^{58}Ni(^{29}Si,2α2pγ) 1997Sy01

History

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

1997Sy01 (also 1999Ta17,1998Ta20): E=128 MeV; measured Eγ, Iγ, $\gamma\gamma$, $\gamma\gamma(\theta)$(DCO), (particle)γ coin using Gammasphere array with 36 high efficiency Ge detectors and Microball array of 95 CsI(Tl) detectors for charged particles. Comparison with Hartree-Fock-Bogoliubov cranking and total Routhian surface calculations.

^{77}Kr Levels

E(level)[†]	J^π[‡]	E(level)[†]	J^π[‡]	E(level)[†]	J^π[‡]	E(level)[†]	J^π[‡]
0.0[#]	$5/2^+$	2604.6[b] *8*	$15/2^-$	5019.2[b] *6*	$27/2^-$	8968.3[a] *15*	$37/2^-$
66.4[&] *4*	$3/2^-$	2706.8[@] *5*	$19/2^+$	5353.5[&] *8*	$27/2^-$	9116.3[b] *14*	$39/2^-$
150.26[@] *10*	$7/2^+$	2937.6[c] *5*	$17/2^-$	5373.1[#] *7*	$29/2^+$	9486.9[@] *16*	$39/2^+$
245.2[a] *4*	$5/2^-$	2988.4[#] *6*	$21/2^+$	5829.2[c] *12*	$29/2^-$	9904.9[#] *14*	$41/2^+$
279.12[#] *13*	$9/2^+$	3109.9[&] *5*	$19/2^-$	5964.9[a] *8*	$29/2^-$	10336[c] *5*	$41/2^-$
499.1[&] *4*	$7/2^-$	3254.5[b] *5*	$19/2^-$	6080.9[@] *8*	$31/2^+$	10853.2[b] *15*	$43/2^-$
784.0[@] *3*	$11/2^+$	3602.1[a] *5*	$21/2^-$	6207.2[b] *12*	$31/2^-$	11747.1[#] *19*	$45/2^+$
798.8[a] *4*	$9/2^-$	3677.9[c] *6*	$21/2^-$	6670.3[&] *9*	$31/2^-$	11839.5 *16*	$45/2^+$
1002.5[#] *3*	$13/2^+$	3768.7[@] *9*	$23/2^+$	6703.1[#] *8*	$33/2^+$	12183[c] *6*	$(45/2^-)$
1176.0[&] *4*	$11/2^-$	4024.7[b] *5*	$23/2^-$	7178.8[c] *23*	$33/2^-$	12796.1[b] *17*	$47/2^-$
1567.8[a] *4*	$13/2^-$	4150.8[#] *6*	$25/2^+$	7388.4[a] *14*	$33/2^-$	14955.0[b] *20*	$(51/2^-)$
1658.8[@] *3*	$15/2^+$	4231.7[&] *6*	$23/2^-$	7572.2[b] *14*	$35/2^-$	17354[b] *3*	$(55/2^-)$
1917.0[#] *4*	$17/2^+$	4642.4[c] *6*	$25/2^-$	7639.0[@] *11*	$35/2^+$		
2061.5[&] *5*	$15/2^-$	4743.8[a] *6*	$25/2^-$	8207.8[#] *11*	$37/2^+$		
2518.6[a] *5*	$17/2^-$	4810.6[@] *6*	$27/2^+$	8677[c] *3*	$37/2^-$		

[†] From least-squares fit to Eγ data.

[‡] As proposed by 1997Sy01 based on DCO ratios, decay and feeding patterns and band assignments. These assignments may differ somewhat from those given in Adopted Levels.

[#] Band(A): ν5/2[422], α=+1/2. $g_{9/2}$ neutron orbital. First band crossing at $\hbar\omega$=0.5-0.6 MeV due to $\pi g^2_{9/2}$ alignment. The second band crossing at $\hbar\omega$=0.8 MeV is due to $\nu g^2_{9/2}$ alignment.

[@] Band(a): ν5/2[422], α=−1/2. $g_{9/2}$ neutron orbital. First band crossing at $\hbar\omega$=0.5-0.6 MeV due to $\pi g^2_{9/2}$ alignment.

[&] Band(B): ν3/2[501], α=−1/2. First band crossing at $\hbar\omega\approx$0.55 MeV due to $\pi g^2_{9/2}$ alignment.

[a] Band(b): ν3/2[501], α=+1/2. First band crossing at $\hbar\omega$=0.5-0.6 MeV due to $\pi g^2_{9/2}$ alignment. The second band crossing at $\hbar\omega$=0.7 MeV due to alignment of protons.

[b] Band(C): 3-qp band, α=−1/2. Possible configuration=ν1/2[431]$\otimes\pi$3/2[312]$\otimes\pi$3/2[431].

[c] Band(c): 3-qp band, α=+1/2. Possible configuration=ν1/2[431]$\otimes\pi$3/2[312]$\otimes\pi$3/2[431].

γ(^{77}Kr)

DCO values correspond to gates on known ΔJ=2, E2 transitions in a geometry with forward angles and 90°. Expected DCO ratios are 1 for ΔJ=2, quadrupole and $\approx$0.5 for ΔJ=1, dipole transitions. For significant mixing ratio in ΔJ=1 transitions, DCO can vary from 0 to 2 in extreme cases.

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^{58}Ni(^{29}Si,2α2pγ) 1997Sy01 (continued)

γ(^{77}Kr) (continued)

E_γ	I_γ	E_i(level)	J^π_i	E_f	J^π_f	Mult.†	Comments
128.9 *1*	>94	279.12	9/2+	150.26	7/2+	D	DCO=0.45 *3*
150.3 *1*	>106	150.26	7/2+	0.0	5/2+	D+Q	DCO=0.73 *6*
178.9 *1*	>80	245.2	5/2−	66.4	3/2−	D+Q	DCO=0.61 *3*
218.5 *1*	12	1002.5	13/2+	784.0	11/2+	D	DCO=0.54 *8*
245.1 *4*	9	245.2	5/2−	0.0	5/2+		DCO=0.6 *3* Mult.: DCO overlaps ΔJ=2 and ΔJ=1 or 0.
254.1 *1*	45	499.1	7/2−	245.2	5/2−	D	DCO=0.50 *6*
258.2 *5*	5	1917.0	17/2+	1658.8	15/2+	D	DCO=0.48 *3*
278.8 *3*	27	279.12	9/2+	0.0	5/2+	Q	DCO=0.99 *5*
281.8 *6*	2	2988.4	21/2+	2706.8	19/2+		
299.7 *1*	27	798.8	9/2−	499.1	7/2−	D	DCO=0.49 *7*
316.9 *1*	7	3254.5	19/2−	2937.6	17/2−	D	DCO=0.57 *6*
333.0 *8*	4	2937.6	17/2−	2604.6	15/2−	D	DCO=0.58 *4*
347.4 *6*	7	4024.7	23/2−	3677.9	21/2−	D	DCO=0.56 *19*
376.7 *4*	3	5019.2	27/2−	4642.4	25/2−	D	DCO=0.51 *7*
377.2 *1*	27	1176.0	11/2−	798.8	9/2−	D	DCO=0.51 *7*
382.1 *10*	4	4150.8	25/2+	3768.7	23/2+		DCO=1.02 *18* Mult.: DCO suggests ΔJ=2, but ΔJ=1 from level scheme.
391.8 *1*	12	1567.8	13/2−	1176.0	11/2−	D	DCO=0.51 *4*
423.1 *10*	2	4024.7	23/2−	3602.1	21/2−	D	DCO=0.56 *17*
423.8 *6*	8	3677.9	21/2−	3254.5	19/2−		DCO=0.7 *3* Mult.: DCO overlaps ΔJ=2 and ΔJ=1 or 0.
432.5 *1*	18	499.1	7/2−	66.4	3/2−	Q	DCO=1.2 *3*
457.1 *1*	7	2518.6	17/2−	2061.5	15/2−	D+Q	DCO=0.64 *5*
491.8 *4*	4	3602.1	21/2−	3109.9	19/2−	D+Q	DCO=0.68 *14*
493.9 *4*	9	2061.5	15/2−	1567.8	13/2−	D+Q	DCO=0.68 *14*
505.1 *4*	21	784.0	11/2+	279.12	9/2+	D	DCO=0.44 *5*
512.1 *5*	2	4743.8	25/2−	4231.7	23/2−	D+Q	DCO=0.70 *4*
553.5 *2*	38	798.8	9/2−	245.2	5/2−	Q	DCO=0.94 *16*
562.6 *4*	8	5373.1	29/2+	4810.6	27/2+	D	DCO=0.46 *12*
568.8 *5*	5	8207.8	37/2+	7639.0	35/2+		
591.5 *3*	5	3109.9	19/2−	2518.6	17/2−	D+Q	DCO=0.69 *16*
608.8 *17*	2	5353.5	27/2−	4743.8	25/2−		DCO=0.72 *24*
613.5 *10*	2	5964.9	29/2−	5353.5	27/2−	D	DCO=0.5 *3*
617.8 *4*	4	4642.4	25/2−	4024.7	23/2−	D	DCO=0.54 *5*
622.2 *4*	7	6703.1	33/2+	6080.9	31/2+	D	DCO=0.57 *15*
629.8 *10*	3	4231.7	23/2−	3602.1	21/2−	D+Q	DCO=0.70 *4*
634.0 *14*	12	784.0	11/2+	150.26	7/2+	Q	DCO=1.1 *3*
650.0 *15*	12	3254.5	19/2−	2604.6	15/2−	Q	DCO=0.92 *9*
656.3 *1*	21	1658.8	15/2+	1002.5	13/2+	D	DCO=0.50 *3*
659.8 *2*	10	4810.6	27/2+	4150.8	25/2+	D	DCO=0.44 *11*
676.9 *2*	34	1176.0	11/2−	499.1	7/2−	Q	DCO=0.95 *12*
707.8 *4*	8	6080.9	31/2+	5373.1	29/2+	D	DCO=0.57 *14*
719 *1*	2	7388.4	33/2−	6670.3	31/2−		DCO=0.8 *5* Additional information 2.
723.3 *3*	100	1002.5	13/2+	279.12	9/2+	Q	DCO=1.01 *5*
735#		3254.5	19/2−	2518.6	17/2−		E_γ: γ shown only in level scheme Fig. 1 of 1997Sy01.
740.6 *7*	5	3677.9	21/2−	2937.6	17/2−	(Q)	DCO=1.1 *4*
769.8 *4*	45	1567.8	13/2−	798.8	9/2−	Q	DCO=0.98 *7*
770.1 *2*	25	4024.7	23/2−	3254.5	19/2−	Q	DCO=1.02 *5*
780.6 *21*	18	3768.7	23/2+	2988.4	21/2+	D+Q	DCO=0.69 *10*
789.8 *3*	11	2706.8	19/2+	1917.0	17/2+	D+Q	DCO=0.34 *5*
874.9 *11*	21	1658.8	15/2+	784.0	11/2+	Q	DCO=1.14 *21*
885.3 *3*	37	2061.5	15/2−	1176.0	11/2−	Q	DCO=1.15 *6*
914.5 *3*	91	1917.0	17/2+	1002.5	13/2+	Q	DCO=1.00 *5*
914.8 *4*	13	4024.7	23/2−	3109.9	19/2−	Q	DCO=1.10 *11*

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^{58}Ni(^{29}Si,2α2pγ) 1997Sy01 (continued)

γ(^{77}Kr) (continued)

E_γ	I_γ	E_i(level)	J_i^π	E_f	J_f^π	Mult.†	Comments
951.2 *5*	40	2518.6	17/2⁻	1567.8	13/2⁻	Q	DCO=1.11 *19*
964.6 *10*	12	4642.4	25/2⁻	3677.9	21/2⁻	Q	DCO=0.89 *10*
994.5 *6*	38	5019.2	27/2⁻	4024.7	23/2⁻	Q	DCO=1.04 *5*
1040.2 *5*	6	4642.4	25/2⁻	3602.1	21/2⁻	Q	DCO=0.95 *4*
1042.0 *21*	30 *20*	4810.6	27/2⁺	3768.7	23/2⁺		DCO=1.1 *4*
1048.0 *21*	45 *20*	2706.8	19/2⁺	1658.8	15/2⁺	Q	DCO=1.1 *4*
1048.0 *5*	30	3109.9	19/2⁻	2061.5	15/2⁻	Q	DCO=1.05 *16*
1062.0 *11*	25 *15*	3768.7	23/2⁺	2706.8	19/2⁺	Q	DCO=0.91 *12*
1071.2 *5*	78	2988.4	21/2⁺	1917.0	17/2⁺		
1083.5 *4*	30	3602.1	21/2⁻	2518.6	17/2⁻	Q	DCO=1.20 *18*
1122.4‡ *5*	14‡	4231.7	23/2⁻	3109.9	19/2⁻	(Q)	DCO=0.97 *7* DCO for doublet.
1122.4‡ *5*	8‡	5353.5	27/2⁻	4231.7	23/2⁻	(Q)	Additional information 1.
1141.2 *4*	16	4743.8	25/2⁻	3602.1	21/2⁻	Q	DCO=1.09 *7*
1159 *3*	9	3677.9	21/2⁻	2518.6	17/2⁻	Q	DCO=1.12 *6*
1162.4 *2*	43	4150.8	25/2⁺	2988.4	21/2⁺	Q	DCO=1.01 *11*
1186.7 *10*	20	5829.2	29/2⁻	4642.4	25/2⁻	Q	DCO=0.96 *13*
1188.0 *10*	35	6207.2	31/2⁻	5019.2	27/2⁻	Q	DCO=0.96 *13*
1193.0 *1*	8	3254.5	19/2⁻	2061.5	15/2⁻		DCO=1.1 *5*
1220.6 *5*	12	5964.9	29/2⁻	4743.8	25/2⁻	Q	DCO=1.04 *7*
1222.3 *4*	28	5373.1	29/2⁺	4150.8	25/2⁺	(Q)	DCO=1.1 *3*
1270.1 *12*	32	6080.9	31/2⁺	4810.6	27/2⁺		DCO=1.0 *5*
1279.1 *11*	1	2937.6	17/2⁻	1658.8	15/2⁺		DCO=1.00 *8* Mult.: DCO suggests ΔJ=2, but ΔJ^π gives ΔJ=1.
1316.8 *4*	6	6670.3	31/2⁻	5353.5	27/2⁻	(Q)	DCO=1.1 *3*
1330.2 *12*	24	6703.1	33/2⁺	5373.1	29/2⁺	Q	DCO=0.92 *5*
1349.6 *20*	16	7178.8	33/2⁻	5829.2	29/2⁻	Q	DCO=1.21 *21*
1365.0 *6*	25	7572.2	35/2⁻	6207.2	31/2⁻	Q	DCO=1.06 *14*
1368.4 *10*	3	2937.6	17/2⁻	1567.8	13/2⁻	Q	DCO=1.06 *14*
1423.5 *11*	8	7388.4	33/2⁻	5964.9	29/2⁻	Q	DCO=1.17 *19* Additional information 3.
1498.0 *20*	14	8677	37/2⁻	7178.8	33/2⁻		DCO=0.9 *6* Mult.: DCO overlaps ΔJ=2 and ΔJ=1 or 0.
1505.2 *15*	22	8207.8	37/2⁺	6703.1	33/2⁺	Q	DCO=1.06 *12*
1544.1 *5*	16	9116.3	39/2⁻	7572.2	35/2⁻	Q	DCO=1.02 *7*
1557.9 *8*	17	7639.0	35/2⁺	6080.9	31/2⁺	Q	DCO=0.93 *6*
1579.9 *5*	8	8968.3	37/2⁻	7388.4	33/2⁻	Q	DCO=1.1 *3*
1602.5 *22*	4	2604.6	15/2⁻	1002.5	13/2⁺		DCO=1.0 *4* Mult.: DCO overlaps ΔJ=2 and ΔJ=1 or 0.
1659 *3*	12	10336	41/2⁻	8677	37/2⁻		DCO=0.9 *6* DCO overlaps ΔJ=2 and ΔJ=1 or 0.
1697.0 *9*	20	9904.9	41/2⁺	8207.8	37/2⁺	Q	DCO=1.05 *16*
1736.9 *5*	18	10853.2	43/2⁻	9116.3	39/2⁻	Q	DCO=1.04 *11*
1842.2 *12*	9	11747.1	45/2⁺	9904.9	41/2⁺	Q	DCO=1.07 *14*
1847 *3*	10	12183	(45/2⁻)	10336	41/2⁻		
1847.9 *12*	10	9486.9	39/2⁺	7639.0	35/2⁺	Q	DCO=1.07 *14*
1934.6 *6*	10	11839.5	45/2⁺	9904.9	41/2⁺	Q	DCO=1.08 *21*
1942.9 *7*	10	12796.1	47/2⁻	10853.2	43/2⁻	(Q)	DCO=1.0 *3*
2158.8 *10*	2	14955.0	(51/2⁻)	12796.1	47/2⁻		
2398.7 *20*	1	17354	(55/2⁻)	14955.0	(51/2⁻)		

† 1997Sy01 do not explicitly list multipolarities. From their DCO values the evaluator assigns mult=Q for ΔJ=2 and D or D+Q for ΔJ=1,0 transitions based on expected DCO values. Mult=Q transitions are most likely E2 transitions and ΔJ=1,0 transitions with

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^{58}Ni(^{29}Si,2α2pγ) 1997Sy01 (continued)

γ(^{77}Kr) (continued)

significant admixtures are likely to be M1+E2, while others may be M1 or E1. When DCO value overlaps that expected for ΔJ=2 or ΔJ=1,0, the assignment as suggested by ΔJ^{π} in level scheme is given in parentheses.

‡ Multiply placed with intensity suitably divided.

Placement of transition in the level scheme is uncertain.

^{58}Ni(^{29}Si,2α2pγ) 1997Sy01

Level Scheme

Intensities: Relative I_γ

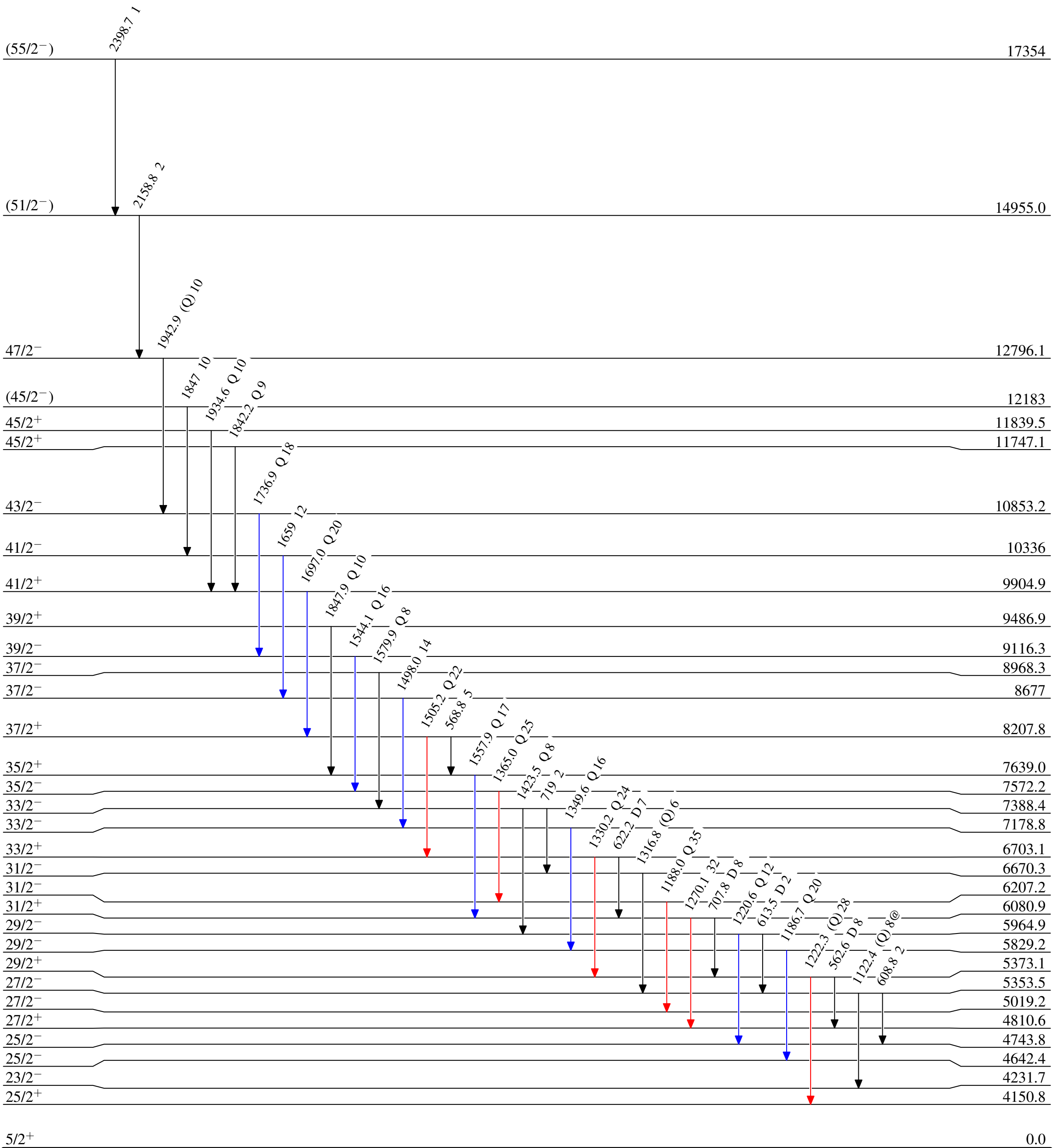
@ Multiply placed: intensity suitably divided

Legend

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

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

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



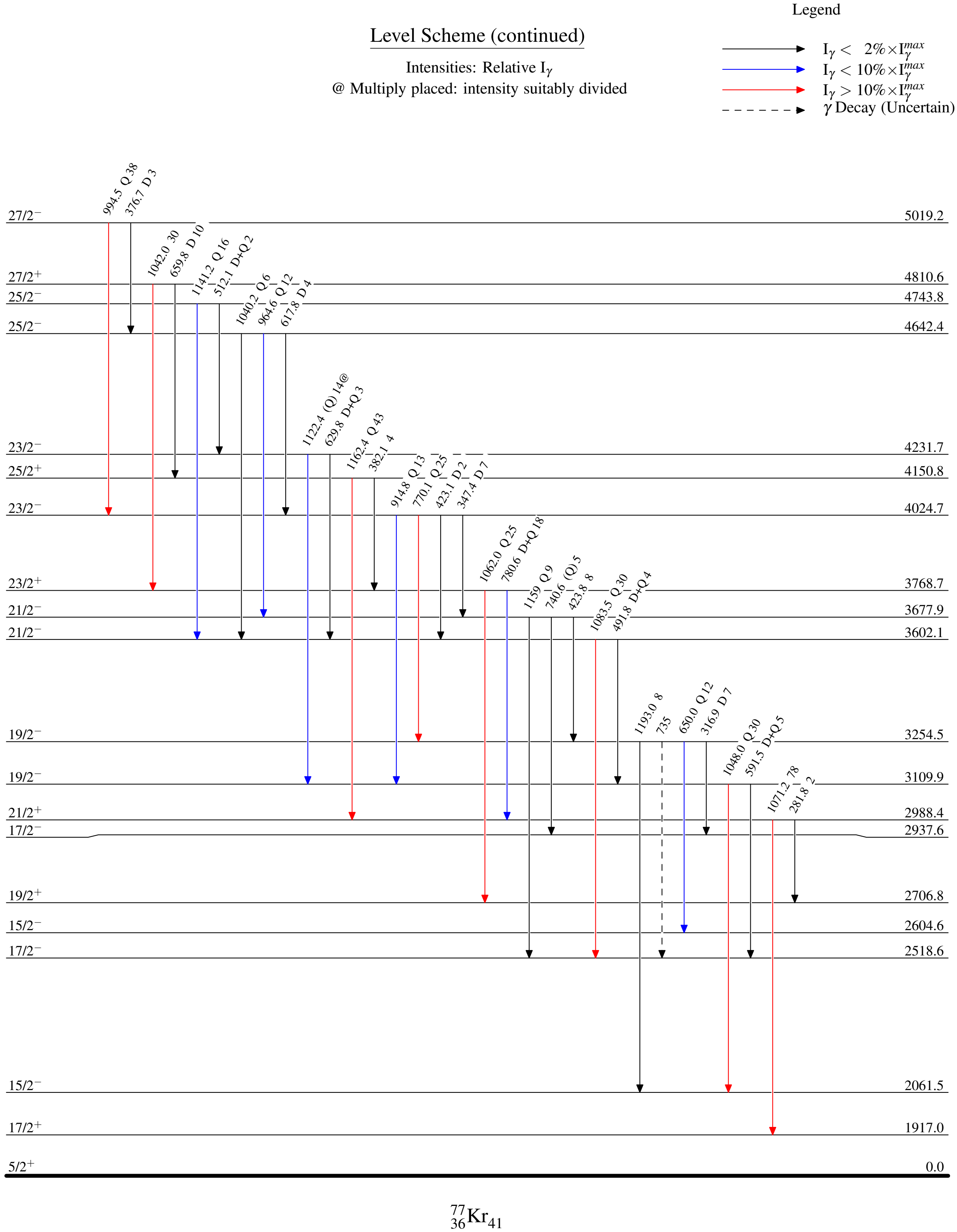
$^{77}_{36}Kr_{41}$

$^{58}Ni(^{29}Si,2\alpha 2p\gamma)$ 1997Sy01

Level Scheme (continued)

Intensities: Relative I_γ

@ Multiply placed: intensity suitably divided



$^{58}Ni(^{29}Si,2\alpha 2p\gamma)$ 1997Sy01

Level Scheme (continued)

Intensities: Relative I_γ

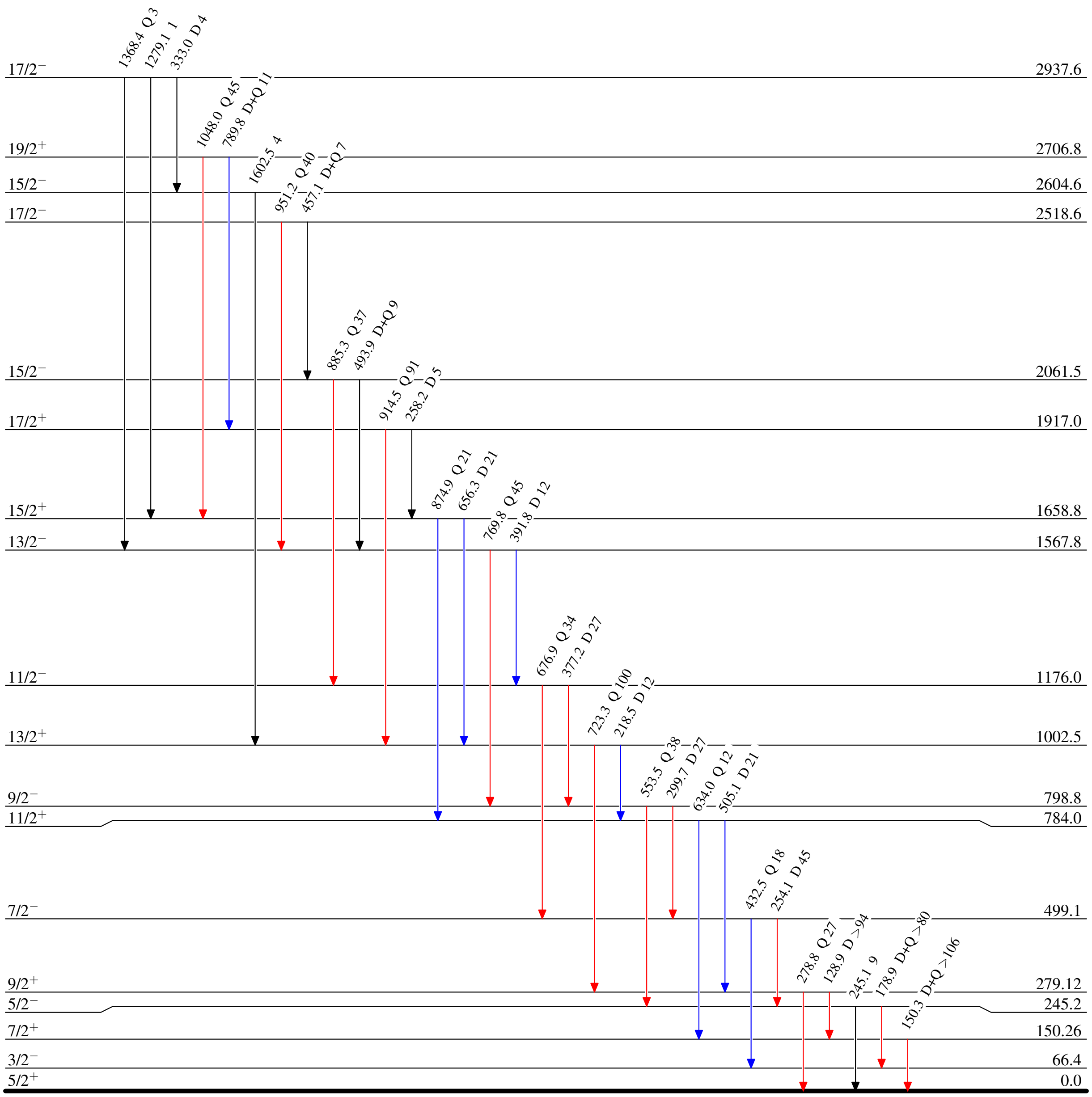
@ Multiply placed: intensity suitably divided

Legend

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

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

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



$^{77}_{36}Kr_{41}$

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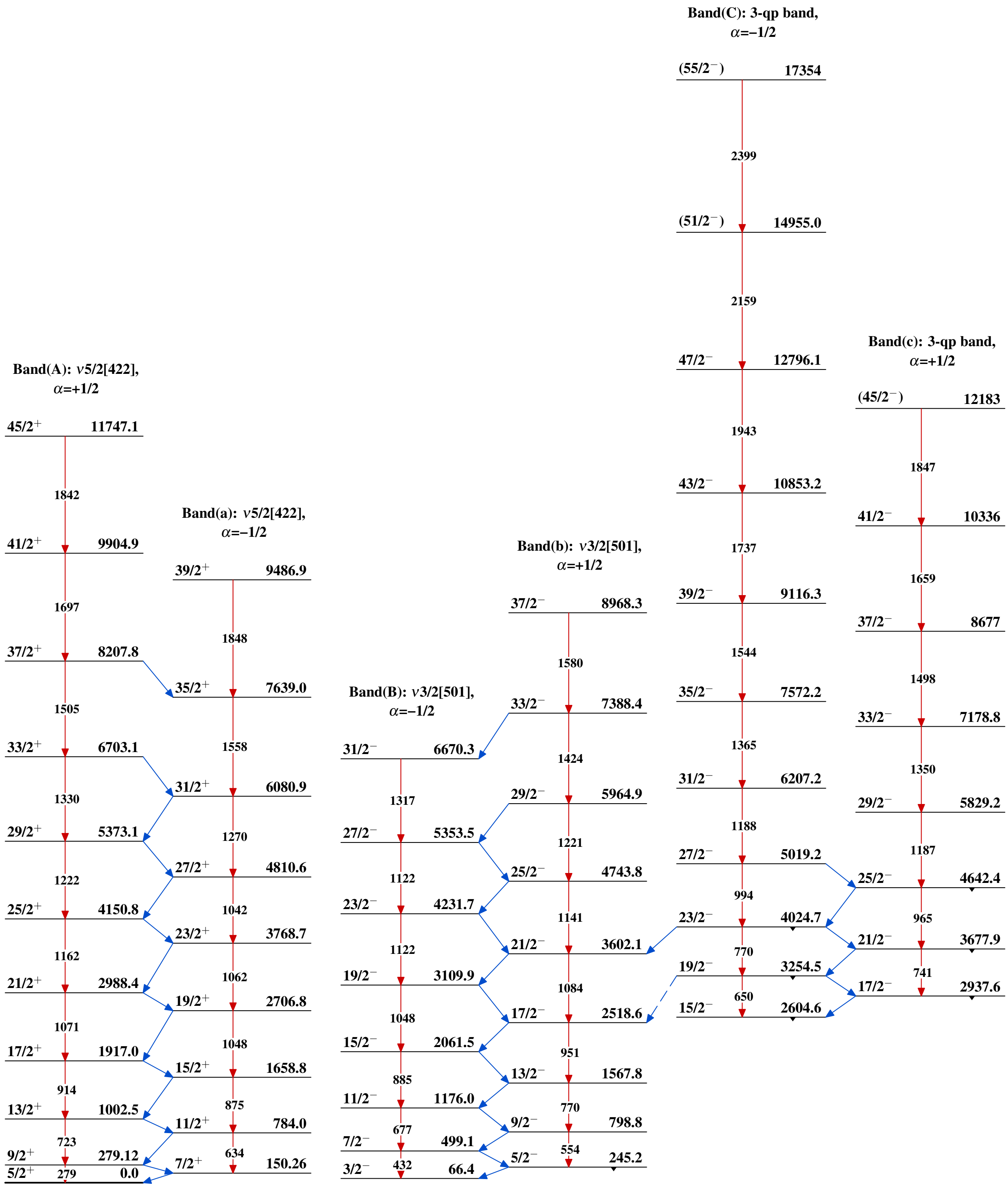

$^{77}_{36}Kr_{41}$