^{74}Ge(^{6}Li,3nγ) 1989NaZZ

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh	ENSDF	30-Sep-2020

1989NaZZ (also 1988NaZP): ^{74}Ge(^{6}Li,3nγ) E=19-30 MeV. Measured γ, $\gamma\gamma$, $\gamma(\theta)$, excitation functions. $\gamma(\theta)$ data at 24, 30 MeV.

^{77}Br Levels

E(level)[†]	J$^{\pi}$[‡]	$T_{1/2}$	Comments
0.0[@]	3/2$^-$		
105.84[a] *10*	9/2$^+$	4.28 min *10*	%IT=100 $T_{1/2}$: from the Adopted Levels.
129.68 *18*	5/2$^+$		
161.90[&] *16*	5/2$^-$		
167.0[d] *4*	(3/2)$^-$		
276.2 *4*	(3/2)$^+$		
417.9[b] *3*	7/2$^{(+)}$		
425.0[d] *4*	5/2$^-$		
575.35[@] *16*	7/2$^-$		
639.32[a] *19*	(13/2)$^+$		
781.7[d] *4*	(7/2$^-$)		
782.01[c] *24*	(9/2)$^+$		
790.17[&] *21*	(9/2)$^-$		
947.07[b] *25*	(11/2$^+$)		
1024.2 *6*	(5/2)$^+$		
1273.34[@] *21*	(11/2)$^-$		
1286.8[d] *6*	(9/2$^-$)		
1303.4[c] *3*	(13/2)$^+$		
1481.1[a] *3*	(17/2)$^+$		
1537.9[&] *3*	(13/2$^-$)		
1747.0[b] *4*	(15/2$^+$)		
1826.1 *6*	(15/2$^+$)		
2021.0[@] *3*	(15/2$^-$)		
2044.7[c] *4*	(17/2)$^+$		
2337.9[&] *4*	(17/2$^-$)		
2548.9[a] *4*	(21/2)$^+$		
2647.2[b] *7*	(19/2$^+$)		
2792.0[@] *4*	(19/2$^-$)		
3036.2[c] *7*	(21/2$^+$)[#]		
3198.2[&] *5*	(21/2$^-$)		
3642.1? *6*	(23/2$^-$)		
3776.7[a] *7*	(25/2$^+$)		

[†] From least-squares fit to Eγ data.
[‡] From the Adopted Levels, unless otherwise stated.
[#] 19/2$^+$ suggested by 1989NaZZ based on ΔJ=1 for 991γ. But in (^{18}O,α2nγ) ΔJ=2 is proposed for 991γ.
[@] Band(A): Band based on g.s.,α=−1/2.
[&] Band(a): Band based on g.s.,α=+1/2.

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^{74}Ge(^{6}Li,3nγ) 1989NaZZ (continued)

^{77}Br Levels (continued)

[a] Band(B): $\nu g_{9/2}$,α=+1/2.
[b] Band(b): $\nu g_{9/2}$,α=−1/2.
[c] Band(C): Band based on $(9/2)^+$,α=+1/2.
[d] Band(D): Band based on $(3/2)^-$.

$\gamma(^{77}Br)$

E_γ[†]	I_γ[†]	E_i(level)	J_i^π	E_f	J_f^π	Mult.	δ	α[&]	Comments
(24.2)		129.68	$5/2^+$	105.84	$9/2^+$	(E2)		145.7	α(K)=82.2 *12*; α(L)=54.3 *8*; α(M)=8.60 *12*; α(N)=0.590 *9* E_γ,Mult.: from Adopted Gammas.
105.87[#] *10*		105.84	$9/2^+$	0.0	$3/2^-$	E3[#]		6.30	α(K)=4.85 *7*; α(L)=1.236 *19*; α(M)=0.198 *3*; α(N)=0.01486 *22* Mult.: from the Adopted dataset.
129.7 *2*	15.2 *8*	129.68	$5/2^+$	0.0	$3/2^-$				
146.5 *3*	4.8 *5*	276.2	$(3/2)^+$	129.68	$5/2^+$				
161.9 *2*	100 *5*	161.90	$5/2^-$	0.0	$3/2^-$	(M1+E2)			A_2=−0.40 *4*; A_4=+0.02 *5*
167.0 *5*	‡	167.0	$(3/2)^-$	0.0	$3/2^-$				
257.9 *5*	‡	425.0	$5/2^-$	167.0	$(3/2)^-$				
264.7 *5*	‡	1537.9	$(13/2^-)$	1273.34	$(11/2)^-$				
307.7 *3*	5.4 *6*	947.07	$(11/2^+)$	639.32	$(13/2)^+$	D			A_2=−0.25 *4*; A_4=−0.02 *5*
312.1 *3*	5.5 *6*	417.9	$7/2^{(+)}$	105.84	$9/2^+$	D			A_2=−0.14 *4*; A_4=−0.05 *5*
317.1 *5*	1.3 *3*	2337.9	$(17/2^-)$	2021.0	$(15/2^-)$	D			A_2=−0.04 *4*; A_4=+0.09 *5*
356.7 *5*	2.9 *7*	781.7	$(7/2^-)$	425.0	$5/2^-$	D			A_2=−0.11 *4*; A_4=0.00 *5*
406.0 *5*	‡	3198.2	$(21/2^-)$	2792.0	$(19/2^-)$				
413.6 *3*	4.2 *4*	575.35	$7/2^-$	161.90	$5/2^-$	(M1+E2)	−0.8 *5*		A_2=−0.58 *4*; A_4=+0.04 *5*
425.0 *4*	7.2 *7*	425.0	$5/2^-$	0.0	$3/2^-$				A_2=+0.13 *4*; A_4=−0.02 *5*
454.0[b]	<1	2792.0	$(19/2^-)$	2337.9	$(17/2^-)$				
483.1		2021.0	$(15/2^-)$	1537.9	$(13/2^-)$				
483.4 *5*	6.6 *7*	1273.34	$(11/2)^-$	790.17	$(9/2)^-$				E_γ,I_γ: 1989NaZZ suggest a doublet with Eγ=483.4 and 483.1, the other transition placed with 2021 level.
520.9[b]	‡	1303.4	$(13/2)^+$	782.01	$(9/2)^+$				E_γ: unresolved doublet.
529.3 *3*	4.4 *5*	947.07	$(11/2^+)$	417.9	$7/2^{(+)}$	(Q)			A_2=+0.20 *4*; A_4=−0.07 *5*
533.5 *2*	72 *4*	639.32	$(13/2)^+$	105.84	$9/2^+$	Q			A_2=+0.30 *4*; A_4=−0.02 *3*
575.2 *2*	17.0 *9*	575.35	$7/2^-$	0.0	$3/2^-$	Q			A_2=+0.24 *4*; A_4=−0.07 *5*
606.3 *5*	‡	1024.2	$(5/2)^+$	417.9	$7/2^{(+)}$				
614.7[b] *5*	‡	781.7	$(7/2^-)$	167.0	$(3/2)^-$				
619.8 *5*	2.4 *6*	781.7	$(7/2^-)$	161.90	$5/2^-$				A_2=−0.01 *4*; A_4=−0.09 *5*
628.2 *2*	25.3 *13*	790.17	$(9/2)^-$	161.90	$5/2^-$	(Q)			A_2=+0.26 *4*; A_4=−0.05 *5*
652.4 *3*	4.8 *5*	782.01	$(9/2)^+$	129.68	$5/2^+$	Q			A_2=+0.23 *4*; A_4=−0.05 *5*
664.1 *3*	6.0 *6*	1303.4	$(13/2)^+$	639.32	$(13/2)^+$				A_2=+0.04 *4*; A_4=+0.01 *5*
676.1 *3*	12.7 *6*	782.01	$(9/2)^+$	105.84	$9/2^+$				A_2=+0.14 *4*; A_4=−0.01 *5*
684.8 *5*	2.3 *6*	790.17	$(9/2)^-$	105.84	$9/2^+$				A_2=+0.34 *4*; A_4=+0.01 *5*
697.9 *2*	19.4 *10*	1273.34	$(11/2)^-$	575.35	$7/2^-$	(Q)			A_2=+0.14 *4*; A_4=+0.05 *5*
741.3 *2*	11.0 *5*	2044.7	$(17/2)^+$	1303.4	$(13/2)^+$	Q			A_2=+0.29 *4*; A_4=−0.11 *5*
747.5[a] *5*	21.7[a] *11*	1537.9	$(13/2^-)$	790.17	$(9/2)^-$	(Q)			A_2=+0.28 *4*; A_4=−0.09 *5* $\gamma(\theta)$ data for the doublet.

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^{74}Ge(^{6}Li,3nγ) 1989NaZZ (continued)

$\gamma(^{77}Br)$ (continued)

E_γ †	I_γ †	E_i(level)	J_i^π	E_f	J_f^π	Mult.	δ	Comments
747.5[a] *5*	21.7[a] *11*	2021.0	$(15/2^-)$	1273.34	$(11/2)^-$	(Q)		
771.0 *2*	10.0 *5*	2792.0	$(19/2^-)$	2021.0	$(15/2^-)$	Q		A_2=+0.30 *4*; A_4=−0.08 *5*
799.8 *5*	2.6[@] *7*	1747.0	$(15/2^+)$	947.07	$(11/2^+)$			
800.1 *5*	11[@] *3*	2337.9	$(17/2^-)$	1537.9	$(13/2^-)$	(Q)		A_2=+0.28 *4*; A_4=−0.11 *5* $\gamma(\theta)$ data for 800.1γ+799.8γ.
841.0 *5*	3.3[@] *8*	947.07	$(11/2^+)$	105.84	$9/2^+$			
841.8 *2*	14.0[@] *7*	1481.1	$(17/2)^+$	639.32	$(13/2)^+$	(Q)		A_2=+0.55 *5*; A_4=−0.21 *6* $\gamma(\theta)$ data for 841.8γ+841.0γ.
850.1 *5*		3642.1?	$(23/2^-)$	2792.0	$(19/2^-)$	(Q)		A_2=+0.30 *4*; A_4=−0.03 *5*
860.4 *5*		3198.2	$(21/2^-)$	2337.9	$(17/2^-)$	(Q)		A_2=+0.35 *6*; A_4=−0.06 *7*
861.8[b] *5*	‡	1286.8	$(9/2^-)$	425.0	$5/2^-$			
898.6 *5*	2.2[@] *4*	1537.9	$(13/2^-)$	639.32	$(13/2)^+$			
900.2 *5*	2.7[@] *7*	2647.2	$(19/2^+)$	1747.0	$(15/2^+)$			I_γ: 900.2γ and 898.6γ are unresolved in singles.
991.5 *5*	2.6 *7*	3036.2	$(21/2^+)$	2044.7	$(17/2)^+$			A_2=−0.26 *4*; A_4=−0.04 *5* Mult.: $\gamma(\theta)$ data indicate ΔJ=1, dipole. But ΔJ=2 transition is proposed in (^{18}O,α2nγ).
1067.8 *3*	7.5 *8*	2548.9	$(21/2)^+$	1481.1	$(17/2)^+$	Q		A_2=+0.60 *4*; A_4=−0.25 *5*
1107.8 *5*	3.1 *8*	1747.0	$(15/2^+)$	639.32	$(13/2)^+$	D		A_2=−0.38 *4*; A_4=+0.07 *5* I_γ: comparison with other studies suggests that this line in 1989NaZZ probably belongs mostly to an impurity. Expected Iγ=0.2.
1167.8 *5*	2.8 *7*	1273.34	$(11/2)^-$	105.84	$9/2^+$	D		A_2=−0.34 *4*; A_4=+0.09 *5*
1186.8 *5*	3.5 *9*	1826.1	$(15/2^+)$	639.32	$(13/2)^+$	(M1+E2)	−2.5 *5*	A_2=−0.80 *5*; A_4=+0.16 *6*
1197.6 *5*	‡	1303.4	$(13/2)^+$	105.84	$9/2^+$			
1227.8 *5*		3776.7	$(25/2^+)$	2548.9	$(21/2)^+$	(Q)		A_2=+0.65 *7*; A_4=−0.15 *8*
1310.9 *5*	‡	2792.0	$(19/2^-)$	1481.1	$(17/2)^+$			
1381.7 *5*	≤1	2021.0	$(15/2^-)$	639.32	$(13/2)^+$			

† At E(^{6}Li)=24 MeV. Uncertainties are not given. The evaluator assigns 0.2 keV to 0.5 keV to γ-ray energies and 5% to 25% to photon intensities.

‡ Intensity is not available, since line is contaminated by an impurity.

From Adopted Gammas.

@ From $\gamma\gamma$. Line in singles is not resolved.

& 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.

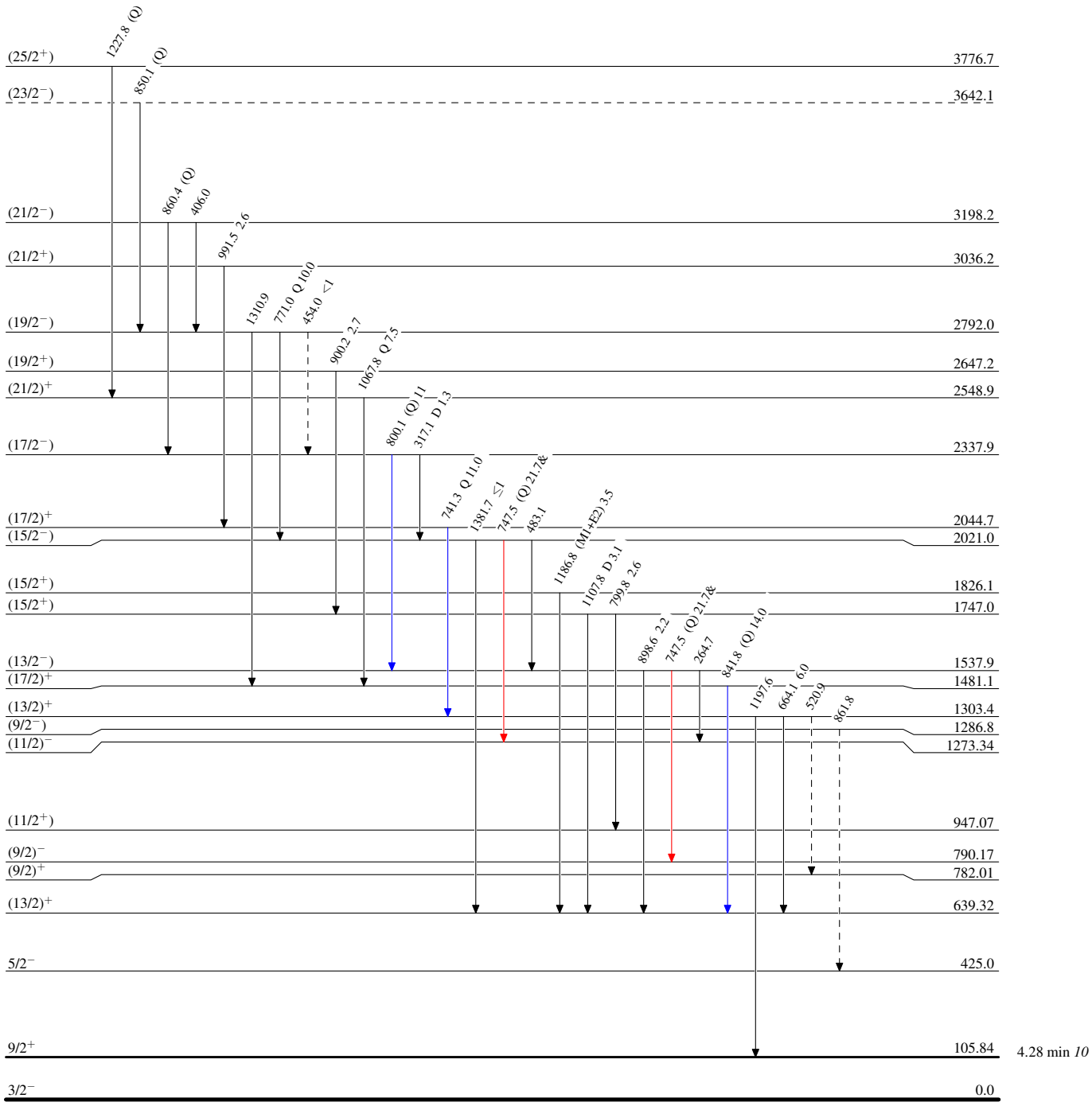
[b] Placement of transition in the level scheme is uncertain.

^{74}Ge(^{6}Li,3nγ) 1989NaZZ

Level Scheme

Intensities: Relative I_γ
& Multiply placed: undivided intensity given

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)

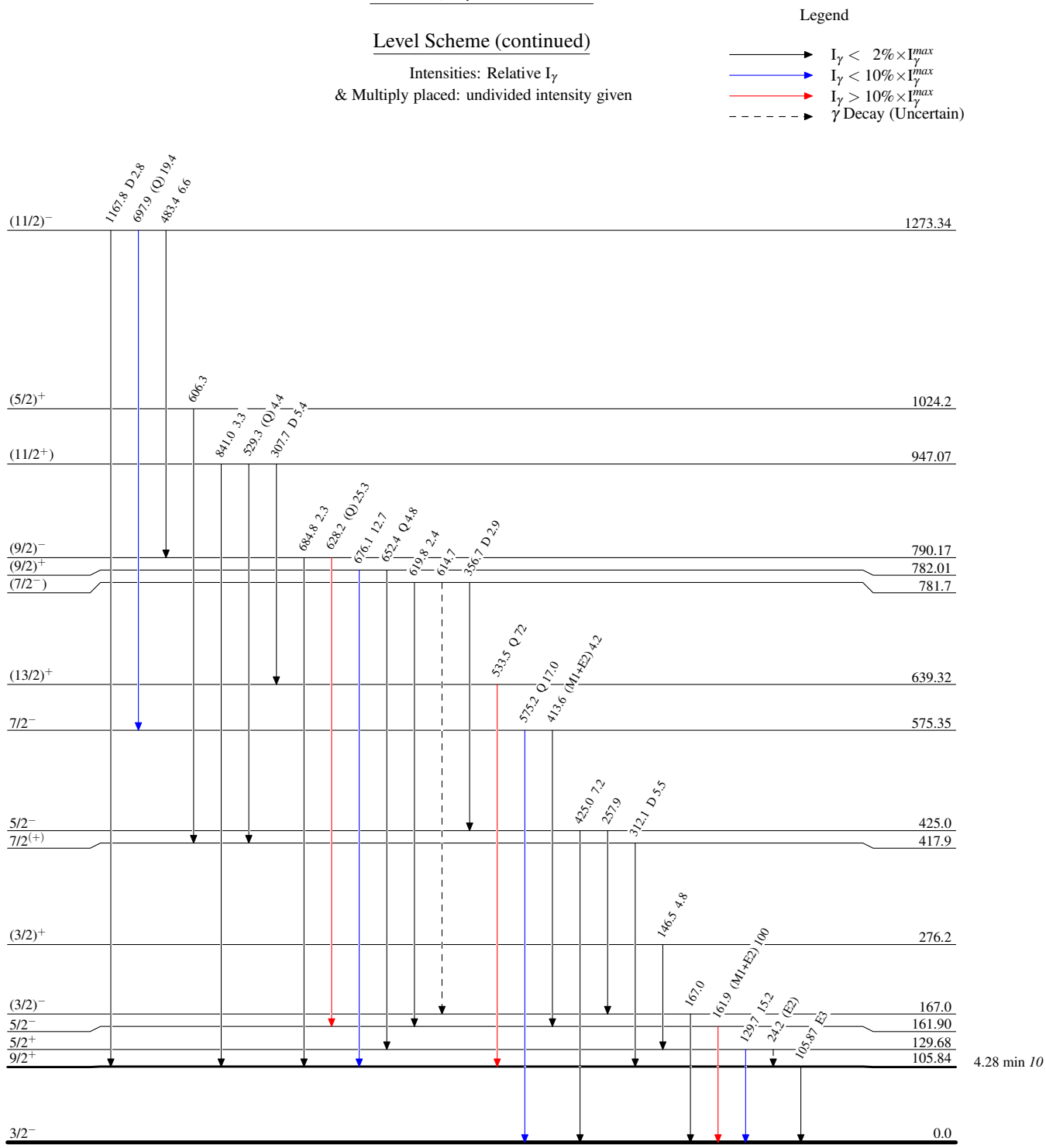


$^{77}_{35}Br_{42}$

^{74}Ge(^{6}Li,3nγ) 1989NaZZ

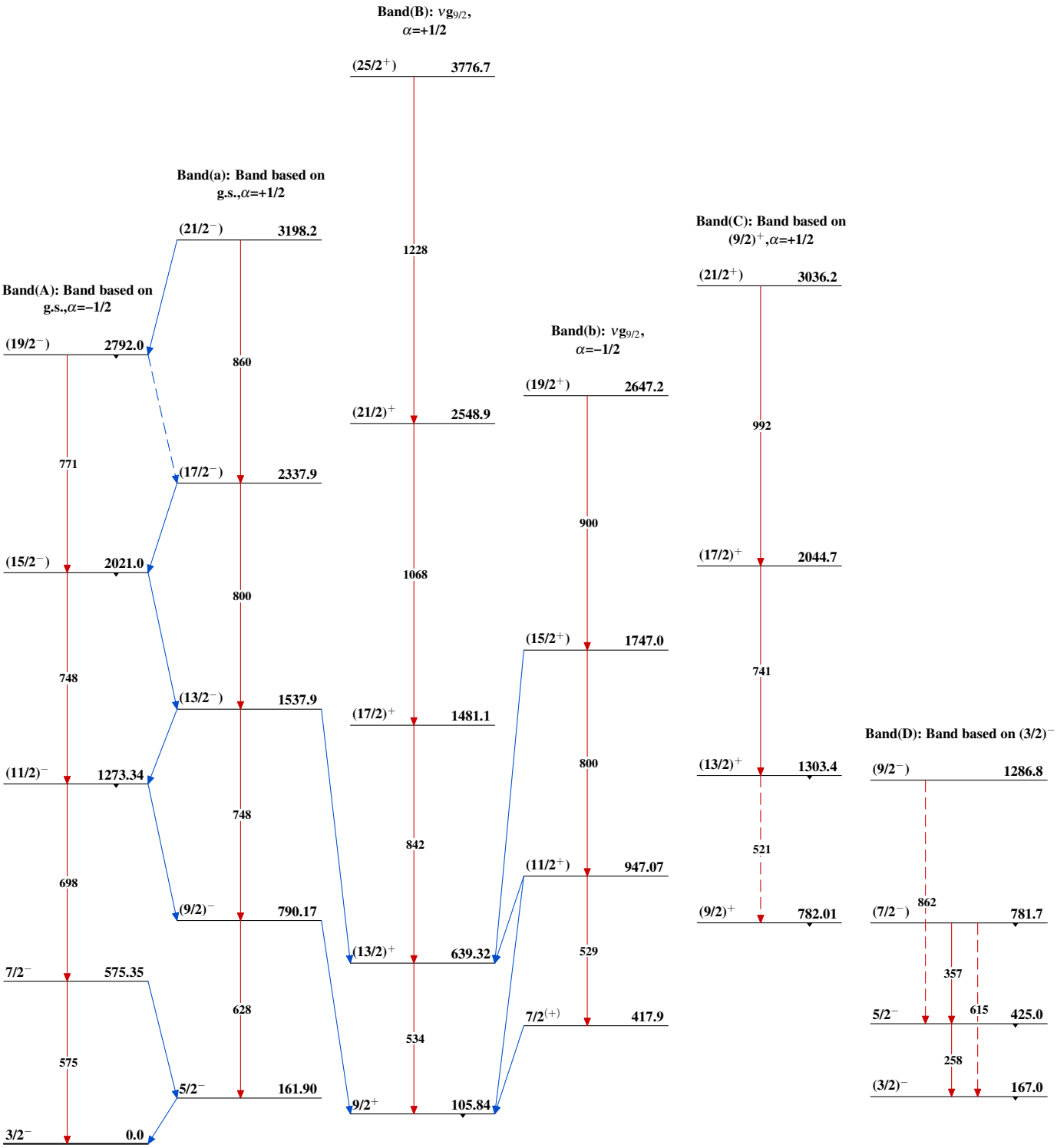
Level Scheme (continued)

Intensities: Relative I_γ
& Multiply placed: undivided intensity given



$^{77}_{35}Br_{42}$

^{74}Ge(^{6}Li,3nγ) 1989NaZZ



$^{77}_{35}Br_{42}$