^{72}Ge(^{35}Cl,2p2nγ) 2008Ra06

History			
Type	Author	Citation	Literature Cutoff Date
Full Evaluation	D. De Frenne	NDS 110, 2081 (2009)	1-Mar-2009

E=135 MeV beam provided by ATLAS facility at Argonne. Measured Eγ, Iγ, γγ coin, lifetimes by DSAM using GAMMASPHERE array of 101 Compton-suppressed HPGe detectors.

^{103}Ag Levels

E(level)[†]	Jπ[#]	$T_{1/2}$[‡]	Comments
0.0	7/2+		
27.54[@] *4*	9/2+		
591.24[@] *24*	11/2+		
851.24[@] *24*	13/2+		
1490.7[@] *3*	15/2+		
1821.3[@] *3*	17/2+		
2159.7 *4*	(15/2−)		
2572.5 *4*	(15/2−)		
2869.1 *4*	17/2−		
3051.7 *4*	(17/2−)		
3061.0 *4*	(17/2−)		
3121.6[a] *4*	19/2−		
3238.9[b] *4*	(17/2−)		
3356.7[a] *4*	21/2−		
3419.7[b] *5*	(19/2−)		
3665.4[a] *5*	23/2−		
3709.0[b] *5*	(21/2−)		
3991.3[b] *4*	(23/2−)		
4081.7[a] *5*	25/2−		
4359.7[b] *4*	(25/2−)		
4443.6[a] *5*	27/2−		
4792.1[b] *5*	(27/2−)		
4959.2[a] *5*	29/2−	0.28 ps *+8−4*	
5174.9[b] *5*	(29/2−)	0.270 ps *+21−28*	
5354.1[&] *5*	(27/2−)		
5488.3[a] *5*	(31/2−)	0.267 ps *+28−42*	E(level): Table with the measured lifetimes of 2008Ra06 gives this level as 5300.9, this is likely an error.
5608.1[b] *6*	(31/2−)	0.222 ps *+14−21*	
5781.9[&] *5*	(29/2−)		
6150.9[b] *7*	(33/2−)	0.132 ps *+7−21*	
6184.3[&] *5*	(31/2−)	0.125 ps *14*	
6185.3[a] *6*	(33/2−)	0.229 ps *+28−21*	
6671.8[&] *6*	(33/2−)	0.090 ps *7*	
6687.3?[a] *6*			
7175.4[&] *7*	(35/2−)	0.083 ps *7*	
7688.0[&] *8*	(37/2−)		
8257.9[&] *8*	(39/2−)		

[†] From least-squares fit to Eγ′s by evaluator, assuming an uncertainty of 0.3 keV for each γ ray. 2008Ra06 seem to have assumed the energy of the first excited state (J^π=9/2+) at 10 keV, but in the Adopted Levels it is at 27.54 keV. Thus all the level energies

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^{72}Ge(^{35}Cl,2p2nγ) 2008Ra06 (continued)

^{103}Ag Levels (continued)

here are about 17.5 keV higher than given in the second column of the table with transition and excitation energies of 2008Ra06.

‡ From Doppler-shift attenuation method (2008Ra06). The uncertainties include those from fitting procedure and side feeding intensities.

From $\gamma\gamma$ coin, γ mult.presumed band structure and measured lifetimes. Apart from parentheses for some levels in Adopted level data set, the values are the same.

@ Band(A): $\Delta J=1$ band based on $9/2^+$.

& Band(B): $\Delta J=1$ band based on $(27/2^-)$. Possible Magnetic-dipole rotational band with configuration=$\pi g_{9/2}^3 \otimes \nu(g_{7/2}h_{11/2})$.

a Band(C): $\Delta J=1$ band based on $19/2^-$. Configuration: $g_{9/2}$ proton; $g_{7/2}+d_{5/2}$ and $h_{11/2}$ neutrons. Chiral partnership with band based on $17/2^-$ suggested from energy and spin matching, but TAC (Tilted Axis Cranking) model calculations do not support this interpretation. The configurations of the two bands are different.This band may satisfy some criteria of magnetic-dipole bands and/or tilted-axis rotational band.

b Band(D): $\Delta J=1$ band based on $(17/2^-)$. Configuration: $g_{9/2}$ proton; $g_{7/2}+d_{5/2}$ and $h_{11/2}$ neutrons. Chiral partnership with band based on $17/2^-$ suggested from energy and spin matching, but TAC (Tilted Axis Cranking) model calculations do not support this interpretation. The configurations of the two bands are different.This band may satisfy some criteria of magnetic-dipole bands and/or tilted-axis rotational band.

$\gamma(^{103}Ag)$

R_{int} in 2008Ra06 are listed here as DCO′s. R_{int}=[($I_{\gamma 1}$at 35°,145°; (gated with γ_2 at 90°)]/ [$I_{\gamma 1}$ at 90°; gated with γ_2 at 35°,145°. For gates on stretched quadrupole transitions, expected values are: ≈0.9 for $\Delta J=2$, quadrupole and ≈0.55 for $\Delta J=1$, dipole transitions.

E_γ	I_γ	E_i(level)	J_i^π	E_f	J_f^π	Mult.‡	α#	Comments
27.54 *4*		27.54	$9/2^+$	0.0	$7/2^+$			E_γ: from Adopted Levels, gammas.
69.9	10.0 *10*	3121.6	$19/2^-$	3051.7	$(17/2^-)$	(M1)	1.16 *6*	
180.8	3.4 *3*	3419.7	$(19/2^-)$	3238.9	$(17/2^-)$	(M1)	0.0820 *12*	
234.9	37 *4*	3356.7	$21/2^-$	3121.6	$19/2^-$	M1	0.0409 *6*	DCO=0.57 *6*
252.5	2.8 *3*	3121.6	$19/2^-$	2869.1	$17/2^-$	M1	0.0339 *5*	DCO=0.55 *6*
260.0	100 *10*	851.24	$13/2^+$	591.24	$11/2^+$	M1†	0.0314 *6*	DCO=1.0 *1*
282.3	3.4 *3*	3991.3	$(23/2^-)$	3709.0	$(21/2^-)$	(M1)	0.0254 *4*	DCO=0.48 *6*
289.4	3.8 *4*	3709.0	$(21/2^-)$	3419.7	$(19/2^-)$	(M1)	0.0238 *4*	DCO=0.42 *6*
296.6	10.0 *10*	2869.1	$17/2^-$	2572.5	$(15/2^-)$	(M1)	0.0224 *4*	
309.0	34 *4*	3665.4	$23/2^-$	3356.7	$21/2^-$	M1	0.0201 *3*	DCO=0.57 *6*
330.5	64 *7*	1821.3	$17/2^+$	1490.7	$15/2^+$	M1	0.01697 *24*	DCO=0.62 *8*
358.8	1.3 *1*	3419.7	$(19/2^-)$	3061.0	$(17/2^-)$	(M1)	0.01380 *20*	
361.9	23.8 *20*	4443.6	$27/2^-$	4081.7	$25/2^-$	M1	0.01351 *20*	DCO=0.53 *6*
368.8	2.3 *2*	4359.7	$(25/2^-)$	3991.3	$(23/2^-)$	(M1)	0.01288 *19*	DCO=0.55 *6*
382.9	1.79 *20*	5174.9	$(29/2^-)$	4792.1	$(27/2^-)$	(M1)†	0.01173 *17*	DCO=0.72 *10*
402.4	3.7 *4*	6184.3	$(31/2^-)$	5781.9	$(29/2^-)$	(M1)	0.01037 *15*	DCO=0.44 *6*
416.2	31 *3*	4081.7	$25/2^-$	3665.4	$23/2^-$	M1		DCO=0.67 *8*
427.8	0.50 *6*	5781.9	$(29/2^-)$	5354.1	$(27/2^-)$	(M1)		
432.2	1.6 *1*	4792.1	$(27/2^-)$	4359.7	$(25/2^-)$	(M1)		DCO=0.44 *6*
433.2	0.87 *8*	5608.1	$(31/2^-)$	5174.9	$(29/2^-)$	(M1)		DCO=0.50 *6*
487.5	1.6 *2*	6671.8	$(33/2^-)$	6184.3	$(31/2^-)$	(M1)		DCO=0.42 *6*
502.0@		6687.3?		6185.3	$(33/2^-)$			I_γ: weak γ ray.
503.6	1.5 *2*	7175.4	$(35/2^-)$	6671.8	$(33/2^-)$	(M1)		DCO=0.45 *6*
512.6	1.4 *2*	7688.0	$(37/2^-)$	7175.4	$(35/2^-)$	(M1)		DCO=0.43 *6*
515.6	24.0 *20*	4959.2	$29/2^-$	4443.6	$27/2^-$	M1†		DCO=0.77 *7*
529.1	3.4 *4*	5488.3	$(31/2^-)$	4959.2	$29/2^-$	(M1)		DCO=0.55 *6*
542.8	0.70 *1*	6150.9	$(33/2^-)$	5608.1	$(31/2^-)$	(M1)		DCO=0.54 *6*
549.1	2.2 *1*	3121.6	$19/2^-$	2572.5	$(15/2^-)$	(E2)		

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^{72}Ge(^{35}Cl,2p2nγ) 2008Ra06 (continued)

γ(^{103}Ag) (continued)

E_γ	I_γ	E_i(level)	J_i^π	E_f	J_f^π	Mult.‡	Comments
563.7	200.0	591.24	$11/2^+$	27.54	$9/2^+$	M1	DCO=0.69 *7*
569.9	0.30 *5*	8257.9	$(39/2^-)$	7688.0	$(37/2^-)$	(M1)	
635.0	0.18 *1*	3991.3	$(23/2^-)$	3356.7	$21/2^-$	(M1)	
639.5	100 *10*	1490.7	$15/2^+$	851.24	$13/2^+$	M1	DCO=0.75 *10*
694.8	1.45 *20*	4359.7	$(25/2^-)$	3665.4	$23/2^-$	(M1)†	DCO=1.30 *15*
697.0	4.1 *4*	6185.3	$(33/2^-)$	5488.3	$(31/2^-)$	(M1)	DCO=0.69 *8*
725.2	3.6 *4*	4081.7	$25/2^-$	3356.7	$21/2^-$	E2	DCO=0.82 *9*
778.1	8.7 *8*	4443.6	$27/2^-$	3665.4	$23/2^-$	E2	DCO=0.95 *6*
801.0	0.50 *1*	4792.1	$(27/2^-)$	3991.3	$(23/2^-)$	(E2)†	DCO=2.20 *23*
815.1	0.31 *1*	5174.9	$(29/2^-)$	4359.7	$(25/2^-)$	(E2)	
823.7	100 *10*	851.24	$13/2^+$	27.54	$9/2^+$	E2	DCO=0.89 *10*
830.2	0.20 *2*	6184.3	$(31/2^-)$	5354.1	$(27/2^-)$	(E2)	
869.9	1.58 *20*	3991.3	$(23/2^-)$	3121.6	$19/2^-$	(E2)	
877.5	5.5 *5*	4959.2	$29/2^-$	4081.7	$25/2^-$	(E2)†	DCO=2.7 *3*
892.0	3.9 *4*	3051.7	$(17/2^-)$	2159.7	$(15/2^-)$	(M1)	
899.5	100 *10*	1490.7	$15/2^+$	591.24	$11/2^+$	E2†	DCO=1.50 *11*
970.0	100 *10*	1821.3	$17/2^+$	851.24	$13/2^+$	E2	DCO=1.03 *12*
1001.9	0.80 *1*	4359.7	$(25/2^-)$	3356.7	$21/2^-$	(E2)	E_γ: poor fit, level-energy difference=1003.0.
1044.7	2.5 *3*	5488.3	$(31/2^-)$	4443.6	$27/2^-$	(E2)†	DCO=1.76 *13*
1225.1	0.60 *6*	6184.3	$(31/2^-)$	4959.2	$29/2^-$	(M1)	
1226.1	2.8 *3*	6185.3	$(33/2^-)$	4959.2	$29/2^-$	(E2)	
1272.4	0.80 *1*	5354.1	$(27/2^-)$	4081.7	$25/2^-$	(M1)†	DCO=0.67 *10*
1300.3	38 *3*	3121.6	$19/2^-$	1821.3	$17/2^+$	E1†	DCO=0.84 *13*
1308.4	1.1 *1*	2159.7	$(15/2^-)$	851.24	$13/2^+$	(E1)	DCO=0.43 *8*
1338.3	2.7 *3*	5781.9	$(29/2^-)$	4443.6	$27/2^-$	(M1)†	DCO=0.59 *5*
1378.3	11.9 *10*	2869.1	$17/2^-$	1490.7	$15/2^+$	E1†	DCO=0.96 *12*
1570.2	1.1 *1*	3061.0	$(17/2^-)$	1490.7	$15/2^+$	(E1)	
1721.2	1.8 *2*	2572.5	$(15/2^-)$	851.24	$13/2^+$	(E1)	
1748.2	0.20 *2*	3238.9	$(17/2^-)$	1490.7	$15/2^+$	(E1)	

† DCO value corresponds to gate on ΔJ=1, dipole transition.
‡ Intraband ΔJ=1 transitions considered as M1; ΔJ=2 intraband transitions considered as E2.
# 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.
@ Placement of transition in the level scheme is uncertain.

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Level Scheme

Intensities: Relative I_γ

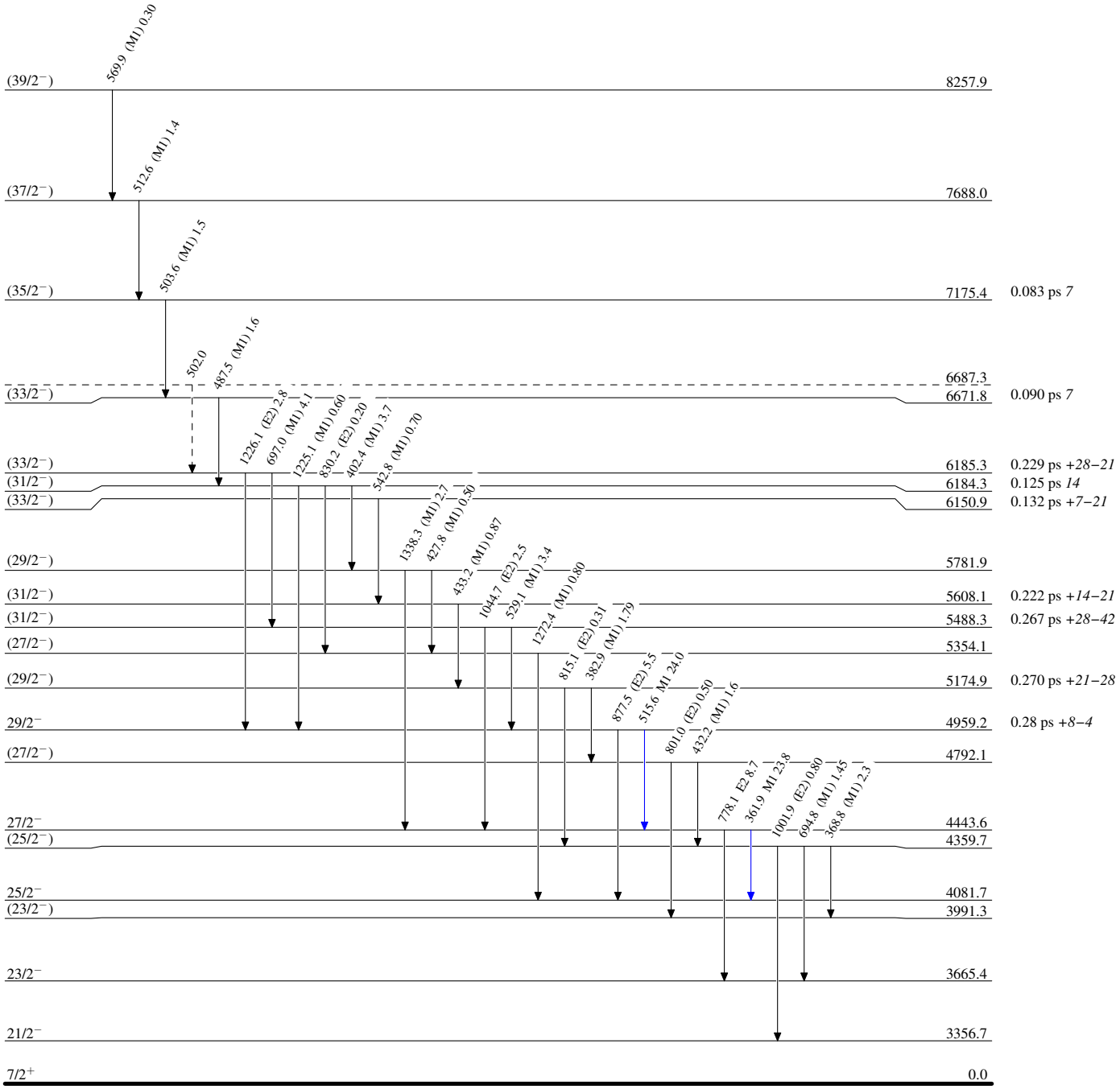
Legend

$I_\gamma < 2\% \times I_\gamma^{max}$

$I_\gamma < 10\% \times I_\gamma^{max}$

$I_\gamma > 10\% \times I_\gamma^{max}$

γ Decay (Uncertain)



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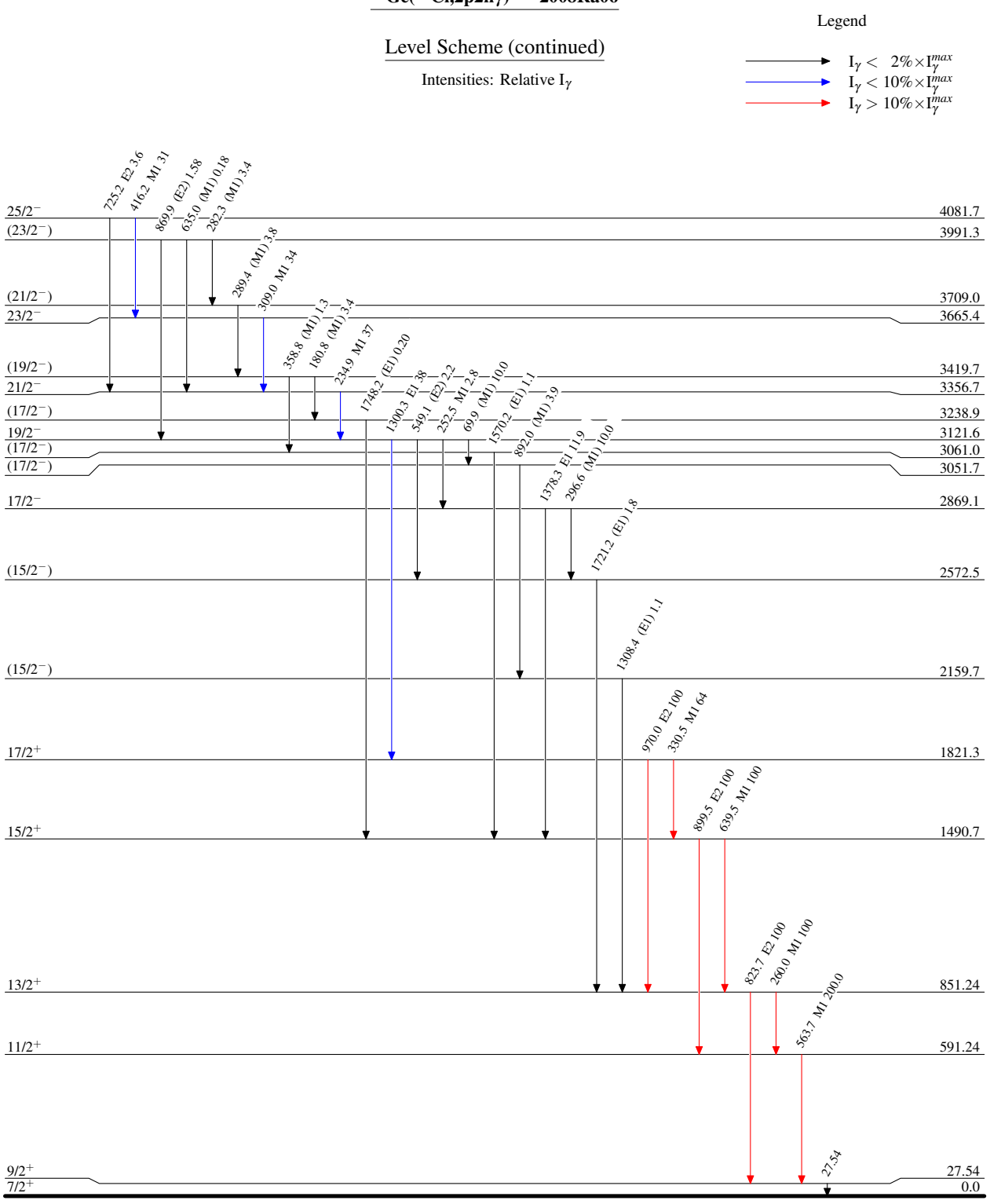
Level Scheme (continued)

Intensities: Relative I_γ



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^{72}Ge(^{35}Cl,2p2nγ) 2008Ra06