^{40}Ca(^{28}Si,αpγ) 2021Ru07

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Jun Chen	NDS 196,17 (2024)	30-Sep-2023

Adapted from a XUNDL dataset for 2021Ru07 compiled by B. Singh, on March 10, 2021.

2021Ru07: E=122 MeV ^{28}Si beam was produced from ATLAS at ANL. Target was 0.5 mg/cm^2 99.975% enriched ^{40}Ca enclosed between two thin gold layers. γ rays were detected with the Gammasphere array of 101 Ge detectors and charged particles were detected with an 4π Microball array of 95 CsI(Tl) detectors. Measured Eγ, Iγ, four-fold $\gamma\gamma$-coin, $\gamma\gamma(\theta)$(DCO), (particle)-γ-coin. Deduced high-spin levels, J, π, band structures. Comparisons with detailed shell model calculations for low-spins and cranked Nilsson-Strutinsky calculations for high-spin levels.

1991Ba20: E=90 MeV ^{28}Si beam was produced from the University of Pennsylvania tandem Van de Graaff accelerator. Target was 350 μg/cm^2 isotopically enriched ^{40}Ca on a 30 mg/cm^2 Au backing. γ rays were detected with four Ge detectors and charged particles were detected an 4π array of phoswich detectors. Measured Eγ, Iγ, particle-γ-coin(t), $\gamma\gamma$-coin. Data reported in 1991Ba20 are mostly from their measurement of ^{40}Ca(^{29}Si,αpnγ). See that dataset for details.

^{63}Ga Levels

Configurations of bands are proposed by 2021Ru07, based on cranked Nilsson-Strutinsky calculations in terms of [(p1)p2p3; (n1)n2n3] labels, where (p1) and (n1) indicate proton and neutron holes, respectively in $f_{7/2}$ orbital; p2 and n2, the number of respective particles in the upper *fp* shell; and p3 and n3, the number of respective $g_{9/2}$ particles. In addition, subscripts + and − indicate α=+1/2 and α=−1/2 signature partners, respectively.

E(level)[†]	J$^\pi$[‡]	Comments
0.0	3/2$^-$[#]	
75.31 *22*	(5/2)$^-$[#]	
443.24 *17*	(3/2$^-$)	
722.30 *17*	(5/2$^-$)	
1152.50 *42*	(9/2$^-$)[#]	
1421.68 *24*	7/2$^{(-)}$[#]	
2046.39[@] *35*	(9/2$^+$)[#]	
2940.7[@] *5*	(13/2$^+$)[#]	
4080.5[@] *7*	17/2$^+$	
5244.4 *10*		
5715.9[@] *9*	21/2$^+$	
5853.0[&] *8*	19/2$^{(-)}$	
6501.7[&] *9*	23/2$^{(-)}$	
7335.3[b] *11*	21/2	
7657.0[c] *10*	(23/2)	
7710.7[&] *9*	27/2$^{(-)}$	
7912.2[a] *10*	25/2$^{(-)}$	
8214.1[b] *10*	25/2	
8857.4[c] *11*	(27/2)	
9040.5[&] *10*	31/2$^{(-)}$	
9256.2[a] *10*	29/2$^{(-)}$	
9483.4[b] *11*	29/2	
10161.6?[c] *15*	(31/2)	Reversed ordering of the 1813-1304 γ cascade is possible, which can give level energy as 10670 keV instead of 10161 keV.
10870.2[&] *12*	35/2$^{(-)}$	
10908.2[b] *11*	33/2	

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^{40}Ca(^{28}Si,αpγ) 2021Ru07 (continued)

^{63}Ga Levels (continued)

E(level)[†]	Jπ[‡]
10982.1[a] 11	33/2(−)
11974.3[c] 18	
12738.5[a] 12	37/2(−)
12833.3[b] 13	37/2
14213.9 21	39/2
14465.2[b] 15	41/2
14542.5 26	(39/2)
15141? 6	(35/2−)
15766.3[d] 40	(39/2−)
16298.8 43	(39/2−)
16428.6? 43	(39/2−)
16634.7 28	
16696[f] 6	(39/2−)
16756.9[e] 25	(41/2−)
17172.3 24	
17193.5 20	43/2
17479.4 23	
17575.1[g] 44	(41/2−)
17643.4 32	(41/2−)
17661.8 32	(41/2−)
17706.8 40	(41/2−)
17755.8 41	(41/2−)
18091.0[d] 42	(43/2−)
18453.2 31	
18525[f] 6	(43/2−)
18933.0[e] 28	(45/2−)
19034.6 33	
19538[g] 5	(45/2−)
19702.9[h] 33	(45/2−)
19765.2[i] 41	(45/2−)
20101.4[d] 44	(47/2−)
20627[f] 6	(47/2−)
21377.9[e] 33	(49/2−)
21807[g] 5	(49/2−)
22073.3[h] 35	(49/2−)
22115.9[i] 43	(49/2−)
22613[d] 5	(51/2−)
23071[f] 6	(51/2−)
24236.5[e] 38	(53/2−)
24456[g] 5	(53/2−)
24797[i] 5	(53/2−)
24901.7[h] 39	(53/2−)
25954[f] 7	(55/2−)
25988?[d] 6	(55/2−)
27614[g] 5	(57/2−)
27870[i] 5	(57/2−)
28124.1[h] 44	(57/2−)
29440?[f] 7	(59/2−)
31329?[i] 6	(61/2−)

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^{40}Ca(^{28}Si,αpγ) 2021Ru07 (continued)

^{63}Ga Levels (continued)

E(level)†	Jπ‡	Comments
x[j]	J1	Additional information 1. E(level): x=19000 (estimated by 2021Ru07).
2191.2+x[j] *13*	J1+2	
2227.8+x? *24*		
4661.7+x[j] *19*	J1+4	
7339.2+x[j] *25*	J1+6	
10254.2+x[j] *30*	J1+8	
13502.9+x[j] *37*	J1+10	
y[k]	J2	Additional information 2. E(level): y=20300 (estimated by 2021Ru07).
2327.1+y[k] *14*	J2+2	
4896.3+y[k] *21*	J2+4	
7673.0+y[k] *26*	J2+6	
10743.7+y[k] *33*	J2+8	
14206.8+y[k] *41*	J2+10	
z?[l]	J3	Additional information 3. E(level): z=19200 (estimated by 2021Ru07).
2200.0+z[l] *19*	J3+2	
4645.0+z[l] *25*	J3+4	
7350.6+z[l] *30*	J3+6	
10382.4+z[l] *37*	J3+8	
13792+z[l] *6*	J3+10	

† From a least-squares fit to γ-ray energies.
‡ As assigned by 2021Ru07, based on previous assignments for low-lying levels, multipolarities and band structures in the present work, unless otherwise noted. The firm assignments in this work will be considered tentative and placed inside parentheses when considered in Adopted Levels if there are no strong supporting arguments.
# From Adopted Levels.
@ Band(A): Band B1 based on $(9/2^+)$, α=+1/2. Configuration=[21_+; 40] (2021Ru07).
& Band(B): Band B2 based on $19/2^{(-)}$, α=−1/2. Configuration=[21_+; 3_+1_+] (2021Ru07), bands B2 and B3 considered as signature partners.
[a] Band(b): Band B3 based on $25/2^{(-)}$, α=+1/2. Configuration=[21_+; 3_-1_+] (2021Ru07), bands B2 and B3 considered as signature partners.
[b] Band(C): Band B4 based on 21/2, α=+1/2. Configuration=[21_+; 22] (2021Ru07).
[c] Band(D): Band B5 based on (23/2), α=−1/2. Configuration=[21_+; 3_+1_+] (2021Ru07), interpreted as excited BAND of the same configuration as that for band B2.
[d] Band(E): Band Q1 based on $(39/2^-)$, 15766 keV, α=−1/2. Configuration=[(1)22; 22] (2021Ru07), bands Q1 and Q2 considered as signature partners.
[e] Band(e): Band Q2 based on $(41/2^-)$, 16757 keV, α=+1/2. Configuration=[(1)22; 22] (2021Ru07), bands Q1 and Q2 considered as signature partners.
[f] Band(F): Band Q3 based on $(39/2^-)$, 16696 keV, α=−1/2. Configuration=[(1)22; (1)3_+2] (2021Ru07), bands Q3 and Q4 considered as signature partners.
[g] Band(f): Band Q4 based on $(41/2^-)$, 17575 keV, α=+1/2. Configuration=[(1)22; (1)3_+2] (2021Ru07), bands Q3 and Q4 considered as signature partners.
[h] Band(G): Band Q5 based on $(41/2^-)$, α=+1/2. The band starts at 17643 keV, $(41/2^-)$ or 17661 keV, $(41/2^-)$. Configuration=[(1_+)22; $(1_+)3_+$2] (2021Ru07), bands Q5 and Q6 considered as signature partners.

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^{40}Ca(^{28}Si,αpγ) 2021Ru07 (continued)

^{63}Ga Levels (continued)

[i] Band(g): Band Q6 based on (41/2$^-$), α=+1/2. The band starts at 17706 keV, (41/2$^-$) or 17755 keV, (41/2$^-$). Configuration=[(1$_-$)22; (1$_-$)3$_-$2] (2021Ru07), bands Q5 and Q6 considered as signature partners.
[j] Band(H): ΔJ=2 band Q7. Estimated energy of the bandhead=19000 keV (2021Ru07).
[k] Band(I): ΔJ=2 band Q8. Estimated energy of the bandhead=20300 keV (2021Ru07).
[l] Band(J): ΔJ=2 band Q9. Estimated energy of the bandhead=19200 keV (2021Ru07).

γ(^{63}Ga)

DCO values under comments are for 30° and 83° geometry, with gates on ΔJ=2, quadrupole transitions. Expected values are 1.0 for ΔJ=2, quadrupole, ≈0.6 for ΔJ=1, dipole, ≈0.9 for ΔJ=0, dipole (2021Ru07). Values lower or much higher than 0.6 suggest ΔJ=1, mixed M1+E2.

E_γ [†]	I_γ [†]	E_i(level)	J_i^π	E_f	J_f^π	Mult. [‡]	Comments
75.4 *3*	71.5	75.31	(5/2)$^-$	0.0	3/2$^-$		I_γ: 2021Ru07 deduced intensity by equating it to that of 1077-keV γ.
279.2 *4*	0.2 *1*	722.30	(5/2$^-$)	443.24	(3/2$^-$)		
368.0 *4*	0.7 *2*	443.24	(3/2$^-$)	75.31	(5/2)$^-$	(D+Q)	DCO≤1
443.3 *2*	3.6 *4*	443.24	(3/2$^-$)	0.0	3/2$^-$	(D+Q)	DCO=0.94 *19* Mult.: assigned by the evaluator based on ΔJ=(0) transition in 2021Ru07; not assigned by the authors.
608.6 *6*	0.8 *2*	5853.0	19/2$^{(-)}$	5244.4			
624.7 *3*	20.5 *8*	2046.39	(9/2$^+$)	1421.68	7/2$^{(-)}$	D	DCO=0.71 *6*
647.1[@] *5*	2.0 *7*	722.30	(5/2$^-$)	75.31	(5/2)$^-$		
648.6 *6*	75.9 *26*	6501.7	23/2$^{(-)}$	5853.0	19/2$^{(-)}$	Q	DCO=1.00 *6*
699.3 *3*	4.2 *3*	1421.68	7/2$^{(-)}$	722.30	(5/2$^-$)	(D+Q)	DCO=1.34 *35*
722.2 *2*	2.9 *4*	722.30	(5/2$^-$)	0.0	3/2$^-$		
785.8 *3*	7.4 *5*	6501.7	23/2$^{(-)}$	5715.9	21/2$^+$	D	DCO=0.73 *9*
878.9 *6*	1.7 *2*	8214.1	25/2	7335.3	21/2		
893.9[@] *5*	81.7 *27*	2046.39	(9/2$^+$)	1152.50	(9/2$^-$)		DCO=0.99 *5* DCO for 893.9+894.3.
894.3[@] *4*	100.0 *32*	2940.7	(13/2$^+$)	2046.39	(9/2$^+$)		DCO=0.99 *5* DCO for 893.9+894.3.
978.6 *4*	3.8 *2*	1421.68	7/2$^{(-)}$	443.24	(3/2$^-$)	(Q)	DCO=1.10 *31*
1077.2 *5*	83.3 *27*	1152.50	(9/2$^-$)	75.31	(5/2)$^-$	Q	DCO=0.99 *6*
1139.8 *4*	89.9 *29*	4080.5	17/2$^+$	2940.7	(13/2$^+$)	Q	DCO=1.02 *5*
1146.8[@] *8*	3.8 *3*	8857.4	(27/2)	7710.7	27/2$^{(-)}$	(D+Q)	DCO≈1 Mult.: assigned by the evaluator based on ΔJ=(0) transition in 2021Ru07; not assigned by the authors.
1155.2 *6*	3.7 *3*	7657.0	(23/2)	6501.7	23/2$^{(-)}$	(D+Q)	DCO≈1 Mult.: assigned by the evaluator based on ΔJ=(0) transition in 2021Ru07; not assigned by the authors.
1200.2 *8*	2.8 *3*	8857.4	(27/2)	7657.0	(23/2)	(Q)	DCO≈1
1209.1 *4*	68.7 *23*	7710.7	27/2$^{(-)}$	6501.7	23/2$^{(-)}$	Q	DCO=1.08 *6*
1269.2 *6*	4.1 *3*	9483.4	29/2	8214.1	25/2	Q	DCO=0.94 *17*
1304.2 *10*	2.1 *2*	10161.6?	(31/2)	8857.4	(27/2)	(Q)	DCO=1.02 *23* Ordering of the 1813-1304 γ cascade could be reversed.
1329.6 *5*	48.2 *17*	9040.5	31/2$^{(-)}$	7710.7	27/2$^{(-)}$	Q	DCO=1.14 *7*
1344.0 *8*	2.2 *2*	9256.2	29/2$^{(-)}$	7912.2	25/2$^{(-)}$		

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^{40}Ca(^{28}Si,αpγ) 2021Ru07 (continued)

γ(^{63}Ga) (continued)

E_γ[†]	I_γ[†]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	δ[#]	Comments
1410.6 *6*	3.4 *3*	7912.2	25/2$^{(-)}$	6501.7	23/2$^{(-)}$	D+Q		DCO=0.36 *8*
1421.6[@] *6*	14.1 *5*	1421.68	7/2$^{(-)}$	0.0	3/2$^-$	Q		DCO=1.00 *8*
1424.9[@] *7*	4.7 *4*	10908.2	33/2	9483.4	29/2	Q		DCO=1.06 *8*
1545.6 *7*	5.3 *3*	9256.2	29/2$^{(-)}$	7710.7	27/2$^{(-)}$	Q+D	>1	DCO=0.31 *6*
1555.1[&] *12*	1.0 *2*	16696	(39/2$^-$)	15141?	(35/2$^-$)			
1631.9 *8*	6.9 *4*	14465.2	41/2	12833.3	37/2	Q		DCO=0.95 *7*
1635.4[@] *8*	10.5 *5*	5715.9	21/2$^+$	4080.5	17/2$^+$	Q		DCO=1.16 *13*
1662.3[&] *11*	0.7 *1*	18091.0	(43/2$^-$)	16428.6?	(39/2$^-$)			
1712.4 *8*	0.8 *2*	8214.1	25/2	6501.7	23/2$^{(-)}$			
1726.3 *9*	4.0 *3*	10982.1	33/2$^{(-)}$	9256.2	29/2$^{(-)}$	Q		DCO=1.06 *16*
1756.4 *8*	5.5 *4*	12738.5	37/2$^{(-)}$	10982.1	33/2$^{(-)}$	Q		DCO=1.15 *17*
1772.2 *7*	76.6 *27*	5853.0	19/2$^{(-)}$	4080.5	17/2$^+$	D		DCO=0.54 *3*
1773.0[@] *10*	5.4 *7*	9483.4	29/2	7710.7	27/2$^{(-)}$	(D)		DCO=0.62 *8* Mult.: assigned by the evaluator based on ΔJ=1 transition from DCO; not assigned by 2021Ru07.
1792.1 *11*	1.7 *2*	18091.0	(43/2$^-$)	16298.8	(39/2$^-$)	(Q)		DCO=1.05 *16*
1804.0[&] *11*	1.7 *3*	7657.0	(23/2)	5853.0	19/2$^{(-)}$			
1812.7 *10*	1.7 *3*	11974.3		10161.6?	(31/2)			Ordering of the 1813-1304 γ cascade could be reversed.
1828.8[@] *12*	2.4 *3*	18525	(43/2$^-$)	16696	(39/2$^-$)			
1829.8 *8*	21.0 *9*	10870.2	35/2$^{(-)}$	9040.5	31/2$^{(-)}$	Q		DCO=1.02 *7*
1867.3[@] *9*	7.5 *4*	10908.2	33/2	9040.5	31/2$^{(-)}$	(D)		DCO=0.35 *3* Mult.: assigned by the evaluator based on ΔJ=1 transition from DCO; not assigned by 2021Ru07.
1868.2 *9*	7.7 *4*	12738.5	37/2$^{(-)}$	10870.2	35/2$^{(-)}$	Q+D	>1	DCO=0.27 *3*
1924.8 *9*	9.6 *5*	12833.3	37/2	10908.2	33/2	Q		DCO=0.95 *7*
1941.2 *9*	5.9 *4*	10982.1	33/2$^{(-)}$	9040.5	31/2$^{(-)}$	Q+D	>1	DCO=0.25 *8*
1962.7[@] *13*	2.6 *2*	19538	(45/2$^-$)	17575.1	(41/2$^-$)	(Q)		DCO=0.84 *17* DCO for 1962.7+1963.4.
1963.4[@] *10*	1.8 *2*	12833.3	37/2	10870.2	35/2$^{(-)}$	(D)		DCO=0.84 *17* Mult.: assigned by the evaluator based on ΔJ=1 transition from DCO; not assigned by 2021Ru07. DCO for 1962.7+1963.4.
2009.3[@] *14*	0.7 *2*	19765.2	(45/2$^-$)	17755.8	(41/2$^-$)	(Q)		DCO=1.12 *14*
2010.4 *13*	4.2 *3*	20101.4	(47/2$^-$)	18091.0	(43/2$^-$)	(Q)		DCO=1.12 *14*
2041.1 *12*	1.3 *2*	19702.9	(45/2$^-$)	17661.8	(41/2$^-$)			
2058.4[@] *13*	0.5 *2*	19765.2	(45/2$^-$)	17706.8	(41/2$^-$)	(Q)		DCO=1.07 *18* DCO for 2059.4+2058.4.
2059.4[@] *13*	1.1 *2*	19702.9	(45/2$^-$)	17643.4	(41/2$^-$)	(Q)		DCO=1.07 *18* DCO for 2059.4+2058.4.
2101.6 *13*	2.4 *3*	20627	(47/2$^-$)	18525	(43/2$^-$)	(Q)		DCO=1.11 *20*
2176.1 *13*	2.7 *2*	18933.0	(45/2$^-$)	16756.9	(41/2$^-$)	(Q)		DCO=1.13 *16*
2191.2[@] *13*	1.1 *1*	2191.2+x	J1+2	x	J1			
2200.0[@&] *19*	0.8 *1*	2200.0+z	J3+2	z?	J3			
2214.2 *20*	0.6 *1*	16756.9	(41/2$^-$)	14542.5	(39/2)			
2269.6 *14*	3.3 *2*	21807	(49/2$^-$)	19538	(45/2$^-$)	(Q)		DCO=1.02 *19*
2304.2 *16*	1.1 *4*	5244.4		2940.7	(13/2$^+$)			
2324.6 *13*	2.3 *2*	18091.0	(43/2$^-$)	15766.3	(39/2$^-$)	(Q)		DCO=1.21 *15*

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^{40}Ca(^{28}Si,αpγ) 2021Ru07 (continued)

γ(^{63}Ga) (continued)

E_γ †	I_γ †	E_i(level)	J_i^π	E_f	J_f^π	Mult. ‡	Comments
2327.0@ *14*	1.1 *1*	2327.1+y	J2+2	y	J2		
2350.7 *13*	1.2 *2*	22115.9	(49/2$^-$)	19765.2	(45/2$^-$)		
2370.4 *13*	2.3 *2*	22073.3	(49/2$^-$)	19702.9	(45/2$^-$)	(Q)	DCO=1.18 *21*
2399.8 *18*	0.5 *1*	19034.6		16634.7			
2433.8& *15*	0.7 *1*	4661.7+x	J1+4	2227.8+x?			
2444.2@ *15*	1.7 *2*	23071	(51/2$^-$)	20627	(47/2$^-$)	(Q)	DCO=1.04 *12* DCO for 2444.2+2444.8+2444.9.
2444.8@ *17*	2.2 *2*	21377.9	(49/2$^-$)	18933.0	(45/2$^-$)	(Q)	DCO=1.04 *12* DCO for 2444.2+2444.8+2444.9.
2444.9 *16*	2.0 *2*	4645.0+z	J3+4	2200.0+z	J3+2	(Q)	DCO=1.04 *12* DCO for 2444.2+2444.8+2444.9.
2470.4 *14*	1.8 *2*	4661.7+x	J1+4	2191.2+x	J1+2		
2497.9 *12*	2.6 *3*	8214.1	25/2	5715.9	21/2$^+$		
2512.0 *16*	2.1 *2*	22613	(51/2$^-$)	20101.4	(47/2$^-$)	(Q)	DCO=1.19 *16*
2569.2 *15*	2.2 *2*	4896.3+y	J2+4	2327.1+y	J2+2	(Q)	DCO=1.01 *19*
2648.3 *15*	2.5 *2*	24456	(53/2$^-$)	21807	(49/2$^-$)	(Q)	DCO=1.26 *21*
2677.4@ *16*	2.6 *2*	7339.2+x	J1+6	4661.7+x	J1+4	(Q)	DCO=1.18 *17*
2681.3@ *16*	1.1 *2*	24797	(53/2$^-$)	22115.9	(49/2$^-$)	(Q)	DCO=1.18 *17*
2705.5@ *17*	1.9 *2*	7350.6+z	J3+6	4645.0+z	J3+4		
2707.0 *19*	0.8 *2*	17172.3		14465.2	41/2		
2728.4 *17*	1.9 *2*	17193.5	43/2	14465.2	41/2	(D)	DCO=0.63 *19* Mult.: assigned by the evaluator based on ΔJ=1 transition from DCO; not assigned in 2021Ru07.
2776.6 *16*	1.7 *2*	7673.0+y	J2+6	4896.3+y	J2+4	(Q)	DCO=1.01 *22*
2828.3 *17*	1.6 *2*	24901.7	(53/2$^-$)	22073.3	(49/2$^-$)		
2858.6 *19*	1.3 *2*	24236.5	(53/2$^-$)	21377.9	(49/2$^-$)		
2882.6 *18*	1.3 *3*	25954	(55/2$^-$)	23071	(51/2$^-$)		
2915.0 *17*	2.1 *2*	10254.2+x	J1+8	7339.2+x	J1+6	(Q)	DCO=1.18 *27*
2979.3 *22*	0.4 *2*	17193.5	43/2	14213.9	39/2		
3014.1 *18*	1.0 *2*	17479.4		14465.2	41/2		
3031.8 *21*	1.9 *2*	10382.4+z	J3+8	7350.6+z	J3+6	(Q)	DCO=1.22 *25*
3070.6@ *20*	1.3 *2*	10743.7+y	J2+8	7673.0+y	J2+6		
3072.9@ *23*	0.7 *1*	27870	(57/2$^-$)	24797	(53/2$^-$)		
3158.1 *19*	1.2 *1*	27614	(57/2$^-$)	24456	(53/2$^-$)		
3222.3 *21*	0.6 *1*	28124.1	(57/2$^-$)	24901.7	(53/2$^-$)		
3248.6 *22*	1.2 *2*	13502.9+x	J1+10	10254.2+x	J1+8		
3255.1 *22*	0.8 *1*	7335.3	21/2	4080.5	17/2$^+$		
3343.4 *22*	1.3 *1*	14213.9	39/2	10870.2	35/2$^{(-)}$		
3374.6& *29*	0.5 *1*	25988?	(55/2$^-$)	22613	(51/2$^-$)		DCO=1.05 *18*
3409.3 *44*	1.3 *2*	13792+z	J3+10	10382.4+z	J3+8		
3459.0@& *29*	0.2 *1*	31329?	(61/2$^-$)	27870	(57/2$^-$)		
3463.0@ *24*	0.4 *1*	14206.8+y	J2+10	10743.7+y	J2+8		
3486.8& *26*	0.4 *1*	29440?	(59/2$^-$)	25954	(55/2$^-$)		
3671.9 *31*	0.7 *1*	14542.5	(39/2)	10870.2	35/2$^{(-)}$		
3801.3 *25*	0.8 *1*	16634.7		12833.3	37/2		
3987.9 *27*	0.6 *1*	18453.2		14465.2	41/2		
4018.5 *28*	2.5 *2*	16756.9	(41/2$^-$)	12738.5	37/2$^{(-)}$	(Q)	DCO=1.17 *24*
x4344							A weak line present in $\gamma\gamma$ coin spectra for band Q7 could not be placed (2021Ru07).
4836.4 *42*	0.7 *1*	17575.1	(41/2$^-$)	12738.5	37/2$^{(-)}$		
4895.9@ *38*	0.9 *1*	15766.3	(39/2$^-$)	10870.2	35/2$^{(-)}$	(Q)	DCO=1.05 *18*

Continued on next page (footnotes at end of table)

^{40}Ca(^{28}Si,αpγ) 2021Ru07 (continued)

γ(^{63}Ga) (continued)

E_γ[†]	I_γ[†]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	Comments
4903.7[@] *41*	0.7 *1*	17643.4	(41/2$^-$)	12738.5	37/2$^{(-)}$	(Q)	DCO=1.05 *18*
4924.1[@] *40*	1.0 *1*	17661.8	(41/2$^-$)	12738.5	37/2$^{(-)}$	(Q)	DCO=1.05 *18*
4968.3[@] *51*	0.4 *1*	17706.8	(41/2$^-$)	12738.5	37/2$^{(-)}$	(Q)	DCO=1.11 *26*
5016.9[@] *55*	0.7 *1*	17755.8	(41/2$^-$)	12738.5	37/2$^{(-)}$	(Q)	DCO=1.11 *26*
5825.6 *56*	0.6 *1*	16696	(39/2$^-$)	10870.2	35/2$^{(-)}$	(Q)	DCO=0.90 *37* Mult.: assigned by the evaluator based on DCO; not assigned by 2021Ru07.

[†] From 2021Ru07.
[‡] From measured $\gamma\gamma$(DCO) in 2021Ru07, unless otherwise noted. The evaluator has replaced M1 (or E1) and E2 as reported in 2021Ru07 with D and Q, respectively, considering that there are no supporting data for electric or magnetic characters measured in 2021Ru07.
[#] From DCO ratio of ≈0.3 for interband transitions (2021Ru07).
[@] Doublet structure.
[&] Placement of transition in the level scheme is uncertain.
[x] γ ray not placed in level scheme.

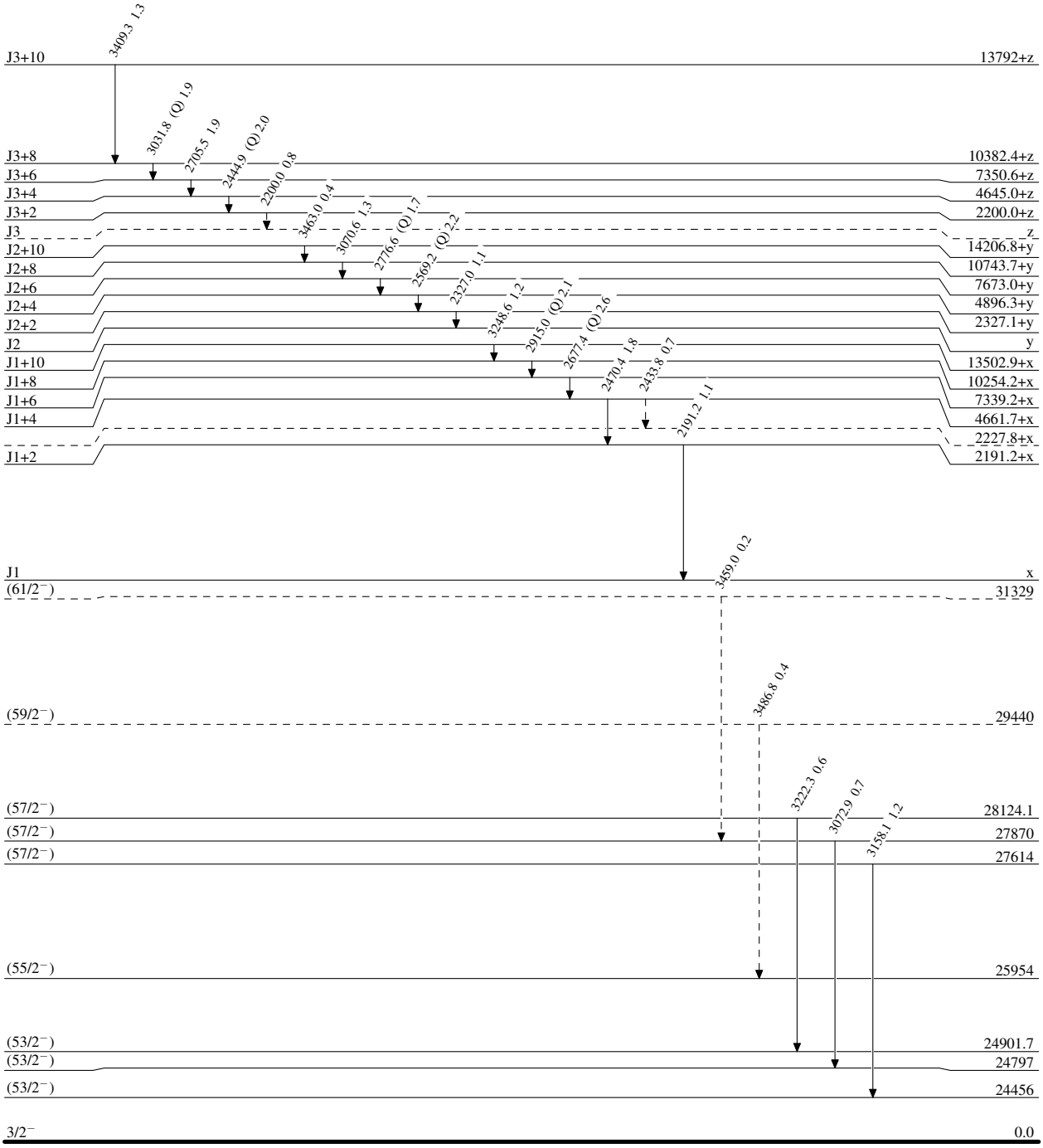
^{40}Ca(^{28}Si,αpγ) 2021Ru07

Level Scheme

Intensities: Relative I_γ

Legend

$I_\gamma < 2\% \times I_\gamma^{max}$
$I_\gamma < 10\% \times I_\gamma^{max}$
$I_\gamma > 10\% \times I_\gamma^{max}$
γ Decay (Uncertain)

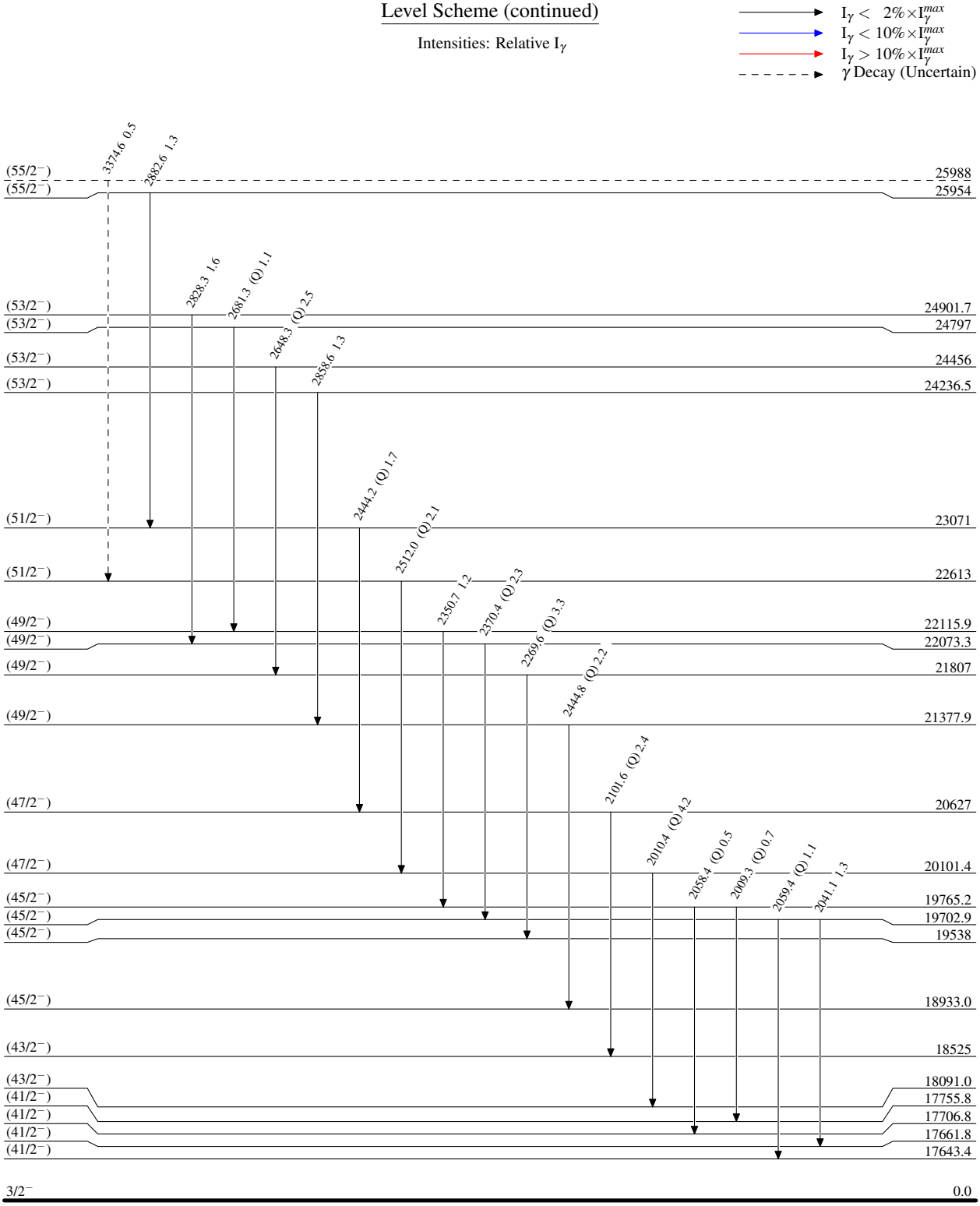


$^{63}_{31}Ga_{32}$

^{40}Ca(^{28}Si,αpγ) 2021Ru07

Level Scheme (continued)

Intensities: Relative I_γ

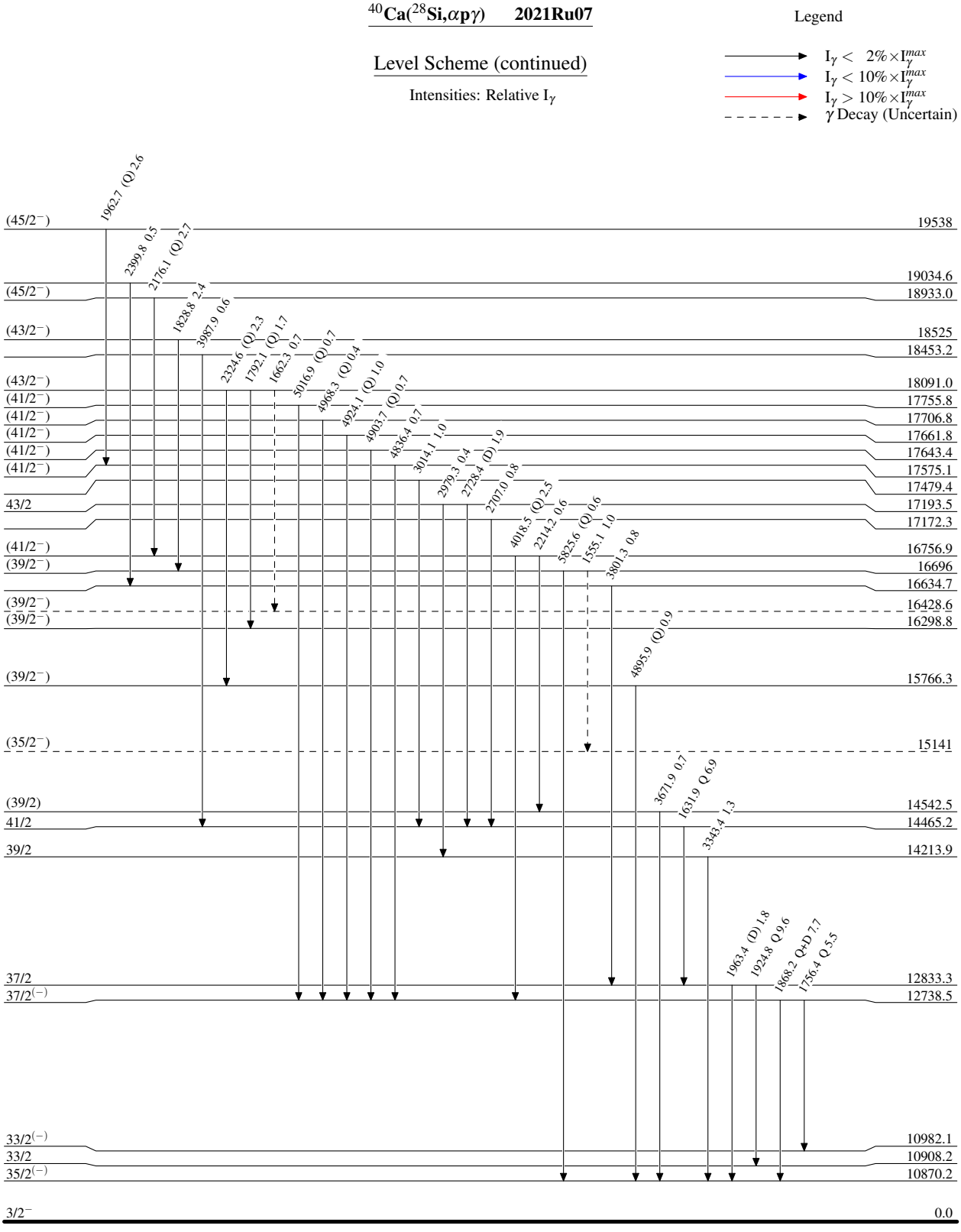


$^{63}_{31}Ga_{32}$

^{40}Ca(^{28}Si,αpγ) 2021Ru07

Level Scheme (continued)

Intensities: Relative I_γ



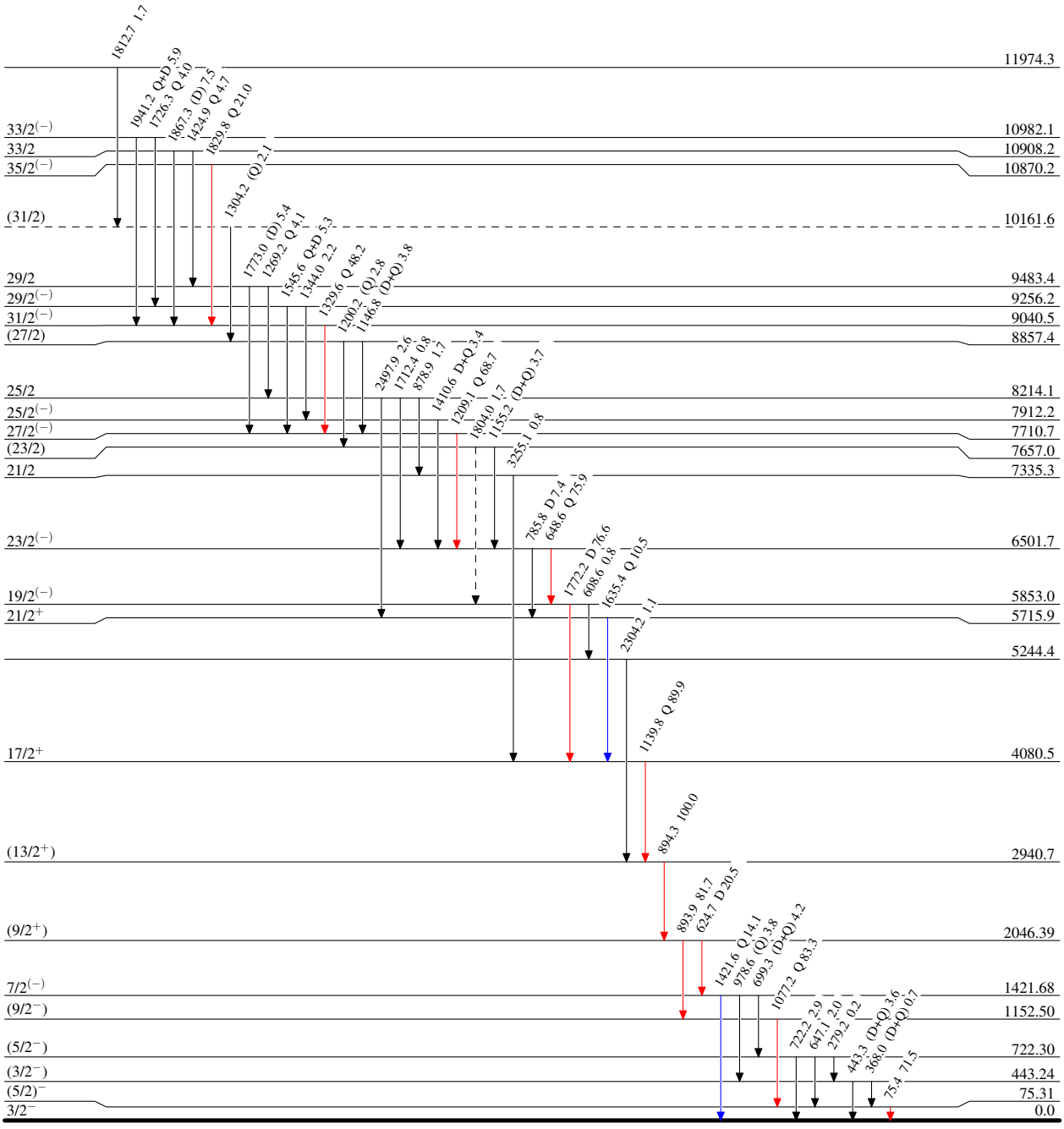
$^{63}_{31}Ga_{32}$

^{40}Ca(^{28}Si,αpγ) 2021Ru07

Level Scheme (continued)

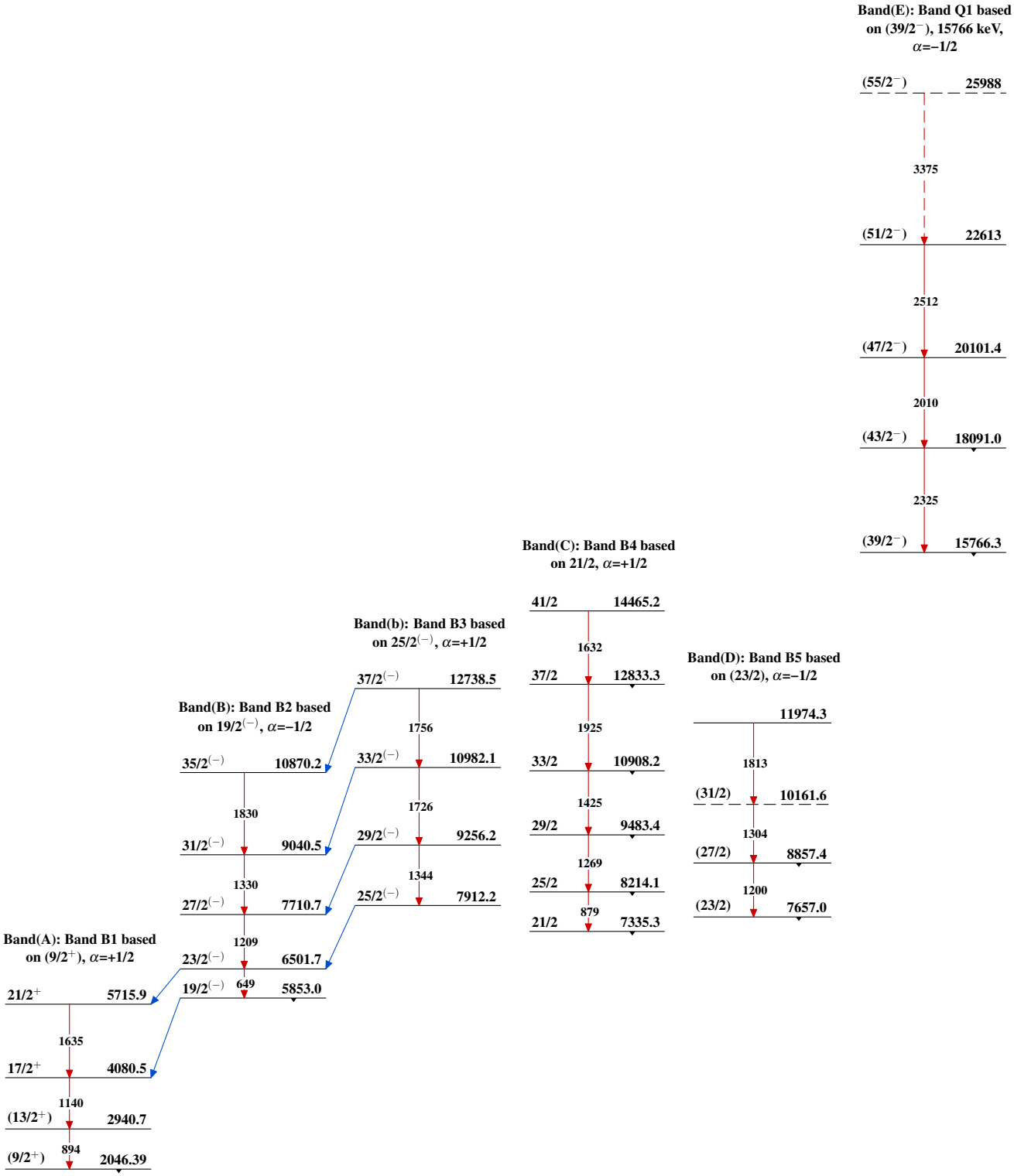
Intensities: Relative I_γ

Legend
- $I_\gamma < 2\% \times I_\gamma^{max}$
- $I_\gamma < 10\% \times I_\gamma^{max}$
- $I_\gamma > 10\% \times I_\gamma^{max}$
- γ Decay (Uncertain)



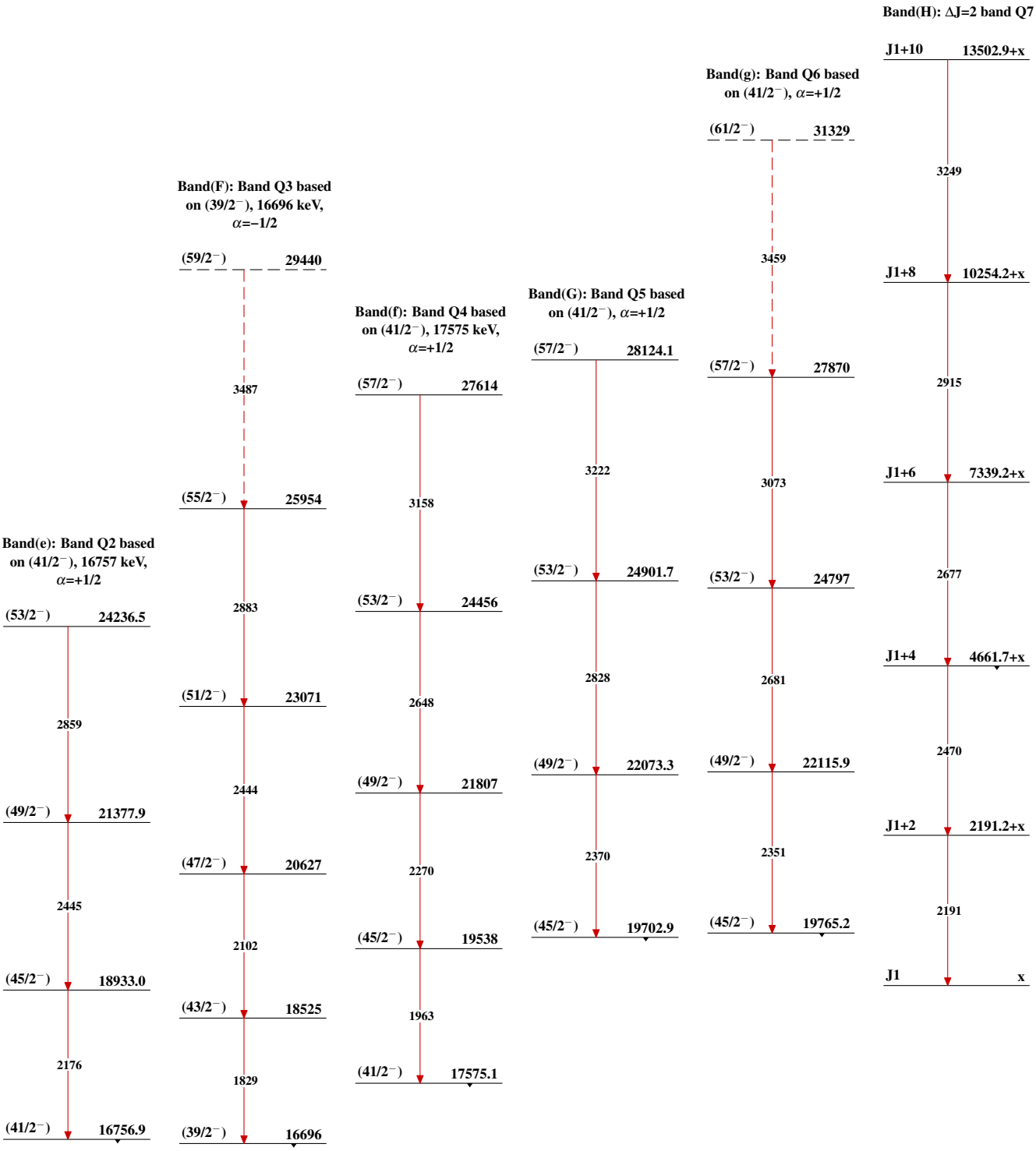
$^{63}_{31}Ga_{32}$

^{40}Ca(^{28}Si,αpγ) 2021Ru07



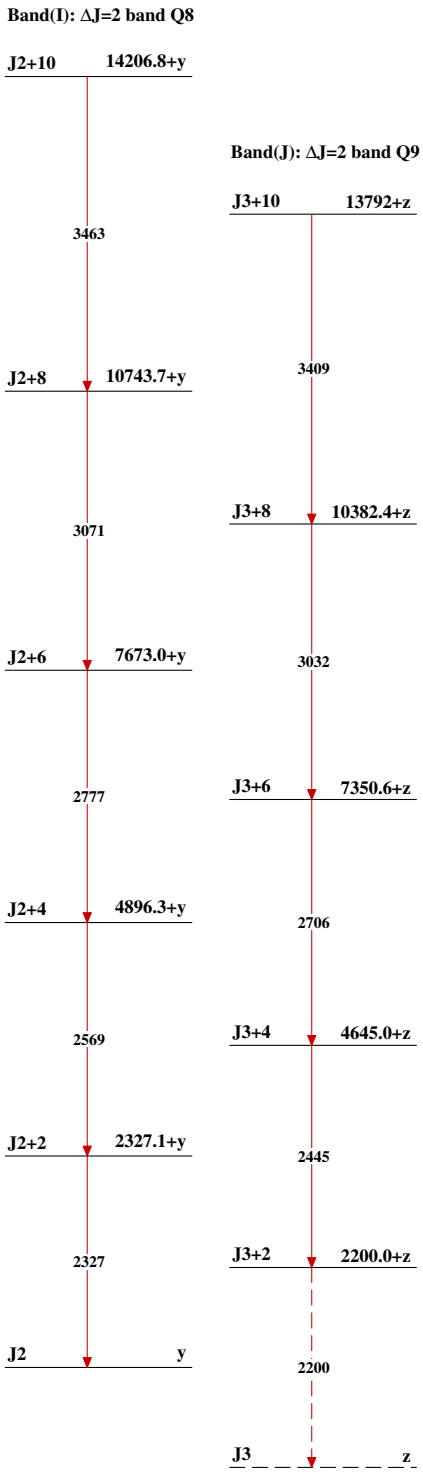
$^{63}_{31}Ga_{32}$

^{40}Ca(^{28}Si,αpγ) 2021Ru07 (continued)



$^{63}_{31}Ga_{32}$

^{40}Ca(^{28}Si,αpγ) 2021Ru07 (continued)



$^{63}_{31}Ga_{32}$