^{76}Ge(^{13}C,4nγ) 2012KuZX

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh and Jun Chen	NDS 116, 1 (2014)	31-Dec-2013

2012KuZX: E=45 MeV. Measured Eγ, Iγ, $\gamma\gamma$ coin, DCO ratios, $\gamma\gamma$(linear pol) using INGA array of 16 Compton-suppressed Clover HPGe detectors.
Additional information 1.
2010KuZS is superseded by 2012KuZX. The level scheme in the two reports is the same, except for a 658.6γ on the top of 5089 level which is in 2010KuZS but left out in 2012KuZX.

^{85}Sr Levels

E(level)†	J$^\pi$‡	E(level)†	J$^\pi$‡	E(level)†	J$^\pi$‡	E(level)†	J$^\pi$‡
0.0#	9/2$^+$	2661.0 *4*	15/2$^-$	4361.3@ *5*	23/2$^-$	5699.4@ *5*	27/2$^-$
231.2 *3*	7/2$^+$	2840.1 *4*	17/2$^+$	4491.5a *5*	25/2$^+$	5703.5 *7*	27/2$^{(+)}$
1111.56# *23*	13/2$^+$	2861.1 *4*	17/2$^-$	4779.6& *5*	(21/2$^+$)	5749.7a *8*	29/2$^+$
1221.1 *4*	11/2$^+$	3027.8@ *4*	19/2$^-$	4793.2@ *5*	25/2$^-$	5939.4@ *5*	29/2$^-$
1261.8 *4*	9/2$^+$	3071.6 *4*	17/2$^+$	4845.0 *6*	25/2$^+$	6007.9& *6*	29/2$^+$
1658.06 *23*	11/2$^+$	3080.0# *4*	21/2$^+$	4969.0& *5*	23/2$^+$	6203.5 *9*	29/2$^{(+)}$
1850.3 *3*	13/2$^+$	3227.2 *4*	21/2$^-$	5006.8 *7*	(25/2$^-$)	6360.8a *9*	(31/2$^+$)
2102.13@ *25*	13/2$^-$	3384.0a *4*	19/2$^+$	5036.5 *5*	25/2$^+$	6466.7& *8*	31/2$^{(+)}$
2367.0@ *4*	17/2$^-$	3396.5@ *4*	21/2$^-$	5091.2a *6*	27/2$^+$	6626.2@ *6*	31/2$^-$
2400.1# *3*	17/2$^+$	3511.6a *4*	21/2$^+$	5181.0& *5*	25/2$^+$	7221.8@ *8*	33/2$^-$
2525.6 *4*	15/2$^+$	3965.8a *5*	23/2$^+$	5422.9& *5*	27/2$^+$	7554.9@ *8*	35/2$^-$

† From least-squares fit to Eγ data.
‡ As proposed in 2012KuZX based on their DCO data, band associations and previous assignments.
# Band(A): Band based on 9/2$^+$.
@ Band(B): Sequence of π=− levels based on 13/2$^{(-)}$.
& Band(C): Band based on (21/2$^+$).
a Band(D): Band based on 19/2$^+$. Possible magnetic rotational structure.

γ(^{85}Sr)

DCO ratios correspond to 90° and 157° geometry with gates on ΔJ=2, quadrupole transitions or ΔJ=1, dipole transitions. Expected DCO values are: 1.0 for ΔJ=2, quadrupole and 0.5 for ΔJ=1, dipole when gated on ΔJ=2, quadrupole. 1.0 for ΔJ=1, dipole and 1.92 for ΔJ=2, quadrupole when gated on ΔJ=1, dipole. 264.9γ, 679.7γ, 1111.6γ and 1288.8γ are ΔJ=2, Q. 368.5γ and 454.2γ are ΔJ=1, dipole.
Expected POL values are: −0.03 to −0.04 for ΔJ=1, M1; +0.07 to +0.08 for ΔJ=2, E2; +0.09 for ΔJ=1, E1; +0.15 to +0.18 for ΔJ=0, M1+E2.

E$_\gamma$	I$_\gamma$	E$_i$(level)	J$_i^\pi$	E$_f$	J$_f^\pi$	Mult.†	Comments
127.7 *3*	5.4 *3*	3511.6	21/2$^+$	3384.0	19/2$^+$	(M1+E2)	DCO=1.09 *18* Additional information 4.
166.6 *3*	3.5 *3*	3027.8	19/2$^-$	2861.1	17/2$^-$	Q	DCO=0.97 *12* from gate on 1111.6γ.
189.2 *5*	0.34 *11*	4969.0	23/2$^+$	4779.6	(21/2$^+$)		
200.0 *3*	1.81 *23*	2861.1	17/2$^-$	2661.0	15/2$^-$	D+Q	DCO=1.44 *15* from gate on 368.5γ.
212.0 *5*	1.14 *9*	5181.0	25/2$^+$	4969.0	23/2$^+$	D+Q	DCO=0.71 *10* from gate on 679.7γ.
231.2 *5*	4.4 *6*	231.2	7/2$^+$	0.0	9/2$^+$	M1	DCO=1.08 *9* from gate on 264.9γ. POL=−0.049 *22*.

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^{76}Ge(^{13}C,4nγ) 2012KuZX (continued)

$\gamma(^{85}Sr)$ (continued)

E_γ	I_γ	E_i(level)	J_i^π	E_f	J_f^π	Mult.[†]	Comments
231.6 *5*	0.40 *14*	3071.6	$17/2^+$	2840.1	$17/2^+$		
240.0 *5*	2.1 *5*	5939.4	$29/2^-$	5699.4	$27/2^-$	M1+E2	DCO=1.34 *15* from gate on 368.5γ. POL=−0.09 *6*.
241.9 *3*	3.7 *4*	5422.9	$27/2^+$	5181.0	$25/2^+$	M1	DCO=1.1 *4* from gate on 454.2γ. POL=−0.035 *21*.
264.9 *3*	33.7 *9*	2367.0	$17/2^-$	2102.13	$13/2^-$	E2	DCO=1.49 *12* from gate on 1111.6γ, 2.51 *19* from gate on 368.5γ. Additional information 3. POL=+0.180 *17* from gate on 1111.6γ, +0.180 *15* from gate on 368.5γ, +0.18 *4* from gate on 444.0γ.
312.3 *3*	4.3 *5*	3384.0	$19/2^+$	3071.6	$17/2^+$	M1+E2	DCO=0.56 *5* from gate on 1111.6γ. POL=−0.078 *32* from gate on 454.2γ, −0.079 *28* from gate on 1288.8γ.
333.1 *3*	2.6 *3*	7554.9	$35/2^-$	7221.8	$33/2^-$	M1+E2	DCO=1.22 *10* from gate on 368.5γ. POL=−0.066 *17*.
336.0 *5*	0.73 *19*	5181.0	$25/2^+$	4845.0	$25/2^+$	M1+E2	DCO=0.78 *11* from gate on 679.7γ. POL=+0.047 *24*.
368.5 *3*	27.7 *9*	3396.5	$21/2^-$	3027.8	$19/2^-$	M1	DCO=0.51 *4* from gate on 1111.6γ, 0.373 *23* from gate on 264.9γ. POL=−0.032 *6*.
386.4 *5*	0.77 *18*	5422.9	$27/2^+$	5036.5	$25/2^+$	D	DCO=1.01 *18* from gate on 454.2γ.
396.2[‡] *5*	0.62 *18*	1658.06	$11/2^+$	1261.8	$9/2^+$	M1	DCO=0.55 *6* from gate on 264.9γ. POL=−0.037 *29*.
431.6 *3*	3.1 *4*	3511.6	$21/2^+$	3080.0	$21/2^+$	M1+E2	DCO=0.84 *7* from gate on 679.9γ, 3.3 *4* from gate on 454.2γ. POL=+0.160 *21*. Mult.: $\Delta J=0$ transition.
432.0 *5*	3.0 *3*	4793.2	$25/2^-$	4361.3	$23/2^-$	M1+E2	DCO=0.91 *8* from gate on 368.5γ. POL=−0.060 *20*.
440.0 *3*	3.20 *21*	2840.1	$17/2^+$	2400.1	$17/2^+$	M1(+E2)	DCO=1.04 8 from gate on 1288.8γ, 3.0 *3* from gate on 454.2γ. POL=+0.100 *26*.
444.0 *3*	14.0 *7*	2102.13	$13/2^-$	1658.06	$11/2^+$	E1	DCO=1.08 *7* from gate on 368.5γ, 0.396 *22* from gate on 264.9γ. POL=+0.099 *29* from gates on 368.5γ and 265.4γ. Additional information 2.
454.2 *3*	26.1 *14*	3965.8	$23/2^+$	3511.6	$21/2^+$	M1	DCO=0.49 *3* from gate on 1111.6γ. POL=−0.046 *9* from gate on 1288.8γ, −0.043 *7* from gate on 1111.6γ.
458.8 *5*	3.6 *5*	6466.7	$31/2^{(+)}$	6007.9	$29/2^+$	D	DCO=0.64 *6* from gate on 454.2γ.
494.2 *3*	3.8 *4*	2861.1	$17/2^-$	2367.0	$17/2^-$	M1(+E2)	DCO=0.99 *12* from gate on 368.4γ, 0.76 *5* from gate on 264.9γ. POL=+0.171 *13*. Mult.: $\Delta J=0$ transition.
500.0 *5*	1.3 *3*	6203.5	$29/2^{(+)}$	5703.5	$27/2^{(+)}$		
525.7 *3*	15.4 *9*	4491.5	$25/2^+$	3965.8	$23/2^+$	M1	DCO=0.48 *3* from gate on 1111.6γ. POL=−0.039 *9* from gate on 1111.6γ, −0.039 *11* from gate on 454.2γ.
543.9 *5*	3.6 *4*	3384.0	$19/2^+$	2840.1	$17/2^+$	M1+E2	DCO=0.68 *12* from gate on 1288.8γ. POL=−0.014 *12*.
546.0 *5*	2.1 *5*	3071.6	$17/2^+$	2525.6	$15/2^+$	E2+M1	DCO=0.78 *7* from gate on 454.2γ. POL=+0.106 *21*.
558.2 *5*	1.52 *17*	2661.0	$15/2^-$	2102.13	$13/2^-$	D	DCO=0.67 *17* from gate on 368.5γ.
585.0 *3*	4.4 *3*	6007.9	$29/2^+$	5422.9	$27/2^+$	M1	DCO=0.58 *6* from gate on 454.2γ. POL=−0.030 *23*.

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^{76}Ge(^{13}C,4nγ) 2012KuZX (continued)

γ(^{85}Sr) (continued)

E_γ	I_γ	E_i(level)	J_i^π	E_f	J_f^π	Mult.[†]	Comments
595.6 *5*	4.1 *7*	7221.8	33/2$^-$	6626.2	31/2$^-$	M1+E2	DCO=1.02 *7* from gate on 368.5γ. POL=−0.084 *23*.
599.7 *3*	9.6 *9*	5091.2	27/2$^+$	4491.5	25/2$^+$	M1	DCO=0.97 *11* from gate on 454.2γ. POL=−0.033 *9*.
611.1 *5*	0.35 *9*	6360.8	(31/2$^+$)	5749.7	29/2$^+$		
627.8 *3*	10.5 *9*	3027.8	19/2$^-$	2400.1	17/2$^+$	E1	DCO=0.51 *4* from gate on 1111.6γ. POL=+0.090 *12* from gate on 368.5γ, +0.089 *12* from gate on 1288.8γ.
658.5 *5*	1.67 *23*	5749.7	29/2$^+$	5091.2	27/2$^+$	M1	DCO=0.86 *7* from gate on 454.2γ. POL=−0.046 *14*.
660.4 *5*	14.8 *6*	3027.8	19/2$^-$	2367.0	17/2$^-$	M1+E2	DCO=0.32 *12* from gate on 1111.6γ. POL=−0.023 *6*.
667.0 *5*	1.4 *3*	5703.5	27/2$^{(+)}$	5036.5	25/2$^+$	D	DCO=0.60 *13* from gate on 454.2γ.
671.6 *5*	5.8 *4*	3071.6	17/2$^+$	2400.1	17/2$^+$	M1+E2	DCO=1.02 *9* from gate on 1288.8γ. POL=−0.028 *22*.
679.7 *3*	9.82 *23*	3080.0	21/2$^+$	2400.1	17/2$^+$	E2	DCO=1.17 *8* from gate on 1111.6γ. POL=+0.162 *13*.
686.8 *3*	4.3 *6*	6626.2	31/2$^-$	5939.4	29/2$^-$	M1+E2	DCO=0.84 *6* from gate on 368.5γ. POL=−0.054 *8*.
689.5[‡] *5*	0.20 *10*	5181.0	25/2$^+$	4491.5	25/2$^+$		
738.8 *3*	5.9 *3*	1850.3	13/2$^+$	1111.56	13/2$^+$	M1+E2	DCO=1.25 *9* from gate on 1111.6γ, 2.5 *3* from gate on 454.2γ. POL=+0.0744 *16*. Mult.: ΔJ=0 transition.
810.8 *3*	1.56 *12*	2661.0	15/2$^-$	1850.3	13/2$^+$	E1	POL=+0.046 *20*.
858.3 *5*	0.62 *23*	3384.0	19/2$^+$	2525.6	15/2$^+$	Q	DCO=2.4 *6* from gate on 454.2γ.
860.2 *3*	8.3 *5*	3227.2	21/2$^-$	2367.0	17/2$^-$	E2	DCO=0.94 *8* from gate on 1111.6γ. POL=+0.090 *9*.
881.0 *5*	1.0 *2*	2102.13	13/2$^-$	1221.1	11/2$^+$	(E1)	DCO=1.04 *21* from gate on 368.5γ. POL=+0.014 *22*.
906.3 *5*	2.2 *3*	5699.4	27/2$^-$	4793.2	25/2$^-$	M1+E2	DCO=1.10 *12* from gate on 368.5γ. POL=−0.084 *13*.
926.8 *5*	0.50 *17*	6626.2	31/2$^-$	5699.4	27/2$^-$		
931.4 *3*	1.88 *16*	5422.9	27/2$^+$	4491.5	25/2$^+$	M1+E2	DCO=0.57 *9* from gate on 454.2γ. POL=−0.19 *4*.
964.6 *3*	6.3 *6*	4361.3	23/2$^-$	3396.5	21/2$^-$	M1+E2	DCO=0.85 *6* from gate on 368.5γ. POL=−0.037 *8*.
983.9 *3*	4.5 *5*	3384.0	19/2$^+$	2400.1	17/2$^+$	M1+E2	DCO=0.27 *3* from gate on 1288.8γ. POL=−0.060 *16*.
989.6 *5*	1.16 *23*	2840.1	17/2$^+$	1850.3	13/2$^+$		
990.4 *3*	20.6 *6*	2102.13	13/2$^-$	1111.56	13/2$^+$	E1	DCO=1.97 *14* from gate on 368.5γ. POL=−0.075 *5*.
1003.2 *5*	0.20 *10*	4969.0	23/2$^+$	3965.8	23/2$^+$		
1030.6 *5*	0.81 *22*	1261.8	9/2$^+$	231.2	7/2$^+$	M1+E2	DCO=+0.37 *6* from gate on 264.9γ consistent with ΔJ=1, dipole. POL=+0.09 *5* from gates on 264.9γ and 368.5γ.
1070.7 *3*	4.0 *3*	5036.5	25/2$^+$	3965.8	23/2$^+$	M1	DCO=0.96 *12* from gate on 454.2γ. POL=−0.013 *9*.
1111.6 *3*	100.0 *20*	1111.56	13/2$^+$	0.0	9/2$^+$	E2	DCO=1.05 *7* from gate on 1288.8γ, 0.61 *4* from gate on 264.9γ, 1.90 *13* for gate on 368.4γ. POL=+0.081 *6* from gate on 679.7γ, +0.073 *5* from gate on 264.9γ, +0.072 *7* from gate on 368.5γ.
1111.9 *5*	30.1 *21*	3511.6	21/2$^+$	2400.1	17/2$^+$	E2	DCO=1.01 *7* from gate on 1111.6γ, 0.82 *6* from gate on 679.9γ. POL=+0.072 *7*.
1146.3 *3*	8.8 *4*	5939.4	29/2$^-$	4793.2	25/2$^-$	E2	DCO=1.81 *14* from gate on 368.5γ, 0.77 *6* from gate

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^{76}Ge(^{13}C,4nγ) 2012KuZX (continued)

$\gamma(^{85}Sr)$ (continued)

E_γ	I_γ	E_i(level)	J_i^π	E_f	J_f^π	Mult.[†]	Comments
							on 264.9γ. POL=+0.087 *12*.
1215.2 *5*	3.6 *5*	5181.0	25/2$^+$	3965.8	23/2$^+$	(M1)	DCO=0.41 *7* from gate on 454.2γ. POL=−0.010 *16*.
1221.0 *5*	1.9 *3*	1221.1	11/2$^+$	0.0	9/2$^+$	M1	DCO=0.64 *16* from gate on 368.5γ. POL=−0.010 *17*.
1221.2 *5*	2.22 *17*	3071.6	17/2$^+$	1850.3	13/2$^+$	(E2)	DCO=1.08 *15* from gate on 454.2γ. POL=+0.011 *19*.
1261.8 *5*	0.66 *23*	1261.8	9/2$^+$	0.0	9/2$^+$		
1268.4 *5*	0.46 *14*	4779.6	(21/2$^+$)	3511.6	21/2$^+$		
1288.8 *3*	70.4 *11*	2400.1	17/2$^+$	1111.56	13/2$^+$	E2	DCO=0.96 *7* from gate on 1111.6γ, 0.85 *6* from gate on 679.9γ, 1.97 *14* from gate on 454.2γ. POL=+0.078 *14* from gate on 368.5γ, +0.079 *5* from gate on 264.9γ, +0.075 *11* from gate on 679.7γ.
1304.6 *5*	1.62 *18*	2525.6	15/2$^+$	1221.1	11/2$^+$		
1334.0 *5*	2.2 *6*	4361.3	23/2$^-$	3027.8	19/2$^-$	(E2)	DCO=0.66 *11* from gate on 264.9γ. POL=+0.041 *38*.
1338.0 *5*	2.0 *7*	5699.4	27/2$^-$	4361.3	23/2$^-$	E2	DCO=1.2 *3* from gate on 368.5γ. POL=+0.015 *12*.
1396.6 *3*	12.7 *8*	4793.2	25/2$^-$	3396.5	21/2$^-$	E2	DCO=2.16 *18* from gate on 368.5γ, 0.60 *5* for gate on 264.9γ. POL=+0.043 *11*.
1414.0 *5*	2.36 *18*	2525.6	15/2$^+$	1111.56	13/2$^+$	M1	DCO=0.54 *11* from gate on 454.2γ. POL=−0.058 *16*.
1426.8 *3*	6.9 *7*	1658.06	11/2$^+$	231.2	7/2$^+$	E2	DCO=2.1 *3* from gate on 368.5γ, 0.71 *5* from gate on 264.9γ. POL=+0.090 *12*.
1457.4 *5*	0.83 *21*	4969.0	23/2$^+$	3511.6	21/2$^+$		
1566.0 *5*	0.52 *23*	4793.2	25/2$^-$	3227.2	21/2$^-$		
1658.0 *3*	10.0 *4*	1658.06	11/2$^+$	0.0	9/2$^+$	M1+E2	DCO=0.48 *5* from gate on 368.5γ. POL=+0.009 *7*.
1669.4 *5*	0.26 *8*	5181.0	25/2$^+$	3511.6	21/2$^+$		
1698.9 *5*	0.41 *12*	4779.6	(21/2$^+$)	3080.0	21/2$^+$		
1728.4 *5*	4.8 *3*	2840.1	17/2$^+$	1111.56	13/2$^+$	E2	DCO=0.93 *11* from gate on 1111.6γ. POL=+0.049 *20*.
1765.0 *5*	1.8 *3*	4845.0	25/2$^+$	3080.0	21/2$^+$	E2	DCO=0.87 *15* from gate on 1111.6γ. POL=+0.06 *4*.
1779.6 *5*	0.78 *19*	5006.8	(25/2$^-$)	3227.2	21/2$^-$	(E2)	POL=+0.189 *20*, +0.27 *7* from gate on 264.9γ.
1850.4 *5*	4.2 *4*	1850.3	13/2$^+$	0.0	9/2$^+$		
1889.0 *5*	1.4 *3*	4969.0	23/2$^+$	3080.0	21/2$^+$	(M1)	DCO=0.48 *17* from gate on 1111.6γ. POL=−0.010 *20*.

[†] From DCO ratios and $\gamma\gamma$(linear polarization).
[‡] Placement of transition in the level scheme is uncertain.

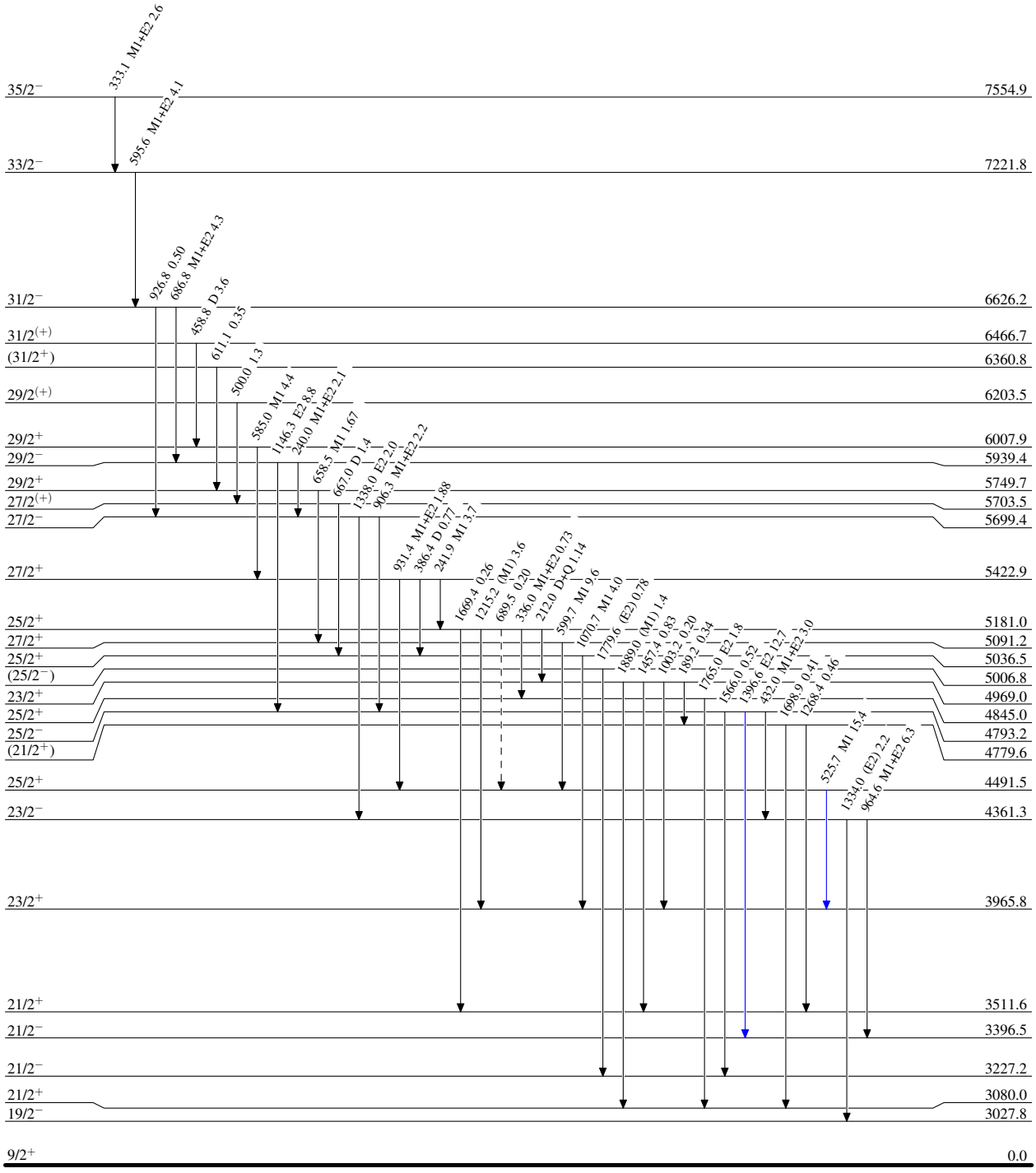
^{76}Ge(^{13}C,4nγ) 2012KuZX

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)



$^{85}_{38}Sr_{47}$

^{76}Ge(^{13}C,4nγ) **2012KuZX**

Level Scheme (continued)

Intensities: Relative I_γ

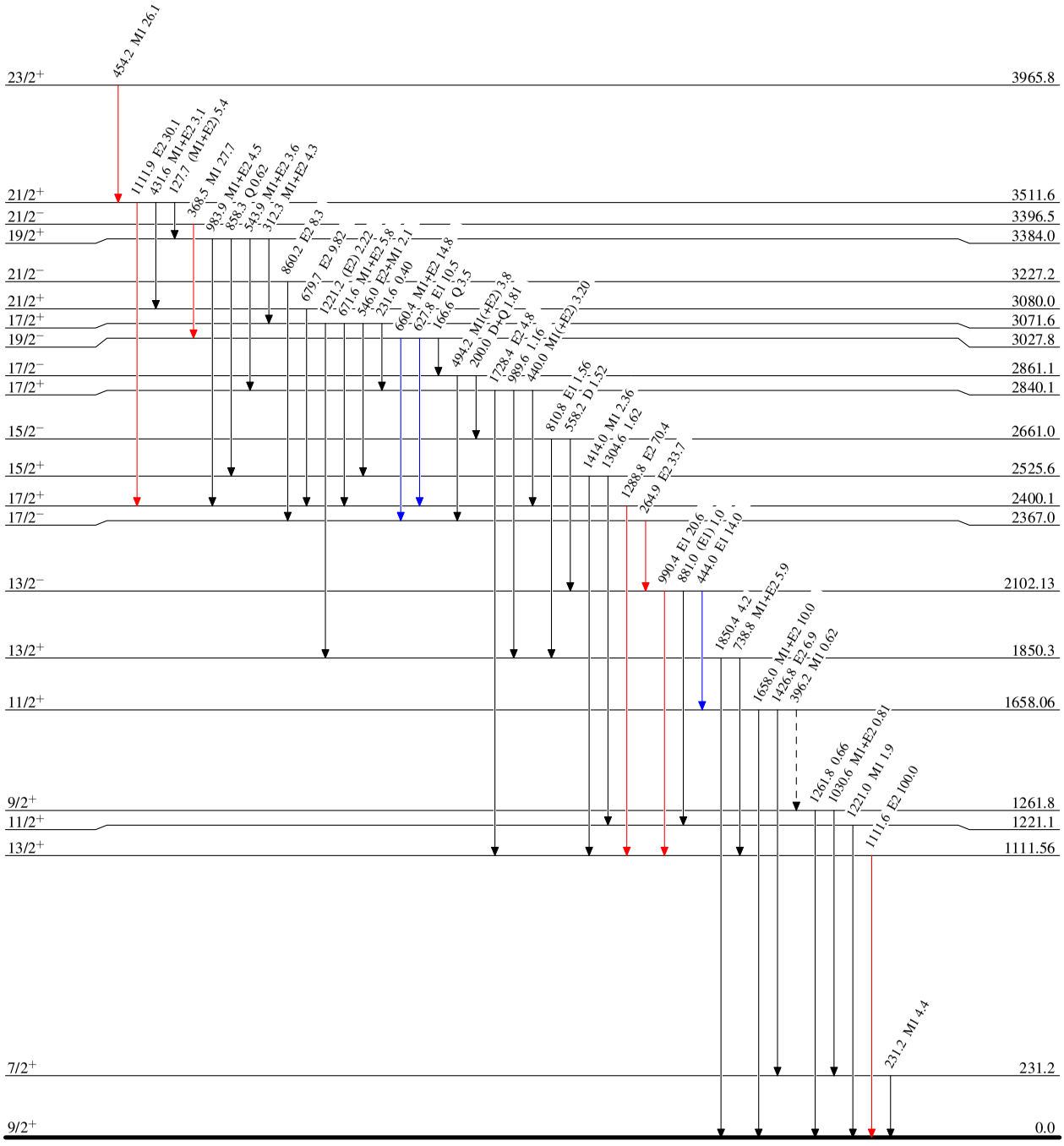
Legend

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

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

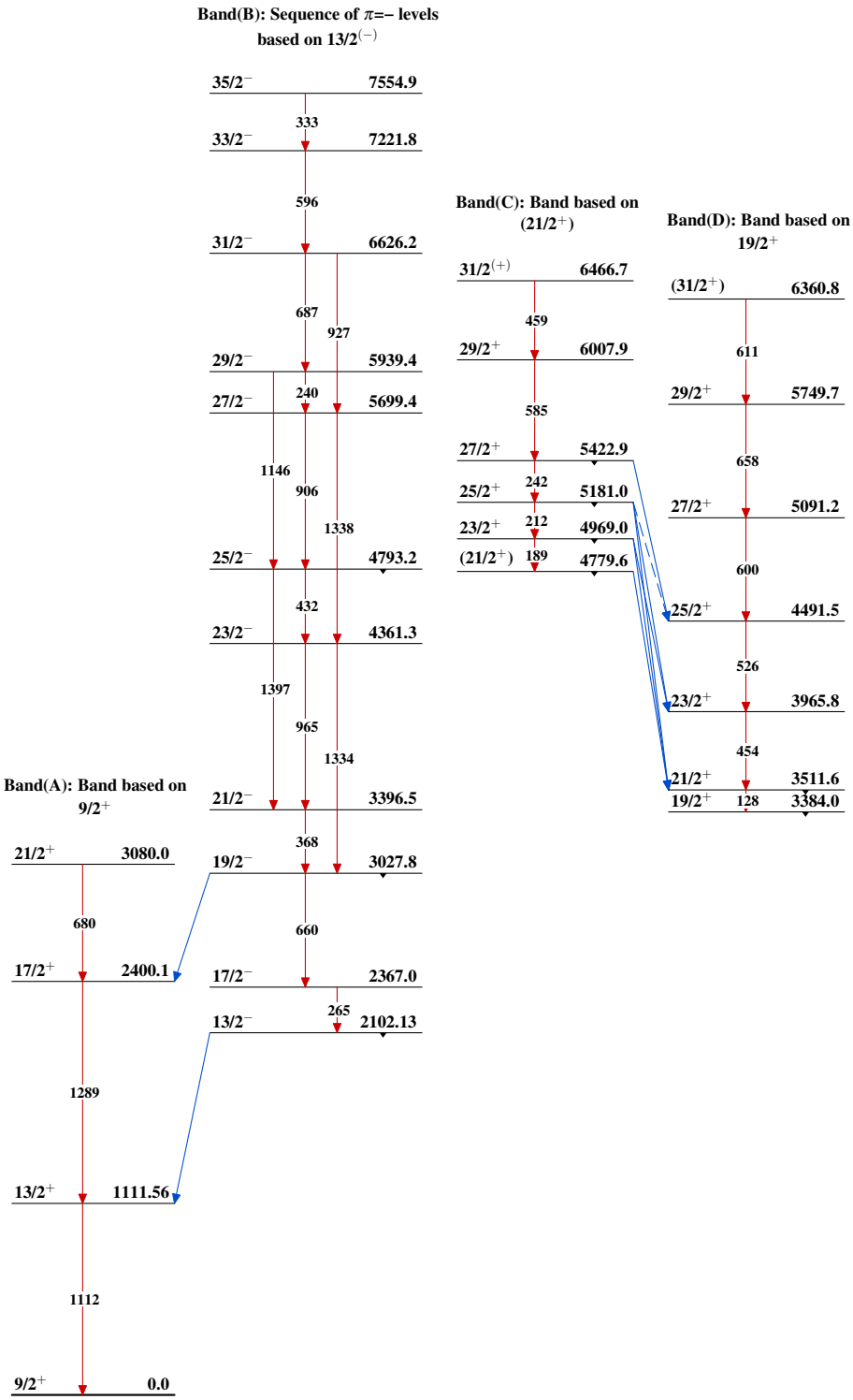
$I_\gamma > 10\% \times I_\gamma^{max}$

γ Decay (Uncertain)



$^{85}_{38}Sr_{47}$

^{76}Ge(^{13}C,4nγ) 2012KuZX



$^{85}_{38}Sr_{47}$