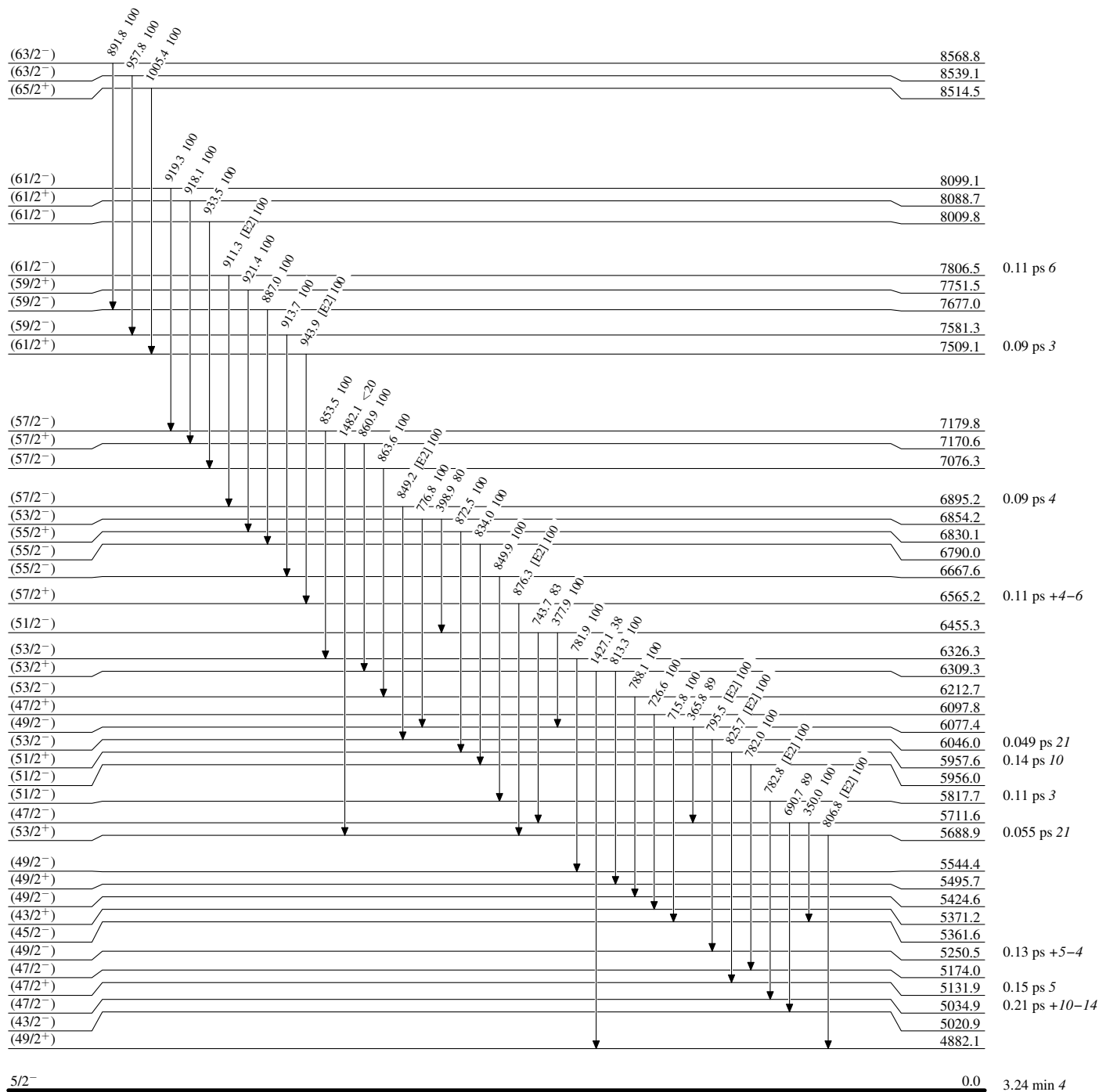
Intensities: Relative photon branching from each level

-----► γ Decay (Uncertain)


Adopted Levels, Gammas

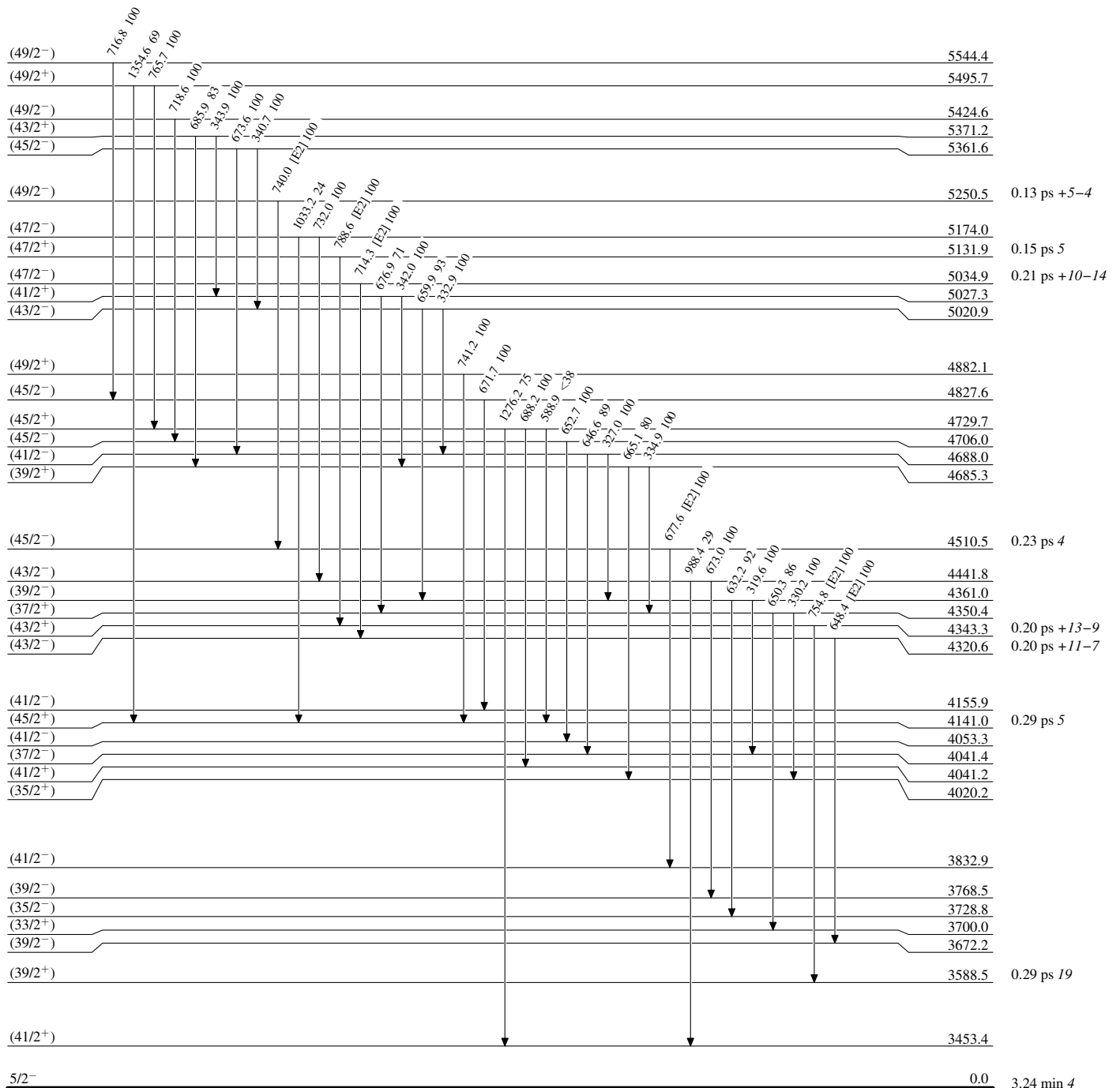
Level Scheme (continued)

Intensities: Relative photon branching from each level



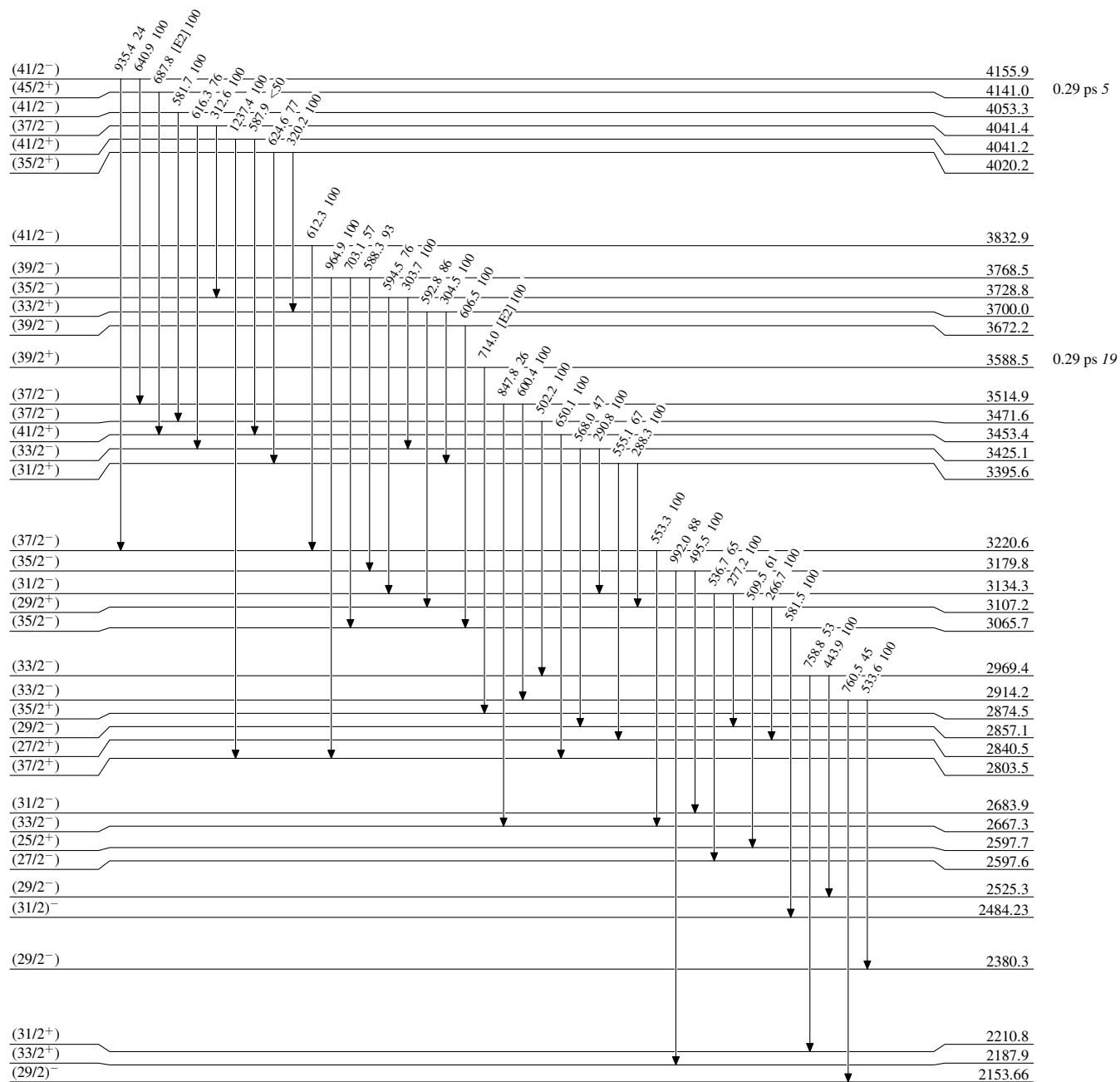
Adopted Levels, Gammas**Level Scheme (continued)**

Intensities: Relative photon branching from each level



Adopted Levels, GammasLevel Scheme (continued)

Intensities: Relative photon branching from each level

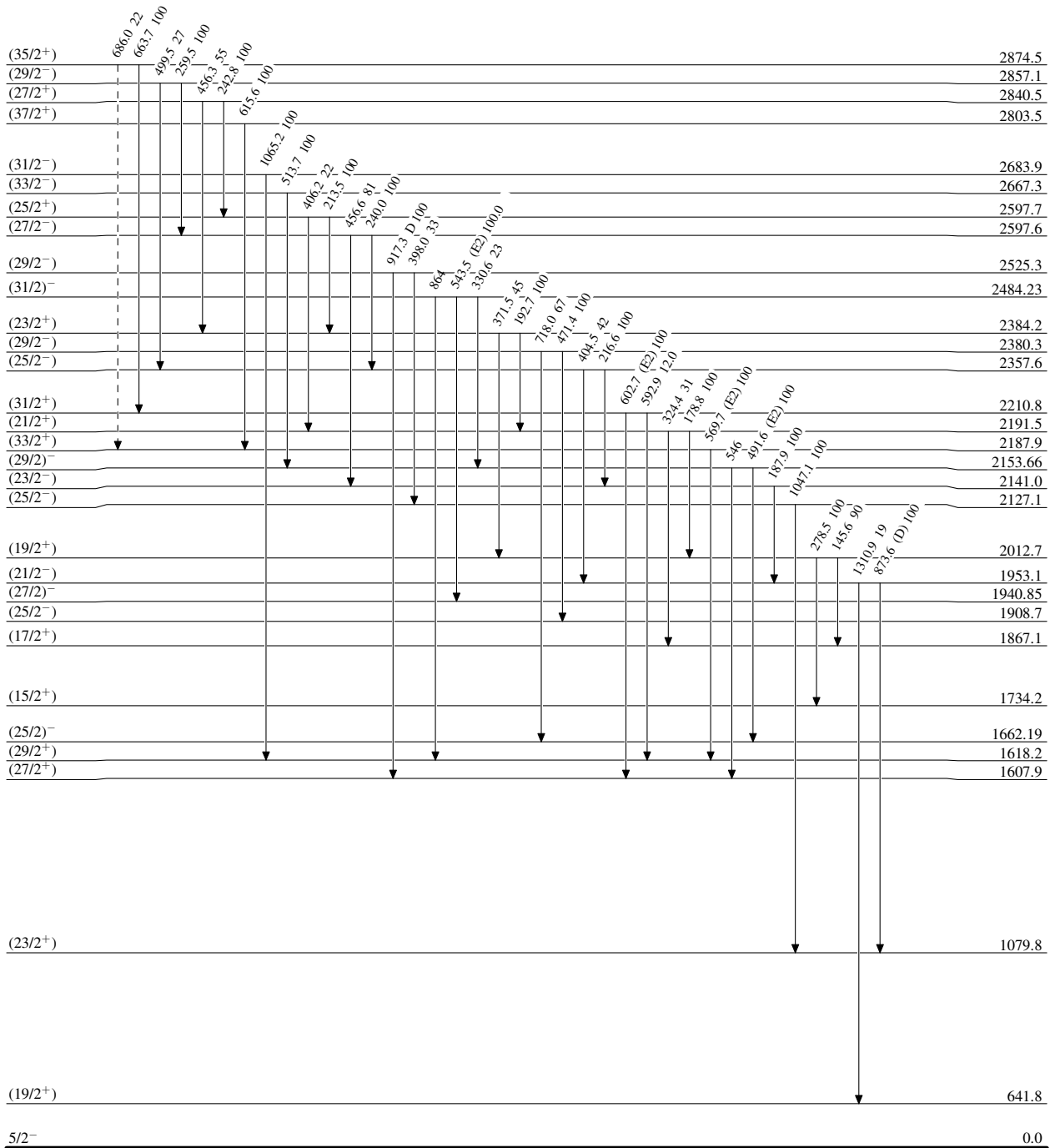


Adopted Levels, Gammas

Legend

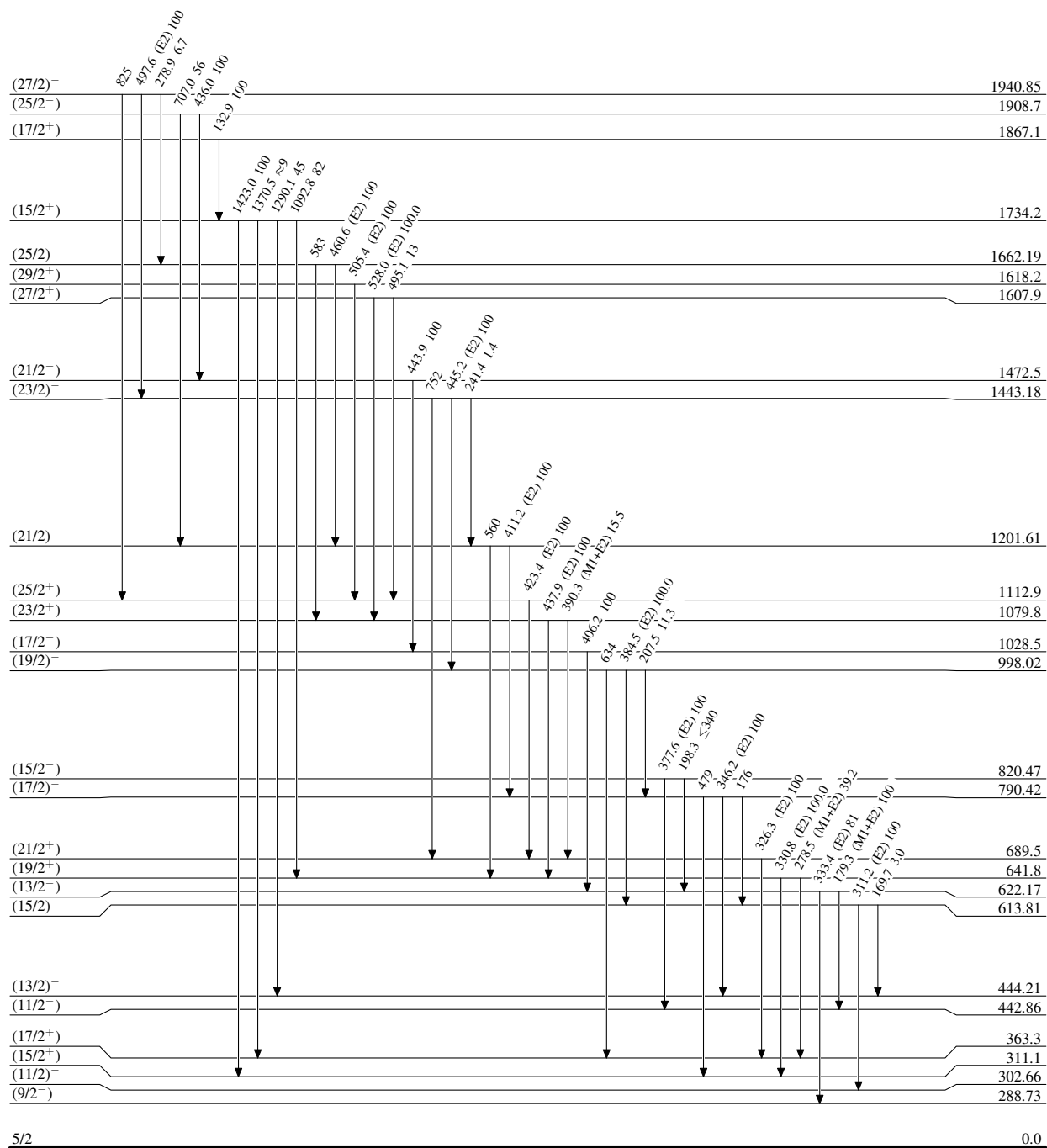
Level Scheme (continued)

Intensities: Relative photon branching from each level

-----► γ Decay (Uncertain)


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

Intensities: Relative photon branching from each level

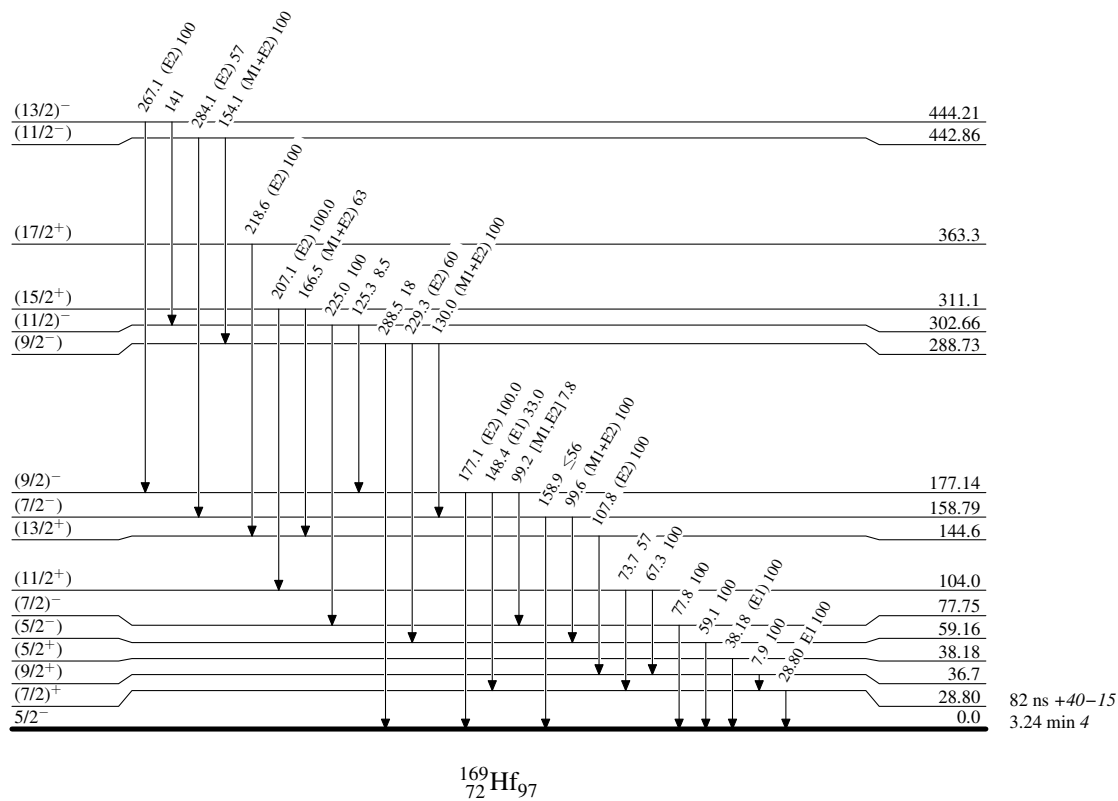


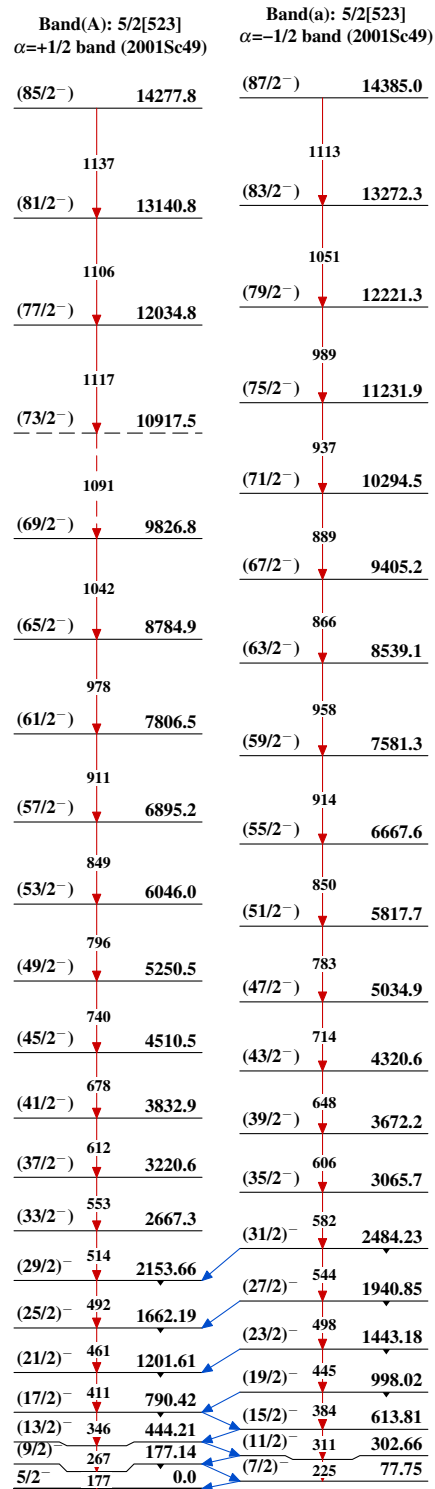
Adopted Levels, Gammas

Legend

Level Scheme (continued)

Intensities: Relative photon branching from each level

-----► γ Decay (Uncertain)

Adopted Levels, Gammas $^{169}_{72}\text{Hf}_{97}$

Adopted Levels, Gammas (continued)

Band(B): 5/2[642]
 $\alpha=+1/2$ band (2001Sc49)

(89/2 ⁺)	15294.5
1179	
(85/2 ⁺)	14115.7
1160	
(81/2 ⁺)	12955.6
1148	
(77/2 ⁺)	11807.4
1131	
(73/2 ⁺)	10676.7
1102	
(69/2 ⁺)	9574.7
1060	
(65/2 ⁺)	8514.5
1005	
(61/2 ⁺)	7509.1
944	
(57/2 ⁺)	6565.2
876	
(53/2 ⁺)	5688.9
807	
(49/2 ⁺)	4882.1
741	
(45/2 ⁺)	4141.0
688	
(41/2 ⁺)	3453.4
650	
(37/2 ⁺)	2803.5
616	
(33/2 ⁺)	2187.9
570	
(29/2 ⁺)	1618.2
505	
(25/2 ⁺)	1112.9
423	
(21/2 ⁺)	689.5
326	
(17/2 ⁺)	363.3
326	
(13/2 ⁺)	144.6
219	
(9/2 ⁺)	38.18
108	
(5/2 ⁺)	36.7

Band(b): 5/2[642]
 $\alpha=-1/2$ band (2001Sc49)

(67/2 ⁺)	9719.2
1002	
(63/2 ⁺)	8717.6
966	
(59/2 ⁺)	7751.5
921	
(55/2 ⁺)	6830.1
872	
(51/2 ⁺)	5957.6
826	
(47/2 ⁺)	5131.9
789	
(43/2 ⁺)	4343.3
755	
(39/2 ⁺)	3588.5
714	
(35/2 ⁺)	2874.5
664	
(31/2 ⁺)	2210.8
603	
(27/2 ⁺)	1607.9
528	
(23/2 ⁺)	1079.8
438	
(19/2 ⁺)	641.8
331	
(15/2 ⁺)	311.1
207	
(11/2 ⁺)	104.0
74	
(7/2 ⁺)	28.80

Band(C): 5/2[512]
 $\alpha=+1/2$ band (2001Sc49)

(61/2 ⁻)	8099.1
919	
(57/2 ⁻)	7179.8
854	
(53/2 ⁻)	6326.3
782	
(49/2 ⁻)	5544.4
717	
(45/2 ⁻)	4827.6
672	
(41/2 ⁻)	4155.9
641	
(37/2 ⁻)	3514.9
600	
(33/2 ⁻)	2914.2
534	
(29/2 ⁻)	2380.3
471	
(25/2 ⁻)	1908.7
436	
(21/2 ⁻)	1472.5
444	
(17/2 ⁻)	1028.5
406	
(13/2 ⁻)	622.17
333	
(9/2 ⁻)	288.73
229	
(5/2 ⁻)	59.16

Band(c): 5/2[512]
 $\alpha=-1/2$ band (2001Sc49)

(63/2 ⁻)	8568.8
892	
(59/2 ⁻)	7677.0
887	
(55/2 ⁻)	6790.0
834	
(51/2 ⁻)	5956.0
782	
(47/2 ⁻)	5174.0
732	
(43/2 ⁻)	4441.8
673	
(39/2 ⁻)	3768.5
588	
(35/2 ⁻)	3179.8
496	
(31/2 ⁻)	2683.9
820.47	
(15/2 ⁻)	
378	
(11/2 ⁻)	442.86
284	
(7/2 ⁻)	158.79

Band(d): $\pi=+$, $\alpha=-1/2$
 3-quasiparticle band
 (2001Sc49)

(47/2 ⁺)	6097.8
727	
(43/2 ⁺)	5371.2
686	
(39/2 ⁺)	4685.3
665	
(35/2 ⁺)	4020.2
625	
(31/2 ⁺)	3395.6
555	
(27/2 ⁺)	2840.5
456	
(23/2 ⁺)	2384.2
372	
(19/2 ⁺)	2012.7
278	
(15/2 ⁺)	1734.2

Band(D): $\pi=+$, $\alpha=+1/2$ 3-quasiparticle band (2001Sc49)	
(41/2 ⁺)	5027.3
677	
(37/2 ⁺)	4350.4
650	
(33/2 ⁺)	3700.0
593	
(29/2 ⁺)	3107.2
510	
(25/2 ⁺)	2597.7
406	
(21/2 ⁺)	2191.5
324	
(17/2 ⁺)	1867.1

Adopted Levels, Gammas (continued)