

Adopted Levels, Gammas

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Coral M. Baglin	NDS 113,2187 (2012)	15-Sep-2012

Q(β^-)=-11302 6; S(n)=14133 4; S(p)=5604 4; Q(α)=-4040 5 [2012Wa38](#)

Note: Current evaluation has used the following Q record -11302 5 14134 4 5603 4-4040 5 [2011AuZZ](#).

Q(β^-),S(n),S(p),Q(α) from [2011AuZZ](#); -11050 500, 13820 660, 5710 360, -4130 300, respectively, from systematics ([2003Au03](#)).

Q(ϵ p)=618 11 ([2011AuZZ](#)).

Production: Ag+p (660 MeV), chem. separation ([1972Ar24](#)). ⁹²Mo(³He,3n), chem separation ([1972De09,1976De07](#)). Ni(¹⁰⁶Cd,x),

E(¹⁰⁶Cd)=60 MeV/nucleon ([1994He28,1995Mo26,1995He39](#)); fragment mass separator.

Mass number confirmed by observed growth of known γ rays following ⁹²Tc ϵ decay.

Shell-model calculations: see, e.g., [1996Ru02](#), [2004De40](#).

⁹²Ru Levels

Cross Reference (XREF) Flags

- A ⁵⁸Ni(⁴⁰Ca,2p $\alpha\gamma$),
- B ⁹²Rh ϵ decay (4.66 s)
- C ⁹³Pd ϵ p decay
- D ⁹²Rh ϵ decay (0.53 s)

E(level) [†]	J ^{π} [‡]	T _{1/2} [#]	XREF	Comments
0.0 [@]	0 ⁺	3.65 min 5	ABCD	% ϵ +% β^+ =100 T _{1/2} : from γ (t) (1976De07). Others: 3.9 min 2 (1972De09), 3.2 min 3 (1972Ar24).
865.7 [@] 1	(2 ⁺)		ABCD	J ^{π} : (E2) 865 γ to 0 ⁺ g.s.
1854.9 [@] 13	(4 ⁺)		ABC	J ^{π} : (E2) 991 γ to 2 ⁺ ; probably feeds lower-J level in (⁴⁰ Ca,2p $\alpha\gamma$).
2535.2 ^{&} 13	(5 ⁻)	16 ns 2	A	J ^{π} : (E3) 1671 γ to (2 ⁺) 866; 680 γ to (4 ⁺) 1855. T _{1/2} : from (⁵⁸ Ni,2p $\alpha\gamma$).
2671.5 [@] 16	(6 ⁺)		ABC	J ^{π} : (E2) 817 γ to (4 ⁺) 1855; probably feeds lower-J level in (⁴⁰ Ca,2p $\alpha\gamma$).
2775.9			B	J ^{π} : 919 γ to (4 ⁺) 1855.
2833.9 [@] 18	(8 ⁺)	100 ns 14	AB	J ^{π} : (E2) 162 γ to (6 ⁺) 2672; probably feeds lower-J level in (⁴⁰ Ca,2p $\alpha\gamma$).
2994.5 20	(8 ⁺)	<12 ps	A	
3014.5	(\geq 5)		B	J ^{π} : level appears to be strongly fed in ϵ decay from (\geq 6 ⁺ parent); 340 γ to (6 ⁺) 2672.
3292.2 ^{&} 16	(7 ⁻)	16 ps 5	A	
3798.2 [@] 21	(10 ⁺)	4.6 ps 24	A	
3931.4 ^{&} 18	(9 ⁻)	<3.5 ps	A	
4363.1 [@] 21	(12 ⁺)	71 ps 16	A	J ^{π} : E2 565 γ to (10 ⁺) 3798; probably feeds lower-J level in (⁴⁰ Ca,2p $\alpha\gamma$).
				T _{1/2} : unweighted average of 55 ps 4 (1997Li29) and 86 ps 9 (1980No06) from RDM in (⁴⁰ Ca,2p $\alpha\gamma$). Source of inconsistency unclear. The weighted average of these data is 60 ps 12.
4705.2 ^{&} 20	(11 ⁻)	11 ps 3	A	
5215.0 [@] 22	(13 ⁺)	<1.4 ps	A	
5267.6 21			A	
5281.9 [@] 22	(14 ⁺)	<7 ps	A	
5369.6? 22			A	
5572.1 22	(14 ⁺)	<1.4 ps	A	
5598.7 ^{&} 21	(13 ⁻)	<1.4 ps	A	

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Adopted Levels, Gammas (continued)

⁹²Ru Levels (continued)

E(level) [†]	J ^π [‡]	T _{1/2} [#]	XREF	E(level) [†]	J ^π [‡]	T _{1/2} [#]	XREF
5658.1 [@] 21	(15 ⁺)	10 ps 3	A	8647 3	(19 ⁺ ,20 ⁺)		A
5741.7 [@] 23	(16 ⁺)	139 ps 55	A	8912? 3	(20 ⁺)		A
6145.3 23	(16 ⁺)		A	9233 ^{&} 3	(21 ⁻)	2.4 ps 3	A
6621.4 ^{&} 21	(15 ⁻)	<1.4 ps	A	9433 3	(20 ⁺)		A
6995.6 [@] 23	(17 ⁺)		A	10741 ^{&} 3	(22 ⁻ ,23 ⁻)		A
7060.7 ^{&} 22	(17 ⁻)	55 ps 3	A	10886 [@] 3	(21 ⁺)		A
7504.2 [@] 25	(18 ⁺)		A	10996 3	(21 ⁺ ,22 ⁺)		A
7658.9 ^{&} 25	(18 ⁻)	<0.7 ps	A	11259 3	(22 ⁺ ,23 ⁺)		A
8001 ^{&} 3	(19 ⁻)	<0.7 ps	A	11311 3	(22 ⁻ ,23 ⁻)		A
8470 [@] 3	(19 ⁺)		A				

[†] From least-squares fit to E_γ, assuming authors' upper limit of ΔE=1 keV for E_γ from (⁴⁰Ca,2pαγ).

[‡] Based on γ anisotropy and the assumptions that, in (⁴⁰Ca,2pαγ), all transitions have J_i≥J_f, most have J_i>J_f and that crossover transitions are E2, except as noted.

[#] From recoil-distance Doppler-shift measurements in (⁴⁰Ca,2pαγ), except as noted.

[@] Band(A): π=+, yrast states.

[&] Band(B): π=-, yrast states.

γ(⁹²Ru)

E _i (level)	J ^π _i	E _γ [†]	I _γ [‡]	E _f	J ^π _f	Mult. [#]	α ^{&}	Comments
865.7	(2 ⁺)	865.7 [@] 1	100	0.0	0 ⁺	(E2)		
1854.9	(4 ⁺)	991.1 [@] 3	100	865.7	(2 ⁺)	(E2)		
2535.2	(5 ⁻)	680.1 10	100 7	1854.9	(4 ⁺)			
		1670.7 10	77 6	865.7	(2 ⁺)	(E3)		B(E3)(W.u.)=1.8 3 Mult.: see comment in (⁴⁰ Ca,2pαγ) data set.
2671.5	(6 ⁺)	817.8 [@] 1	100	1854.9	(4 ⁺)	(E2)		Other E _γ : 816.6 10 in (⁴⁰ Ca,2pαγ).
2775.9		919.1 [@] 1	100	1854.9	(4 ⁺)			
2833.9	(8 ⁺)	163.1 [@] 2	100	2671.5	(6 ⁺)	E2	0.225	B(E2)(W.u.)=1.62 23
2994.5	(8 ⁺)	160.6 10	100	2833.9	(8 ⁺)	(M1)	0.0841 19	B(M1)(W.u.)>0.40 Mult.: anisotropy ratio consistent with stretched Q (or D ΔJ=0); 1997Li29 adopt the latter. Δπ=no from level scheme.
3014.5	(≥5)	339.9 [@] 2	100	2671.5	(6 ⁺)			
3292.2	(7 ⁻)	757.0 10	100	2535.2	(5 ⁻)	E2		B(E2)(W.u.)=5.8 18
3798.2	(10 ⁺)	803.7 10	100	2994.5	(8 ⁺)	E2		B(E2)(W.u.)=15 8
3931.4	(9 ⁻)	639.2 10	100	3292.2	(7 ⁻)	E2		B(E2)(W.u.)>61
4363.1	(12 ⁺)	564.9 10	100	3798.2	(10 ⁺)	E2		B(E2)(W.u.)=5.6 13
4705.2	(11 ⁻)	773.8 10	100	3931.4	(9 ⁻)	E2		B(E2)(W.u.)=7.5 21
5215.0	(13 ⁺)	852.0 10	100	4363.1	(12 ⁺)	(M1)		B(M1)(W.u.)>0.025
5267.6		562.5 10	100	4705.2	(11 ⁻)			
5281.9	(14 ⁺)	918.7 10	100	4363.1	(12 ⁺)	E2		B(E2)(W.u.)>5.0
5369.6?		102 1	100	5267.6				
5572.1	(14 ⁺)	357.3 10	100	5215.0	(13 ⁺)	(M1)	0.01056 17	B(M1)(W.u.)>0.34
5598.7	(13 ⁻)	229.2 10	61 6	5369.6?		D		
		893.4 10	100 24	4705.2	(11 ⁻)	E2		B(E2)(W.u.)>18
5658.1	(15 ⁺)	86.1 10	100.0 18	5572.1	(14 ⁺)	(M1)	0.472 18	B(M1)(W.u.)=2.0 7

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Adopted Levels, Gammas (continued)

γ(⁹²Ru) (continued)

<u>E_i(level)</u>	<u>J_i^π</u>	<u>E_γ[†]</u>	<u>I_γ[‡]</u>	<u>E_f</u>	<u>J_f^π</u>	<u>Mult. #</u>	<u>α^{&}</u>	<u>Comments</u>
5658.1	(15 ⁺)	376.0 10	23.2 20	5281.9	(14 ⁺)	(M1)		B(M1)(W.u.)=0.0056 18
5741.7	(16 ⁺)	83.8 10	100	5658.1	(15 ⁺)	(M1)	0.509 19	B(M1)(W.u.)=0.18 7
6145.3	(16 ⁺)	487.1 10	100	5658.1	(15 ⁺)	D		
6621.4	(15 ⁻)	963.2 10	49 11	5658.1	(15 ⁺)			
		1022.7 10	100 7	5598.7	(13 ⁻)	E2		B(E2)(W.u.)>9.8
6995.6	(17 ⁺)	850.2 10	82 11	6145.3	(16 ⁺)	D		
		1337.7 10	100 5	5658.1	(15 ⁺)	Q		
7060.7	(17 ⁻)	439.1 10	45.0 26	6621.4	(15 ⁻)	E2		B(E2)(W.u.)=7.9 7
		1319.2 10	100.0 26	5741.7	(16 ⁺)	(E1)		B(E1)(W.u.)=1.81×10 ⁻⁶ 12
7504.2	(18 ⁺)	508.6 10	100	6995.6	(17 ⁺)	D		
7658.9	(18 ⁻)	598.2 10	100	7060.7	(17 ⁻)	(M1)		B(M1)(W.u.)>0.15
8001	(19 ⁻)	341.9 10	100	7658.9	(18 ⁻)	(M1)	0.01178 19	B(M1)(W.u.)>0.77
8470	(19 ⁺)	965.7 10	100	7504.2	(18 ⁺)	(D)		
8647	(19 ⁺ ,20 ⁺)	176.7 10	100 9	8470	(19 ⁺)			
		1142.7 10	67 13	7504.2	(18 ⁺)			
8912?	(20 ⁺)	1407.9 10	100	7504.2	(18 ⁺)			
9233	(21 ⁻)	1232.1 10	100	8001	(19 ⁻)	E2		B(E2)(W.u.)=3.4 5
9433	(20 ⁺)	962.7 10	100 20	8470	(19 ⁺)	D		
		1929.1 10	41 11	7504.2	(18 ⁺)	Q		
10741	(22 ⁻ ,23 ⁻)	1508.3 10	100	9233	(21 ⁻)			
10886	(21 ⁺)	1973.7 10	100 26	8912?	(20 ⁺)	D		
		2239.0 10	65 22	8647	(19 ⁺ ,20 ⁺)			
10996	(21 ⁺ ,22 ⁺)	1563.1 10	100 12	9433	(20 ⁺)			
		2349.7 10	53 8	8647	(19 ⁺ ,20 ⁺)	Q		
11259	(22 ⁺ ,23 ⁺)	262.7 10	71 6	10996	(21 ⁺ ,22 ⁺)	(D)		
		373.5 10	100 10	10886	(21 ⁺)	(Q)		
11311	(22 ⁻ ,23 ⁻)	2078.2 10	100	9233	(21 ⁻)			

[†] From (⁴⁰Ca,2pαγ), except as noted. ΔE=0.2 to 1.0 keV, depending on E_γ and I_γ; evaluator assigns authors' upper limit of ΔE=1 keV to all data.

[‡] Branching from (⁴⁰Ca,2pαγ).

[#] Based on γ anisotropy data from (⁴⁰Ca,2pαγ), except as noted. Stretched Q transitions are assigned as E2 if RUL disallows M2; others are assigned as (E2) when lifetime information is available to enable the calculation of transition probabilities. D transitions are assigned as (M1) (except for 1319γ, for which the level scheme requires Δπ=yes) for the purpose of calculating transition probabilities.

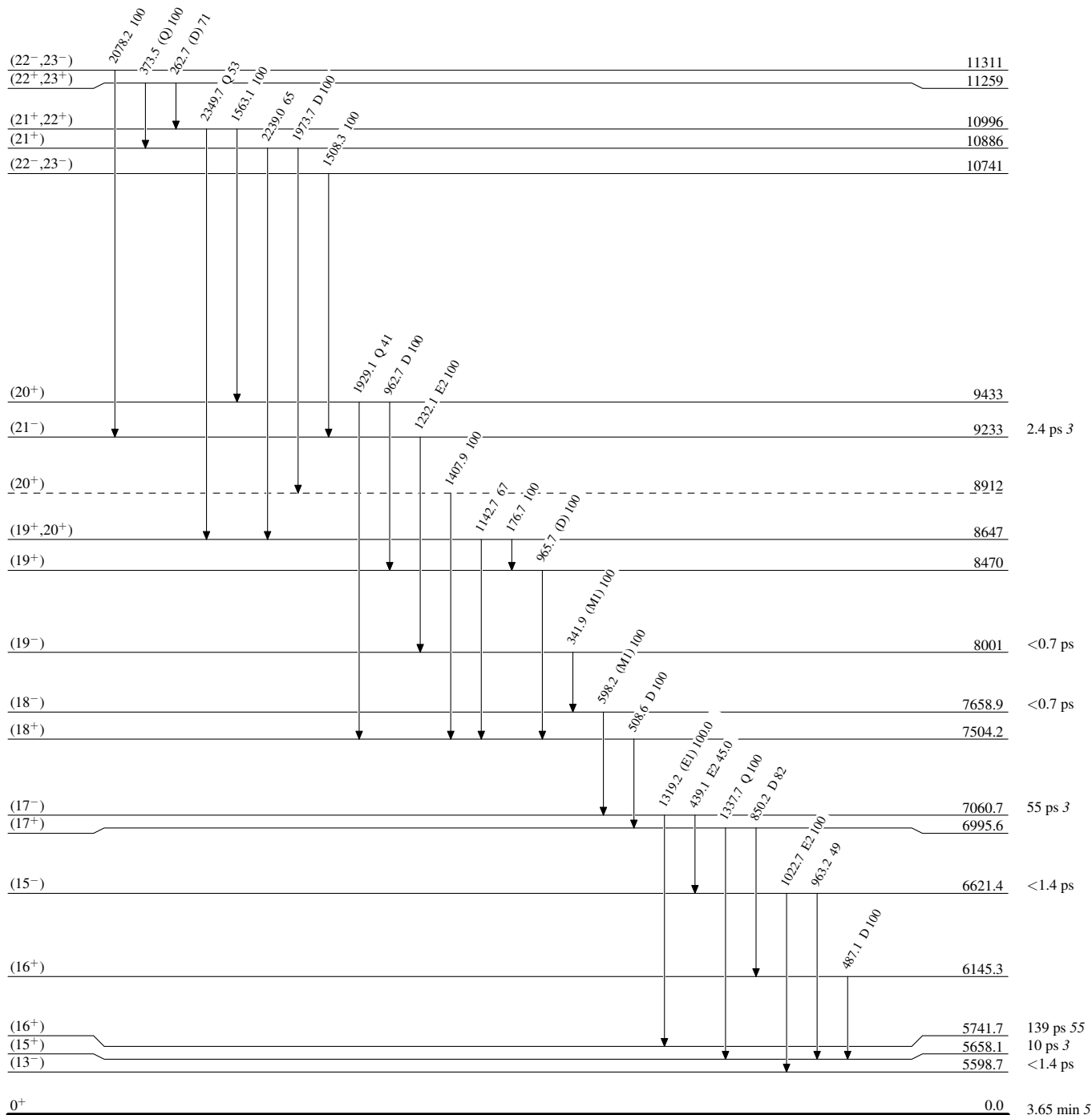
[@] From ⁹²Rh ε decay (4.66 s).

[&] 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.

Adopted Levels, Gammas

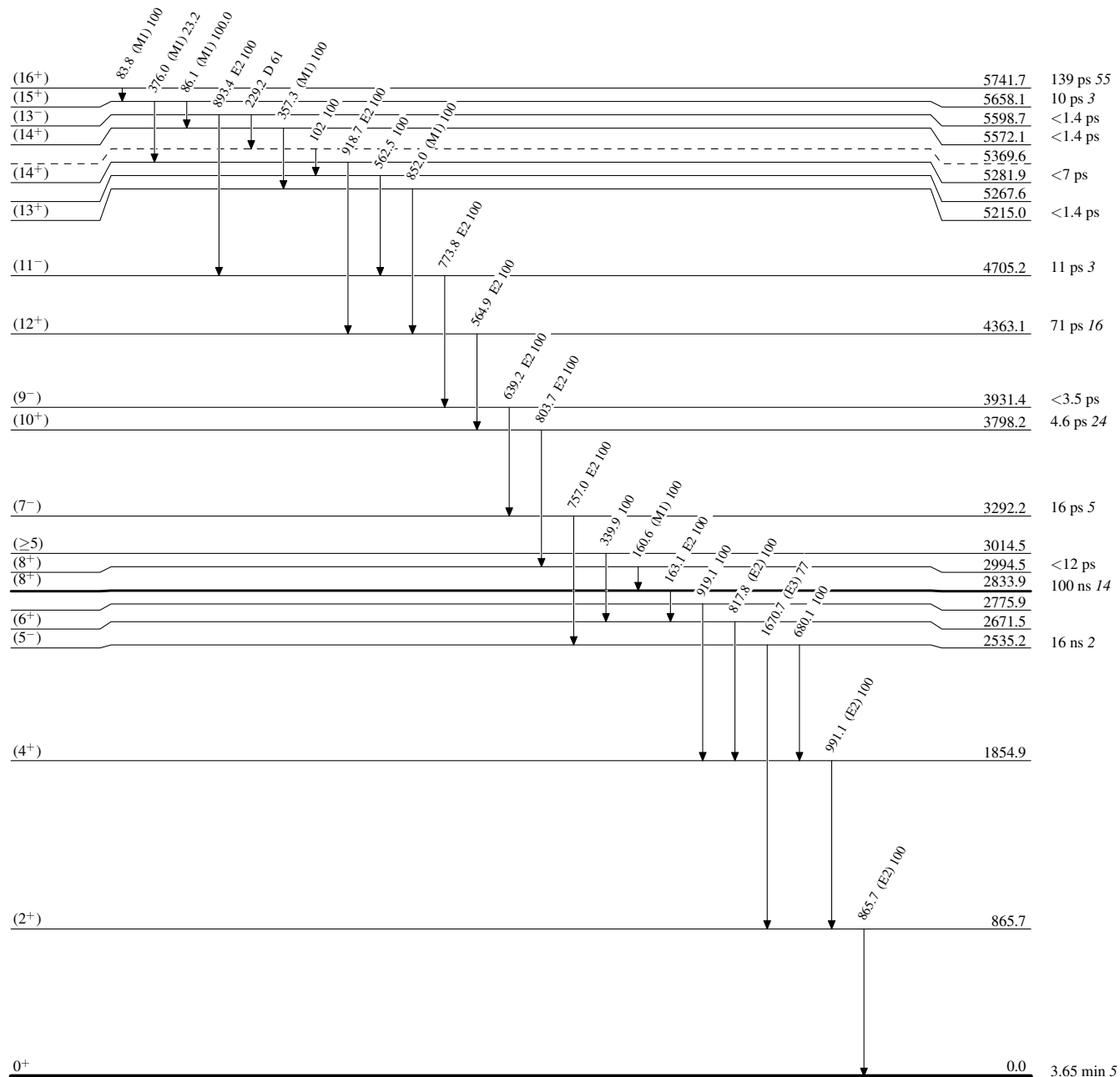
Level Scheme

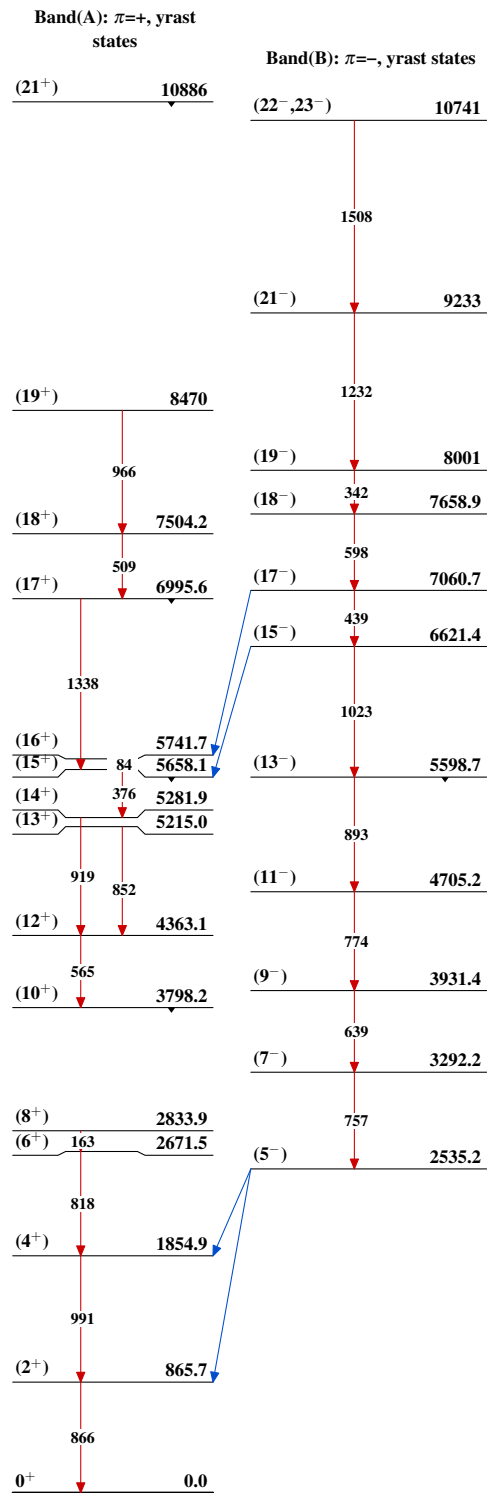
Intensities: Relative photon branching from each level



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

Intensities: Relative photon branching from each level

 $^{92}_{44}\text{Ru}_{48}$

Adopted Levels, Gammas $^{92}_{44}\text{Ru}_{48}$