(HI,xnγ) 1995He27,1997So06

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	E. Browne, J. K. Tuli	NDS 111, 2425 (2010)	1-Aug-2009

1995He27: ^{40}Ca(^{28}Si,2pnγ) E=93 MeV, ^{40}Ca(^{31}P,apng) E= 115 MeV. At E=93 MeV. Measured Eγ, γγ, γ(lin pol) and γ(θ) using the OSIRIS ring spectrometer consisting of six Compton-suppressed Ge detectors in conjunction with a four segmented neutron detector. E=115 MeV. Linear polarization measurements were done using the Compton polarimeter POLALI comprised of five HPGe detectors.

1997So06: ^{12}C(^{58}Ni,αnγ), E=261 MeV. Measured Eγ, γγ, and γ(θ) using NORDBALL array comprised of 15 BGO-shielded Ge detectors, a 30-element gamma-ray calorimeter of BaF_2 crystals, 11 neutron detectors and a 4 PI charged particle detector array consisting of 21 δE type Si detectors. Although authors do not reference earlier work of 1995He27, their level scheme agrees with that of 1995He27 up to 5 MeV, except for reversing the placement of 1254 and 1356 γ rays. It is also in agreement with 1987Go02.

1987Go02:^{40}Ca(^{28}Si,2pnγ) E(^{28}Si)=60-100 MeV; measured Eγ, Iγ, charged particle-γγ coincidences, charged particle-γ timing, nγ(θ).

Other: 1986ChZD.

^{65}Ge Levels

E(level)†	Jπ	$T_{1/2}$‡	Comments
0	$3/2^-$		
111.02 *10*	$5/2^-$		
604.50 *9*	$5/2^-$		
771.0# *10*	$9/2^-$		
890.10 *9*	$7/2^-$		
1077.0# *10*			
1155.22 *14*	$7/2^-$		
1215.86 *11*	$9/2^+$	7 ns *1*	
1419.0# *15*	$9/2,13/2^-$		
2080.17 *14*	$13/2^+$	<2 ns	
2122.08 *19*	$(11/2^+)$		
2146.08 *25*	$(11/2^-)$		
2573.29 *23*	$11/2^-$		
2837.18 *21*	$(13/2^+)$		
3035.70 *19*	$(15/2^+)$		
3436.48 *16*	$(17/2^+)$		E(level): E(lev)=3334 if the placement of 1254γ and 1356γ is reversed as 1997So06. Jπ: $15/2^{(-)}$ in 1997So06.
3737.99 *23*	$(17/2^+)$		
3843.27 *22*	$(15/2^-)$		
4188.50 *24*	$15/2^-$		
4228.38 *22*	$15/2^-$		
4504.20 *20*	$(17/2^-)$		
4691.19 *17*	$19/2^-$		
5152.99 *20*	$(21/2^-)$		
5210.39 *20*	$23/2^-$	<2 ns	
5397.4# *11*	$25/2^{(-)}$		
5580.1 *4*			
5739.2 *4*			
6329.4 *4*	$(25/2^-,27/2^-)$		Jπ: $25/2^-$ in 1997So06.
6348.0 *4*			
6348.9 *4*			
6555.4 *4*			
6689.4# *11*			
7789.9 *5*			
8152.4 *5*			

Continued on next page (footnotes at end of table)

(HI,xnγ) 1995He27,1997So06 (continued)

^{65}Ge Levels (continued)

E(level)[†]	Jπ	Comments
x[#]	25/2$^{(-)}$	E(level): x=5671 (1997So06) based upon 462γ depopulating this level and feeding 5209 level; however 462γ is placed from 5153 level by 1995He27 not reported by 1997So06.
x+1417[#]	(27/2$^-$)	
x+1656[#]	(27/2$^-$)	
x+1920[#]	(29/2$^-$)	
x+3535[#]	(33/2$^-$)	

[†] Deduced by evaluators from least-squares fit to γ-ray energies.
[‡] From 1987Go02.
[#] From 1997So06, not seen by 1995He27.

(HI,xnγ) 1995He27,1997So06 (continued)

γ(^{65}Ge)

All data from 1995He27, unless given otherwise. Δ(Eγ)=0.3 keV for gamma ray energy quoted without an uncertainty but a decimal point and 1 keV, otherwise.

E_γ[†]	I_γ	E_i(level)	J_i^π	E_f	J_f^π	Mult.	δ	α[&]	Comments
57.4 *3*		5210.39	23/2$^-$	5152.99	(21/2$^-$)				
60.6 *3*		1215.86	9/2$^+$	1155.22	7/2$^-$				
111.0 *3*		111.02	5/2$^-$	0	3/2$^-$	(M1+E2)[#]	+0.25[#] *4*	0.086 *9*	α(K)=0.076 *8*; α(L)=0.0086 *10*; α(M)=0.00128 *14*; α(N+..)=7.7×10^{-5} *8* α(N)=7.7×10^{-5} *8* A_2<0.
187.0 *2*	13.5 *4*	4691.19	19/2$^-$	4504.20	(17/2$^-$)				
187[‡] *1*		5397.4	25/2$^{(-)}$	5210.39	23/2$^-$				
275.9 *3*		4504.20	(17/2$^-$)	4228.38	15/2$^-$				
276[‡a] *1*		x	25/2$^{(-)}$	5397.4	25/2$^{(-)}$				
285.6 *2*	4.2 *3*	890.10	7/2$^-$	604.50	5/2$^-$				
315.7 *3*		4504.20	(17/2$^-$)	4188.50	15/2$^-$				
325.8 *1*	38.9 *4*	1215.86	9/2$^+$	890.10	7/2$^-$	E1		0.00216 *3*	α=0.00216 *3*; α(K)=0.00193 *3*; α(L)=0.000198 *3*; α(M)=2.95×10^{-5} *5*; α(N+..)=1.90×10^{-6} *3* α(N)=1.90×10^{-6} *3* A_2=−0.21 *1*. A_4=0. POL=+0.28 *5*.
400.7 *3*		3436.48	(17/2$^+$)	3035.70	(15/2$^+$)				
427.1 *3*		5580.1		5152.99	(21/2$^-$)				
461.8 *1*	15.3 *20*	5152.99	(21/2$^-$)	4691.19	19/2$^-$	M1+E2	−0.03 *1*	0.001673 *24*	α=0.001673 *24*; α(K)=0.001495 *21*; α(L)=0.0001540 *22*; α(M)=2.30×10^{-5} *4*; α(N+..)=1.513×10^{-6} α(N)=1.513×10^{-6} *22* E_γ: See level x for alternate placement by 1997So06. A_2=−0.26 *3*. A_4=0. Additional information 1.
462.8 *3*		4691.19	19/2$^-$	4228.38	15/2$^-$				
493.5 *3*		604.50	5/2$^-$	111.02	5/2$^-$				
502.7 *3*		4691.19	19/2$^-$	4188.50	15/2$^-$				
503[‡] *1*		x+1920	(29/2$^-$)	x+1417	(27/2$^-$)				
519.2 *1*	47.8 *4*	5210.39	23/2$^-$	4691.19	19/2$^-$	(E2)[@]		0.00209 *3*	α=0.00209 *3*; α(K)=0.00187 *3*; α(L)=0.000196 *3*; α(M)=2.92×10^{-5} *4*; α(N+..)=1.86×10^{-6} *3* α(N)=1.86×10^{-6} *3* A_2=+0.30 *2*. A_4=−0.07 *2*.

$^{65}_{32}Ge_{33}$-3

(HI,xnγ) 1995He27,1997So06 (continued)

γ(^{65}Ge) (continued)

E_γ [†]	I_γ	E_i(level)	J_i^π	E_f	J_f^π	Mult.	δ	α [&]	Comments
604.5 *1*	10.3 *5*	604.50	5/2$^-$	0	3/2$^-$	M1+E2	−2.35 *+57−44*	0.00127 *4*	α=0.00127 *4*; α(K)=0.00113 *4*; α(L)=0.000117 *4*; α(M)=1.75×10^{-5} *6*; α(N+..)=1.13×10^{-6} *4* α(N)=1.13×10^{-6} *4* A$_2$=−0.31 *4*. A$_4$=+0.07 *1*.
648[‡] *1*		1419.0	9/2,13/2$^-$	771.0	9/2$^-$				
648.8 *3*		5152.99	(21/2$^-$)	4504.20	(17/2$^-$)				
660[‡] *1*		771.0	9/2$^-$	111.02	5/2$^-$				
660.9 *2*	11.8 *5*	4504.20	(17/2$^-$)	3843.27	(15/2$^-$)				A$_2$<0.
702.3 *3*		3737.99	(17/2$^+$)	3035.70	(15/2$^+$)				
715.1 *2*	7.9 *4*	2837.18	(13/2$^+$)	2122.08	(11/2$^+$)	M1+E2	+0.66 *+9−6*	0.000690 *15*	α=0.000690 *15*; α(K)=0.000616 *14*; α(L)=6.33×10^{-5} *14*; α(M)=9.45×10^{-6} *21*; α(N+..)=6.19×10^{-7} *1* α(N)=6.19×10^{-7} *13* A$_2$=+0.50 *2*. A$_4$=+0.06 *1*.
779.1 *1*	22.2 *4*	890.10	7/2$^-$	111.02	5/2$^-$	M1+E2	−2.58 *+17−19*	0.000642 *10*	α=0.000642 *10*; α(K)=0.000573 *9*; α(L)=5.91×10^{-5} *9*; α(M)=8.82×10^{-6} *13*; α(N+..)=5.73×10^{-7} *9* α(N)=5.73×10^{-7} *9* A$_2$=−0.37 *1*. A$_4$=+0.10 *2*.
864.3 *1*	100.0 *6*	2080.17	13/2$^+$	1215.86	9/2$^+$	E2		0.000505 *7*	α=0.000505 *7*; α(K)=0.000451 *7*; α(L)=4.65×10^{-5} *7*; α(M)=6.93×10^{-6} *10*; α(N+..)=4.51×10^{-7} *7* α(N)=4.51×10^{-7} *7* A$_2$=+0.30 *1*. A$_4$=−0.07 *1*. POL=+0.52 *5*.
890.1 *1*	16.5 *13*	890.10	7/2$^-$	0	3/2$^-$				A$_2$=+0.27 *3*. A$_4$=−0.06 *4*.
900.8 *3*		3737.99	(17/2$^+$)	2837.18	(13/2$^+$)				
906.2 *2*	10.2 *15*	2122.08	(11/2$^+$)	1215.86	9/2$^+$				
913.6 *3*		3035.70	(15/2$^+$)	2122.08	(11/2$^+$)				
953.2 *3*		4691.19	19/2$^-$	3737.99	(17/2$^+$)				
955.5 *2*	13.9 *16*	3035.70	(15/2$^+$)	2080.17	13/2$^+$				
966[‡] *1*		1077.0		111.02	5/2$^-$				
1044.2 *2*	7.0 *5*	1155.22	7/2$^-$	111.02	5/2$^-$				A$_2$=+0.28 *1*. A$_4$=−0.08 *1*.
1048.0 *3*		5739.2		4691.19	19/2$^-$				
1104.8 *1*	77.5 *5*	1215.86	9/2$^+$	111.02	5/2$^-$	M2+E3	−0.02 *1*	0.000558 *8*	α=0.000558 *8*; α(K)=0.000499 *7*; α(L)=5.14×10^{-5} *8*; α(M)=7.68×10^{-6} *11*; α(N+..)=5.77×10^{-7} *8* α(N)=5.07×10^{-7} *7*; α(IPF)=7.00×10^{-8} *11* A$_2$=+0.28 *1*. A$_4$=−0.08 *1*. POL=−0.41 *10*.

$^{65}_{32}Ge_{33}$-4

(HI,xnγ) 1995He27,1997So06 (continued)

γ(^{65}Ge) (continued)

E_γ [†]	I_γ	E_i(level)	J_i^π	E_f	J_f^π	Mult.	α[&]	Comments
1119.0 *3*	18.2 *18*	6329.4	(25/2$^-$,27/2$^-$)	5210.39	23/2$^-$			
1138.5 *3*		6348.9		5210.39	23/2$^-$			
1155.2 *2*	12.0 *20*	1155.22	7/2$^-$	0	3/2$^-$			
1195.0 *3*		6348.0		5152.99	(21/2$^-$)			
1254.7 *1*	51.2 *7*	4691.19	19/2$^-$	3436.48	(17/2$^+$)	E1	0.000185 *3*	α=0.000185 *3*; α(K)=9.01×10^{-5} *13*; α(L)=9.11×10^{-6} *13*; α(M)=1.359×10^{-6} *19*; α(N+..)=8.44×10^{-5} *12* α(N)=8.93×10^{-8} *13*; α(IPF)=8.43×10^{-5} *12* A_2=−0.22 *1*. A_4=0. POL=+0.33 *6*.
1255.9 *3*		2146.08	(11/2$^-$)	890.10	7/2$^-$			
1345.0 *3*		6555.4		5210.39	23/2$^-$			
1356.3 *1*	63.5 *9*	3436.48	(17/2$^+$)	2080.17	13/2$^+$	E2	0.000221 *3*	α=0.000221 *3*; α(K)=0.0001605 *23*; α(L)=1.634×10^{-5} *23*; α(M)=2.44×10^{-6} *4*; α(N+..)=4.18×10^{-5} *6* α(N)=1.601×10^{-7} *23*; α(IPF)=4.16×10^{-5} *6* A_2=+0.30 *1*. A_4=−0.06 *1*. POL=+0.45 *10*.
1417[‡] *1*		x+1417	(27/2$^-$)	x	25/2$^{(-)}$			
1418.1 *3*		2573.29	11/2$^-$	1155.22	7/2$^-$			
1460.5 *3*		7789.9		6329.4	(25/2$^-$,27/2$^-$)			
1479[‡] *1*		6689.4		5210.39	23/2$^-$			
1615[‡] *1*		x+3535	(33/2$^-$)	x+1920	(29/2$^-$)			
1615.2 *3*		4188.50	15/2$^-$	2573.29	11/2$^-$			
1621.3 *3*		2837.18	(13/2$^+$)	1215.86	9/2$^+$			
1655.1 *3*		4228.38	15/2$^-$	2573.29	11/2$^-$			
1656[‡] *1*		x+1656	(27/2$^-$)	x	25/2$^{(-)}$			
1697.1 *3*		3843.27	(15/2$^-$)	2146.08	(11/2$^-$)			
1763.1 *3*		3843.27	(15/2$^-$)	2080.17	13/2$^+$			
1823.0 *3*		8152.4		6329.4	(25/2$^-$,27/2$^-$)			
2148.2 *3*		4228.38	15/2$^-$	2080.17	13/2$^+$			

[†] From 1995He27, unless given otherwise.
[‡] From 1997So06, not seen by 1995He27. Assumed ΔE=1 keV.
[#] From 1987Go02.
[@] From 1987Go02.
[&] 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] Placement of transition in the level scheme is uncertain.

$^{65}_{32}Ge_{33}$-5

(HI,xnγ) 1995He27,1997So06

Level Scheme

Intensities: Relative I_γ

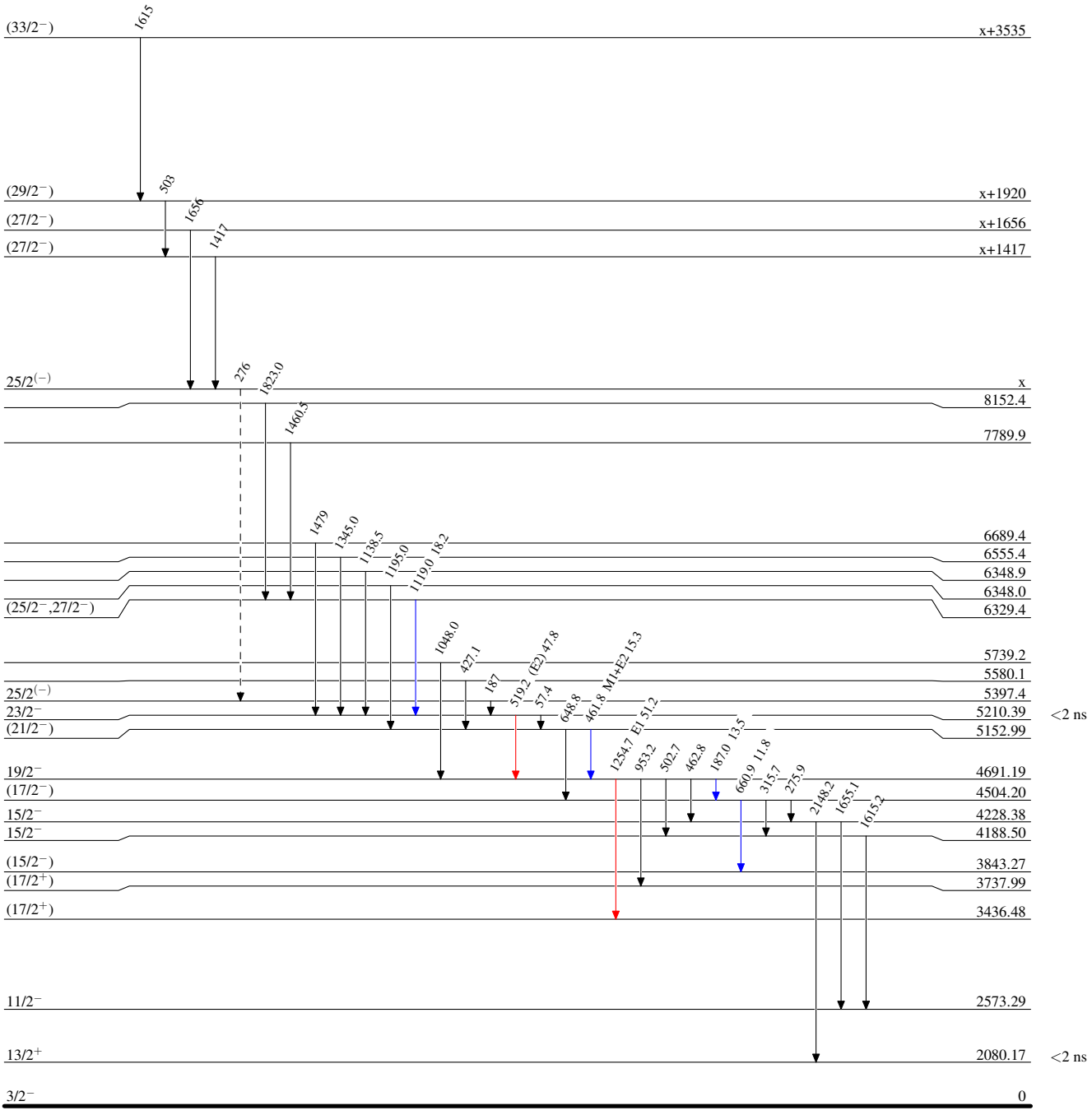
Legend

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

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

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

γ Decay (Uncertain)



$^{65}_{32}Ge_{33}$

(HI,xnγ) 1995He27,1997So06

Level Scheme (continued)

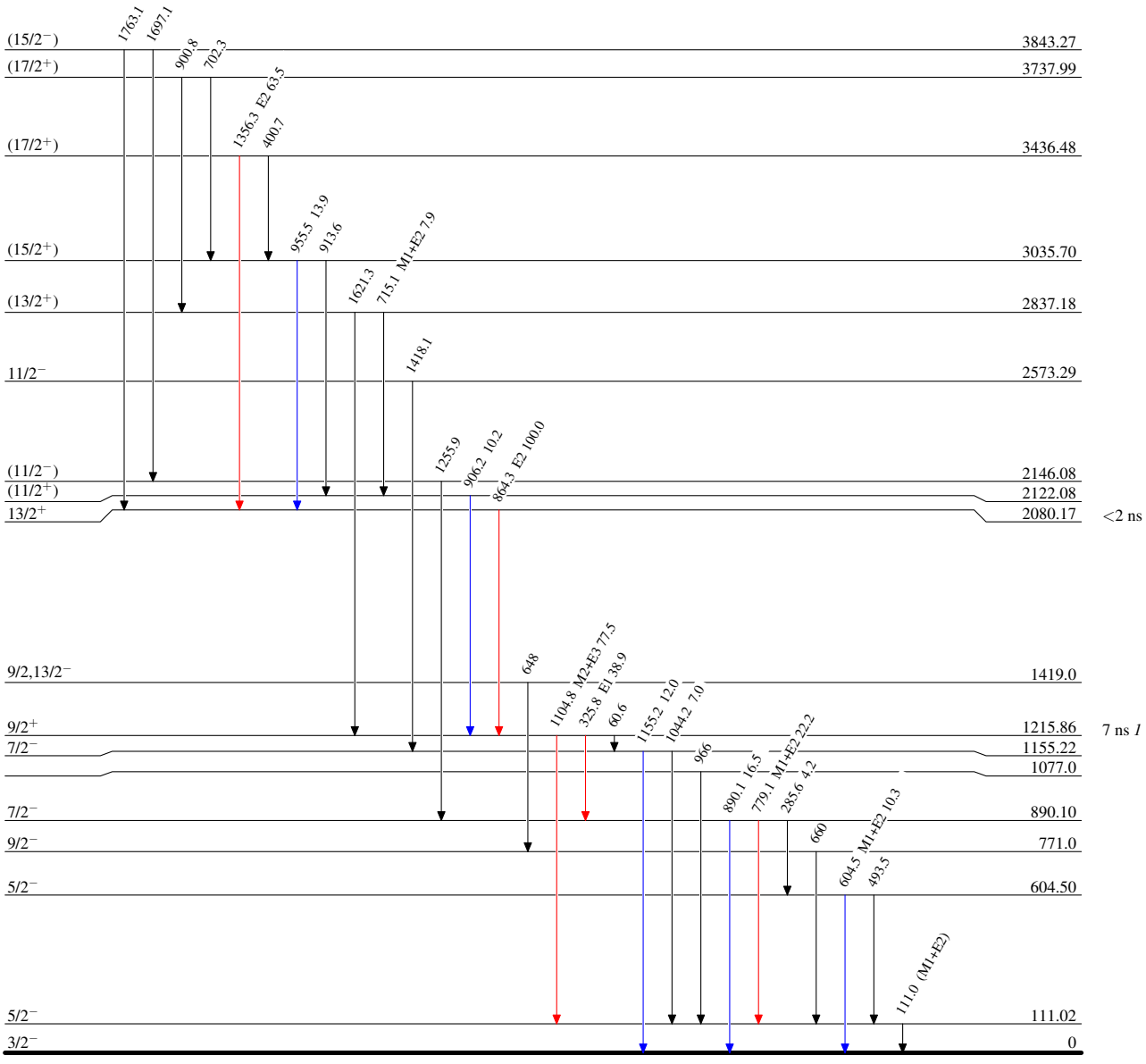
Intensities: Relative I_γ

Legend

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

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

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



$^{65}_{32}Ge_{33}$