^{65}Cu(^{36}S,p3nγ) 1998Kh01,2000Kh02

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	N. Nica	NDS 111, 525 (2010)	19-Nov-2009

1998Kh01,2000Kh02: E=142 MeV. Measured Eγ, Iγ, $\gamma\gamma$, $\gamma\gamma(\theta)$(DCO) using GAMMASPHERE array with 36 Compton-suppressed Ge detectors. Lifetime measurements by recoil-distance Doppler-shift method (RDDS) are given by 2000Kh02. 1993Re09: superseded by 1998Kh01.

^{97}Ru Levels

E(level)†	J$^\pi$@	$T_{1/2}$‡	E(level)†	J$^\pi$@
0.0[a]	5/2$^+$		7908.0 *13*	
421.8[&] *4*	7/2$^+$	17.9 ps *19*	8162.2 *10*	(39/2$^+$)
878.5[a] *4*	9/2$^+$		8407.0 *13*	(43/2$^+$)
1198.7[&] *4*	11/2$^+$	10.5 ps *16*	8471.2[&] *10*	(43/2$^+$)
1650.6[a] *5*	(13/2$^+$)		8491.9[c] *10*	(41/2$^+$)
1825.1 *5*	(13/2$^+$)		8541.5[a] *13*	(43/2$^+$)
1846.5[&] *5*	15/2$^+$	11.6 ps *16*	8624.1 *12*	(41/2$^+$)
1878.0[b] *5*	(11/2$^-$)		9207.2[&] *11*	(45/2$^+$)
2505.4[a] *7*	(17/2$^+$)		9382.8[a] *13*	(47/2$^+$)
2545.4[&] *5*	17/2$^+$	11.4 ps *12*	9422.9 *13*	(47/2$^+$)
2551.7[b] *5*	(15/2$^-$)		9446.5 *13*	(47/2$^+$)
2660.2[a] *8*	(19/2$^+$)		9731.7 *12*	(47/2$^+$)
2738.7[&] *6*	21/2$^+$	7.3[#] ps *8*	9766.4[c] *11*	(45/2$^+$)
2762.0 *6*	(19/2$^+$)		10123.9[&] *12*	(47/2$^+$)
3224.4[b] *7*	(19/2$^-$)		10128.9 *12*	(43/2$^+$)
3302.9 *9*	(21/2$^+$)		10625.5 *12*	(47/2$^+$)
3609.3[a] *9*	(23/2$^+$)		10832.2 *11*	(47/2$^+$)
3623.6 *7*	(23/2$^+$)		10930.0[c] *12*	(47/2$^+$)
3671.5[&] *7*	25/2$^+$	4.9 ps *6*	11084.1[&] *12*	(49/2$^+$)
3940.7[b] *8*	(23/2$^-$)		11290.9 *13*	(51/2$^+$)
4265.4[&] *7*	27/2$^+$	4.9 ps *6*	11511.3 *12*	(49/2$^+$)
4652.9[a] *10*	(27/2$^+$)		11720.5 *13*	(53/2$^+$)
4693.4[b] *9*	(27/2$^-$)		12127.3[c] *12*	(49/2$^+$)
4733.0[&] *7*	29/2$^+$	7.1 ps *9*	12424.4 *13*	(51/2$^+$)
4766.1 *8*	(29/2$^+$)		12562.2 *13*	(51/2$^+$)
5109.2 *7*	(31/2$^+$)		12732.0 *15*	
5376.1[&] *8*	33/2$^+$	≤12.5 ps	12740.7 *13*	
5488.9[b] *10*	(31/2$^-$)		12747.3 *13*	(53/2$^+$)
5720.7 *10*	(31/2$^-$)		12949.8 *14*	
6133.1[a] *10*	(31/2$^+$)		13256.6 *13*	(53/2$^+$)
6251.3[&] *9*	(35/2$^+$)		13330.9[c] *13*	(51/2$^+$)
6311.5[b] *11*	(35/2$^-$)		13978.2 *15*	
6765.0[a] *11*	(35/2$^+$)		14568.8 *17*	
6780.2 *16*	(37/2$^+$)		15050.5 *17*	
6892.8[c] *10*	(37/2$^+$)		15212.8 *16*	
7383.3 *10*	(39/2$^+$)		15482.7[c] *16*	
7462.6[a] *12*	(39/2$^+$)		16090.8 *20*	
7641.4[&] *10*	(39/2$^+$)	≤13.9 ps	16134.8 *20*	
7678.3 *13*			17294.6 *19*	

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^{65}Cu(^{36}S,p3nγ) 1998Kh01,2000Kh02 (continued)

^{97}Ru Levels (continued)

† From least squares fit to Eγ.
‡ From RDDS (2000Kh02).
# The unit is probably a typographic error (ns for other measurements, see Adopted Levels dataset).
@ Assigned by 1998Kh01 (because of lack of evidence not all are adopted).
& Band(A): sequence 1.
a Band(B): sequence 2.
b Band(C): (11/2$^-$) band.
c Band(D): sequence 3.

γ(^{97}Ru)

E$_\gamma$ †	I$_\gamma$ ‡	E$_i$(level)	J$_i^\pi$	E$_f$	J$_f^\pi$	Mult. #	Comments
154.8 *4*	3.0 *5*	2660.2	(19/2$^+$)	2505.4	(17/2$^+$)	(M1(+E2))	DCO=1.5 *3* E$_\gamma$: 155.1.
193.1 *4*	40 *4*	2738.7	21/2$^+$	2545.4	17/2$^+$	(E2)	DCO=2.0 *2* E$_\gamma$: 193.4.
206.8 *4*	4.0 *7*	11290.9	(51/2$^+$)	11084.1	(49/2$^+$)	(M1(+E2))	DCO=1.6 *2* E$_\gamma$: 207.1.
215.7 *4*	1.0 *5*	7678.3		7462.6	(39/2$^+$)		E$_\gamma$: 216.0.
217.3 *4*	4.2 *6*	2762.0	(19/2$^+$)	2545.4	17/2$^+$	(M1(+E2))	DCO=1.6 *2* E$_\gamma$: 217.7.
229.7 *4*	≤1	7908.0		7678.3			E$_\gamma$: 230.1.
266.8 *4*	6.0 *10*	5376.1	33/2$^+$	5109.2	(31/2$^+$)	(M1(+E2))	DCO=1.5 *2* E$_\gamma$: 267.2.
306.3 *4*	2.0 *4*	3609.3	(23/2$^+$)	3302.9	(21/2$^+$)	(M1(+E2))	DCO=1.6 *3* E$_\gamma$: 306.7.
316.3 *4*	1.0 *3*	12740.7		12424.4	(51/2$^+$)		E$_\gamma$: 316.7.
320.0 *4*	15.0 *15*	1198.7	11/2$^+$	878.5	9/2$^+$	(M1(+E2))	DCO=1.5 *2* E$_\gamma$: 320.4.
329.6 *4*	1.0 *4*	8491.9	(41/2$^+$)	8162.2	(39/2$^+$)		E$_\gamma$: 330.0.
343.1 *4*	2.0 *5*	5109.2	(31/2$^+$)	4766.1	(29/2$^+$)		E$_\gamma$: 343.5.
376.1 *4*	2.0 *6*	5109.2	(31/2$^+$)	4733.0	29/2$^+$		E$_\gamma$: 376.5.
421.7 *4*	100.0	421.8	7/2$^+$	0.0	5/2$^+$	(M1(+E2))	DCO=1.5 *1* E$_\gamma$: 422.1.
429.6 *4*	4.0 *7*	11720.5	(53/2$^+$)	11290.9	(51/2$^+$)	(M1(+E2))	DCO=1.6 *3* E$_\gamma$: 430.1.
456.7 *4*	9.0 *9*	878.5	9/2$^+$	421.8	7/2$^+$	(M1(+E2))	DCO=1.6 *2* E$_\gamma$: 457.2.
467.6 *4*	13.0 *13*	4733.0	29/2$^+$	4265.4	27/2$^+$	(M1(+E2))	DCO=1.6 *2* E$_\gamma$: 468.1.
490.5 *4*	2.1 *5*	7383.3	(39/2$^+$)	6892.8	(37/2$^+$)		E$_\gamma$: 491.0.
500.6 *4*	2.0 *5*	4766.1	(29/2$^+$)	4265.4	27/2$^+$		E$_\gamma$: 501.1.
524.5 *4*	≤1	9731.7	(47/2$^+$)	9207.2	(45/2$^+$)		E$_\gamma$: 525.0.
593.7 *4*	13.0 *13*	4265.4	27/2$^+$	3671.5	25/2$^+$	(M1(+E2))	DCO=1.6 *2* E$_\gamma$: 594.2.
631.9 *4*	7.0 *7*	6765.0	(35/2$^+$)	6133.1	(31/2$^+$)	(E2)	DCO=2.1 *2* E$_\gamma$: 632.5.
641.5 *4*	16.0 *16*	6892.8	(37/2$^+$)	6251.3	(35/2$^+$)	(M1(+E2))	DCO=1.5 *2* E$_\gamma$: 642.1.
642.0 *4*	15.0 *15*	4265.4	27/2$^+$	3623.6	(23/2$^+$)	(E2)	DCO=1.9 *2* E$_\gamma$: 642.6.
642.6 *4*	2.0 *6*	3302.9	(21/2$^+$)	2660.2	(19/2$^+$)	(M1(+E2))	DCO=1.6 *3* E$_\gamma$: 643.2.
643.1 *4*	23.0 *23*	5376.1	33/2$^+$	4733.0	29/2$^+$	(E2)	DCO=1.8 *2* E$_\gamma$: 643.7.

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^{65}Cu(^{36}S,p3nγ) 1998Kh01,2000Kh02 (continued)

$\gamma(^{97}Ru)$ (continued)

E_γ †	I_γ ‡	E_i(level)	J_i^π	E_f	J_f^π	Mult.#	Comments
647.6 *4*	89 *9*	1846.5	15/2$^+$	1198.7	11/2$^+$	(E2)	DCO=2.0 *2* E_γ: 648.2.
672.7 *4*	4.0 *9*	3224.4	(19/2$^-$)	2551.7	(15/2$^-$)	(E2)	DCO=2.1 *2* E_γ: 673.3.
673.7 *4*	3.0 *10*	2551.7	(15/2$^-$)	1878.0	(11/2$^-$)	(E2)	DCO=1.8 *3* E_γ: 674.3.
694.4 *4*	1.0 *2*	13256.6	(53/2$^+$)	12562.2	(51/2$^+$)		E_γ: 695.0.
697.6 *4*	6.0 *6*	7462.6	(39/2$^+$)	6765.0	(35/2$^+$)	(E2)	DCO=1.9 *2* E_γ: 698.2.
699.3 *4*	68 *7*	2545.4	17/2$^+$	1846.5	15/2$^+$	(M1(+E2))	DCO=1.6 *2* E_γ: 699.9.
716.3 *4*	3.0 *7*	3940.7	(23/2$^-$)	3224.4	(19/2$^-$)	(E2)	DCO=2.0 *3* E_γ: 716.9.
720.5 *4*	1.0 *4*	2545.4	17/2$^+$	1825.1	(13/2$^+$)		E_γ: 721.1.
726.5 *4*	1.0 *4*	2551.7	(15/2$^-$)	1825.1	(13/2$^+$)		E_γ: 727.1.
736.1 *4*	15.0 *15*	9207.2	(45/2$^+$)	8471.2	(43/2$^+$)	(M1(+E2))	DCO=1.5 *2* E_γ: 736.7.
752.7 *4*	2.0 *6*	4693.4	(27/2$^-$)	3940.7	(23/2$^-$)	(E2)	DCO=1.9 *3* E_γ: 753.3.
772.1 *4*	16.0 *16*	1650.6	(13/2$^+$)	878.5	9/2$^+$	(E2)	DCO=1.8 *2* E_γ: 772.7.
777.0 *4*	88 *9*	1198.7	11/2$^+$	421.8	7/2$^+$	(E2)	DCO=2.1 *1* E_γ: 777.6.
795.5 *4*	1.0 *4*	5488.9	(31/2$^-$)	4693.4	(27/2$^-$)		E_γ: 796.1.
801.1 *4*	4.0 *9*	10930.0	(47/2$^+$)	10128.9	(43/2$^+$)		E_γ: 801.7.
822.6 *4*	1.0 *3*	6311.5	(35/2$^-$)	5488.9	(31/2$^-$)		E_γ: 823.2.
829.8 *4*	16.0 *16*	8471.2	(43/2$^+$)	7641.4	(39/2$^+$)	(E2)	DCO=1.8 *2* E_γ: 830.4.
841.3 *4*	1.0 *5*	9382.8	(47/2$^+$)	8541.5	(43/2$^+$)		E_γ: 842.0.
843.9 *4*	15.0 *15*	5109.2	(31/2$^+$)	4265.4	27/2$^+$	(E2)	DCO=1.9 *2* E_γ: 844.6.
854.7 *4*	7.1 *7*	2505.4	(17/2$^+$)	1650.6	(13/2$^+$)	(E2)	DCO=1.8 *3* E_γ: 855.4.
861.7 *4*	17.0 *17*	3623.6	(23/2$^+$)	2762.0	(19/2$^+$)	(E2)	DCO=2.0 *2* E_γ: 862.4.
875.2 *4*	7.0 *7*	6251.3	(35/2$^+$)	5376.1	33/2$^+$	(M1(+E2))	DCO=1.6 *2* E_γ: 875.9.
878.6 *4*	68 *7*	878.5	9/2$^+$	0.0	5/2$^+$	(E2)	DCO=1.8 *2* E_γ: 879.3.
881.4 *4*	1.0 *3*	9422.9	(47/2$^+$)	8541.5	(43/2$^+$)		E_γ: 882.1.
914.9 *4*	21.0 *21*	2762.0	(19/2$^+$)	1846.5	15/2$^+$	(E2)	DCO=2.1 *2* E_γ: 915.6.
916.7 *4*	2.0 *7*	10123.9	(47/2$^+$)	9207.2	(45/2$^+$)	(M1(+E2))	DCO=1.5 *3* E_γ: 917.4.
932.7 *4*	22.0 *22*	3671.5	25/2$^+$	2738.7	21/2$^+$	(E2)	DCO=2.0 *2* E_γ: 933.4.
944.4 *4*	1.0 *5*	8407.0	(43/2$^+$)	7462.6	(39/2$^+$)		E_γ: 945.1.
946.7 *4*	22.0 *22*	1825.1	(13/2$^+$)	878.5	9/2$^+$	(E2)	DCO=1.9 *2* E_γ: 947.4.
949.2 *4*	8.8 *9*	3609.3	(23/2$^+$)	2660.2	(19/2$^+$)	(E2)	DCO=2.1 *2* E_γ: 949.9.
960.0 *4*	4.0 *8*	11084.1	(49/2$^+$)	10123.9	(47/2$^+$)	(M1(+E2))	DCO=1.5 *3* E_γ: 960.7.
999.5 *4*	8.0 *8*	1878.0	(11/2$^-$)	878.5	9/2$^+$	D	DCO=1.3 *2* E_γ: 1000.2.
1027.3 *4*	1.0 *4*	5720.7	(31/2$^-$)	4693.4	(27/2$^-$)		E_γ: 1028.0.

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^{65}Cu(^{36}S,p3nγ) 1998Kh01,2000Kh02 (continued)

$\gamma(^{97}Ru)$ (continued)

E_γ[†]	I_γ[‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[#]	Comments
1028.4 *4*	2.0 *10*	13978.2		12949.8			E_γ: 1029.1.
1039.5 *4*	1.0 *5*	9446.5	(47/2$^+$)	8407.0	(43/2$^+$)		E_γ: 1040.2.
1043.6 *4*	13.0 *13*	4652.9	(27/2$^+$)	3609.3	(23/2$^+$)	(E2)	DCO=1.9 *2* E_γ: 1044.3.
1061.5 *4*	10.0 *10*	4733.0	29/2$^+$	3671.5	25/2$^+$	(E2)	DCO=1.9 *2* E_γ: 1062.3.
1078.9 *4*	1.0 *4*	8541.5	(43/2$^+$)	7462.6	(39/2$^+$)		E_γ: 1079.7.
1108.6 *4*	14.0 *14*	8491.9	(41/2$^+$)	7383.3	(39/2$^+$)	(M1(+E2))	DCO=1.5 *2* E_γ: 1109.4.
1142.3 *4*	1.0 *5*	9766.4	(45/2$^+$)	8624.1	(41/2$^+$)		E_γ: 1143.1.
1163.6 *4*	6.0 *10*	10930.0	(47/2$^+$)	9766.4	(45/2$^+$)	(M1(+E2))	DCO=1.6 *3* E_γ: 1164.4.
1197.3 *4*	6.0 *12*	12127.3	(49/2$^+$)	10930.0	(47/2$^+$)	(M1(+E2))	DCO=1.5 *3* E_γ: 1198.1.
1203.6 *4*	6.0 *10*	13330.9	(51/2$^+$)	12127.3	(49/2$^+$)	(M1(+E2))	DCO=1.5 *3* E_γ: 1204.4.
1229.3 *4*	5.0 *9*	12949.8		11720.5	(53/2$^+$)		E_γ: 1230.1.
1269.2 *4*	3.0 *8*	8162.2	(39/2$^+$)	6892.8	(37/2$^+$)	(M1(+E2))	DCO=1.6 *3* E_γ: 1270.1.
1274.5 *4*	8.0 *8*	9766.4	(45/2$^+$)	8491.9	(41/2$^+$)	(E2)	DCO=2.2 *2* E_γ: 1275.4.
1340.3 *4*	1.0 *5*	12424.4	(51/2$^+$)	11084.1	(49/2$^+$)		E_γ: 1341.2.
1387.4 *4*	4.0 *4*	11511.3	(49/2$^+$)	10123.9	(47/2$^+$)		E_γ: 1388.3.
1390.1 *4*	16.0 *16*	7641.4	(39/2$^+$)	6251.3	(35/2$^+$)	(E2)	DCO=2.1 *2* E_γ: 1391.0.
1418.3 *4*	1.0 *5*	10625.5	(47/2$^+$)	9207.2	(45/2$^+$)		E_γ: 1419.2.
1456.4 *4*	1.0 *5*	12747.3	(53/2$^+$)	11290.9	(51/2$^+$)		E_γ: 1457.3.
1478.1 *4*	1.0 *5*	12562.2	(51/2$^+$)	11084.1	(49/2$^+$)		E_γ: 1479.1.
1480.2 *4*	7.0 *7*	6133.1	(31/2$^+$)	4652.9	(27/2$^+$)	(E2)	DCO=2.2 *3* E_γ: 1481.2.
1522.0 *10*	≤1	16090.8		14568.8			E_γ: 1523.
1566.0 *10*	≤1	16134.8		14568.8			E_γ: 1567.
1600 *1*	17.0 *17*	8491.9	(41/2$^+$)	6892.8	(37/2$^+$)	(E2)	DCO=1.9 *2* E_γ: 1601.
1619.0 *10*	≤1	14568.8		12949.8			E_γ: 1620.
1625.0 *1*	1.0 *5*	10832.2	(47/2$^+$)	9207.2	(45/2$^+$)		E_γ: 1626.
1637.0 *10*	6.0 *6*	10128.9	(43/2$^+$)	8491.9	(41/2$^+$)		E_γ: 1638.
1652.0 *10*	1.0 *5*	10123.9	(47/2$^+$)	8471.2	(43/2$^+$)		E_γ: 1653.
1793.9	1.0 *5*	15050.5		13256.6	(53/2$^+$)		E_γ: 1795.
1843.9 *10*	1.0 *5*	8624.1	(41/2$^+$)	6780.2	(37/2$^+$)		E_γ: 1845.
1877.8 *10*	1.0 *5*	11084.1	(49/2$^+$)	9207.2	(45/2$^+$)		E_γ: 1879.
1881.8 *10*	1.0 *5*	15212.8		13330.9	(51/2$^+$)		E_γ: 1883.
1899.8 *10*	≤1	12732.0		10832.2	(47/2$^+$)		E_γ: 1901.
2081.8 *10*	≤1	17294.6		15212.8			E_γ: 2083.
2151.7 *10*	1.0 *5*	15482.7		13330.9	(51/2$^+$)		E_γ: 2153.

[†] The Eγ values of 1998Kh01 are systematically higher than those In Adopted Levels, Gammas dataset. Listed here are Eγ values recalibrated by evaluator through linear regression on 193.53γ, 320.2γ, 421.55γ, 641.2γ, 646.47γ, 699.77γ, 777.44γ, 861.5γ, 878.80γ, 947.3γ set of Adopted Gammas, and 193.4γ, 320.4γ, 422.1γ, 642.6γ, 648.2γ, 699.9γ, 777.6γ, 862.4γ, 879.3γ, 947.4γ set of same γ's from 1998Kh01 (recal. Eγ=0.999518Eγ−0.245785); the original values of 1998Kh01 are given In comments.

[‡] From 1998Kh01 relative to Iγ(422γ)=100. For γ's having Iγ>6 ΔIγ=10%Iγ were adopted by evaluator (No values given by 1998Kh01 while they mention ΔIγ's less than 10% for these γ's); also ΔIγ=50%Iγ were adopted by evaluator for Iγ=1 γ's

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^{65}Cu(^{36}S,p3nγ) 1998Kh01,2000Kh02 (continued)

γ(^{97}Ru) (continued)

with Eγ>1400 keV. For all the other γ's 1998Kh01 list ΔIγ values, which are given In the table.

ADOPTED by evaluator based on DCO ratios reported by 1998Kh01, assuming (M1+E2) for D+Q, and (E2) for Q transitions respectively.

$^{65}Cu(^{36}S,p3n\gamma)$ 1998Kh01,2000Kh02

Level Scheme

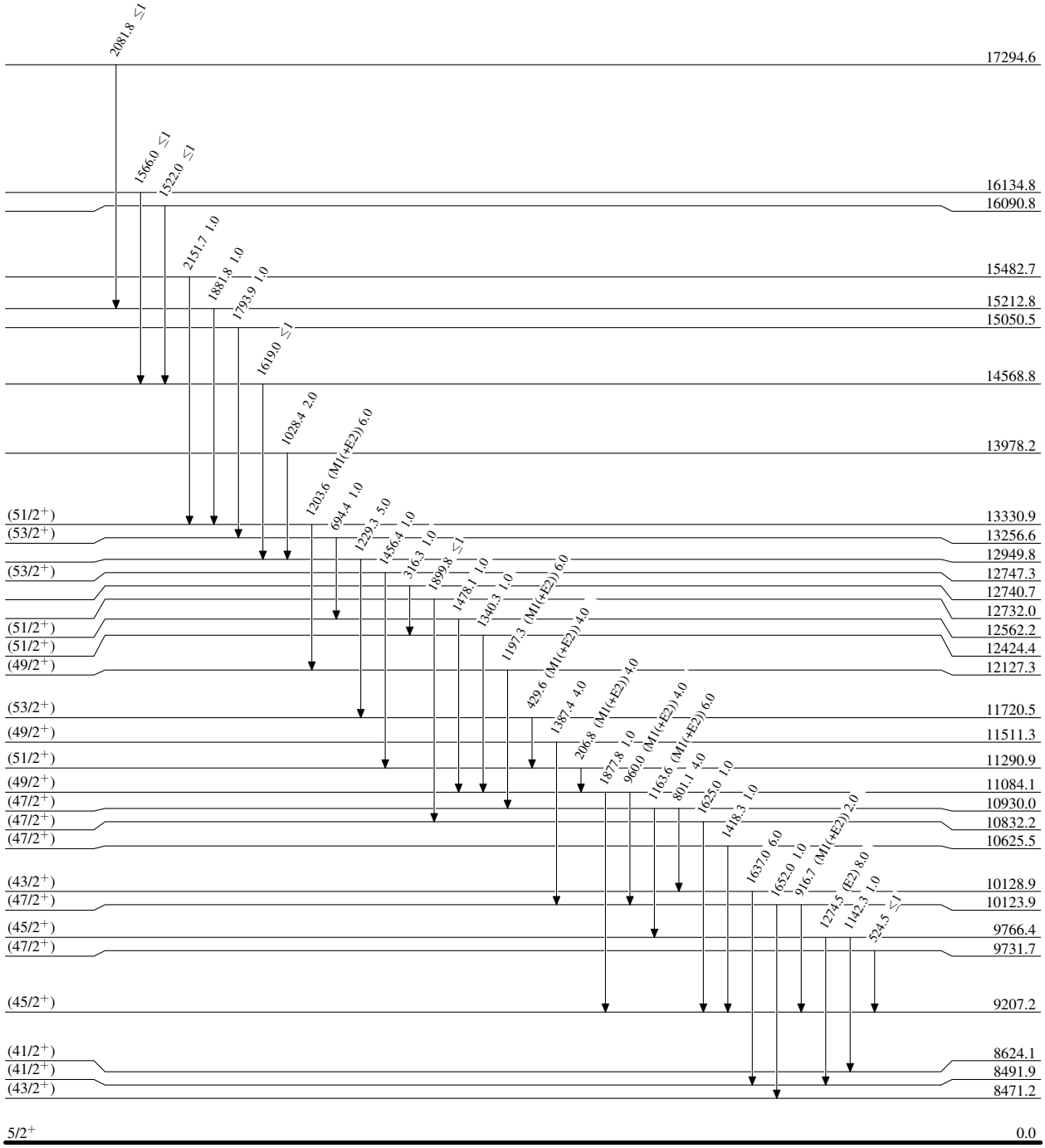
Intensities: Relative I_γ

Legend

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

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

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

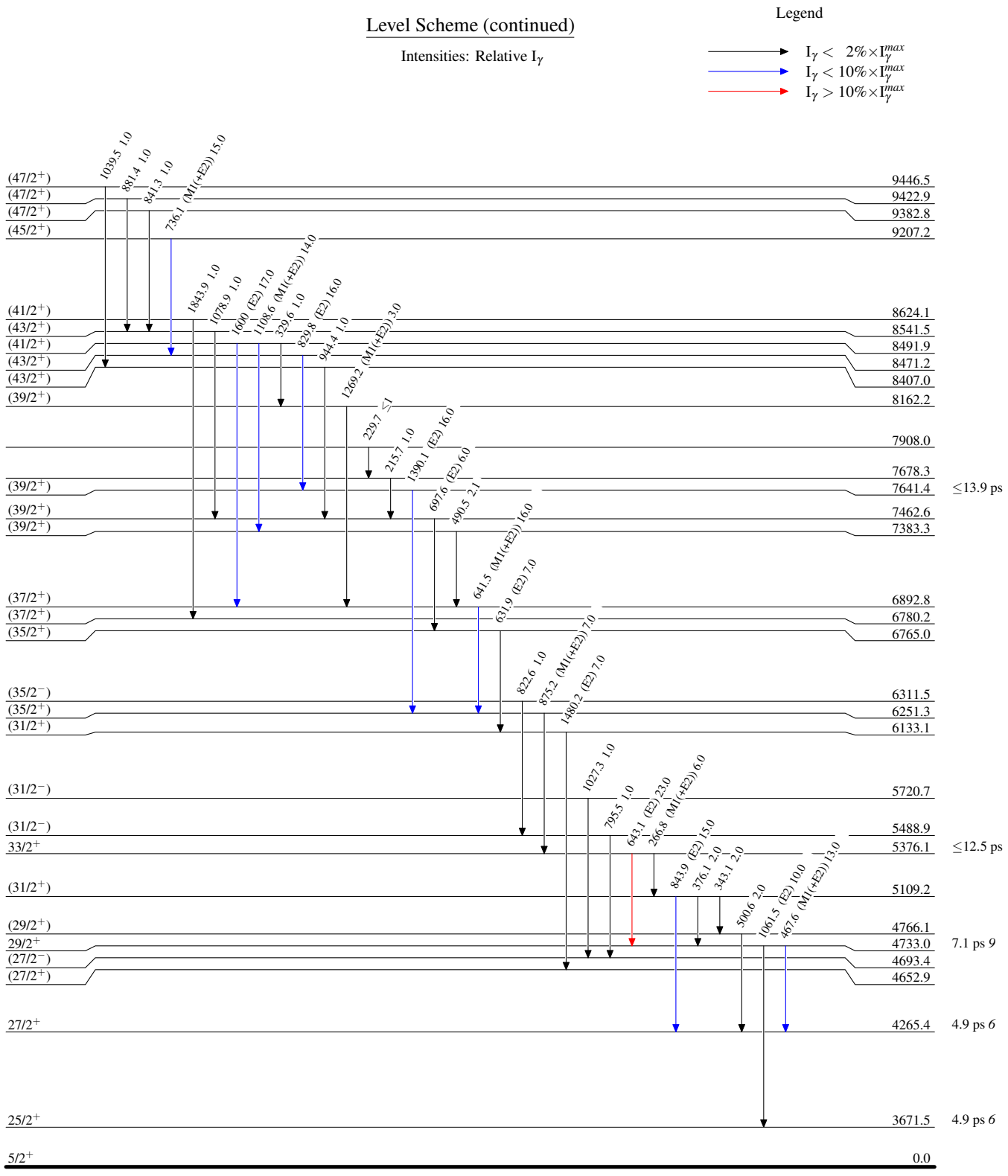


$^{97}_{44}Ru_{53}$

^{65}Cu(^{36}S,p3nγ) 1998Kh01,2000Kh02

Level Scheme (continued)

Intensities: Relative I_γ

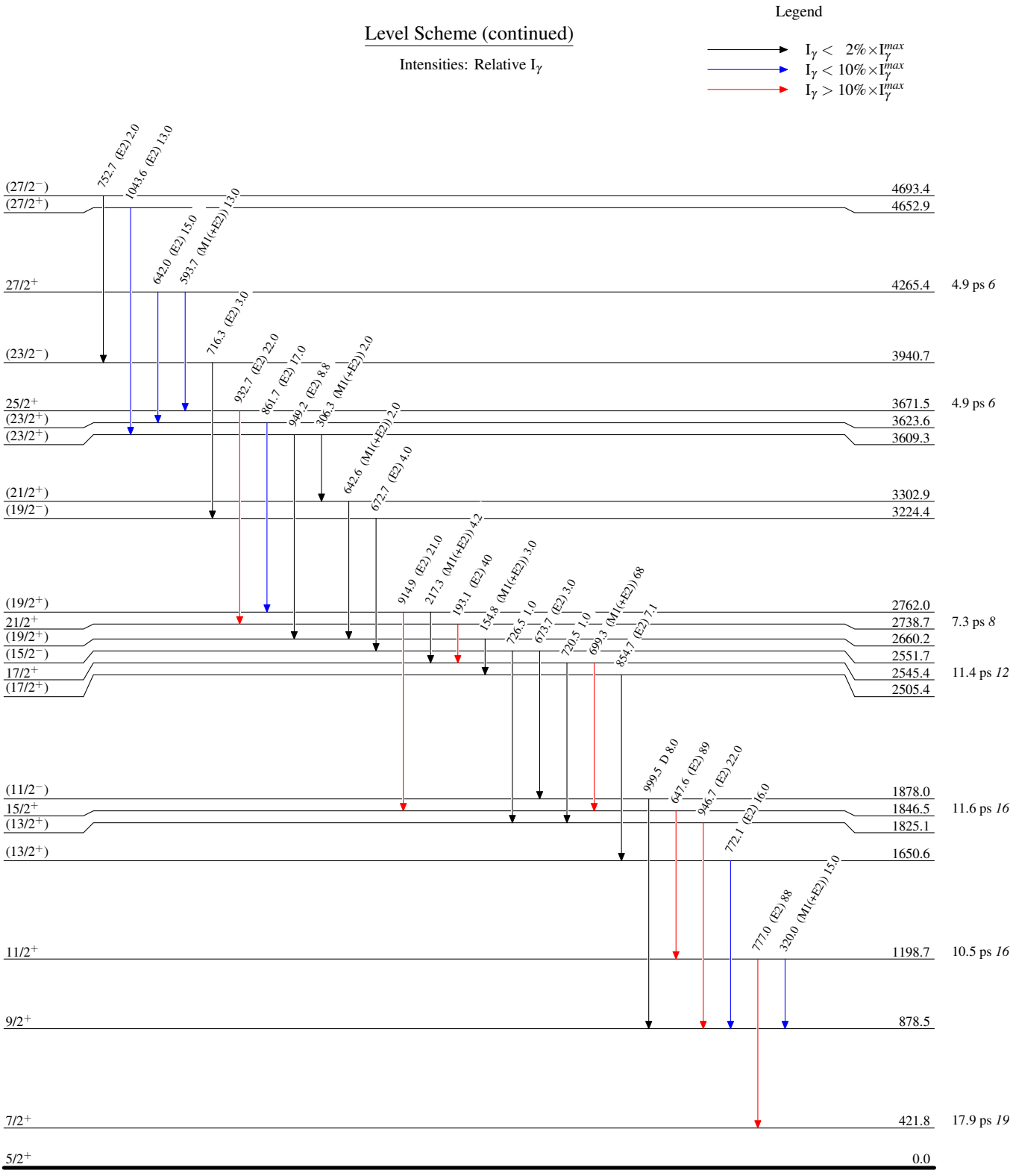


$^{97}_{44}Ru_{53}$

^{65}Cu(^{36}S,p3nγ) 1998Kh01,2000Kh02

Level Scheme (continued)

Intensities: Relative I_γ

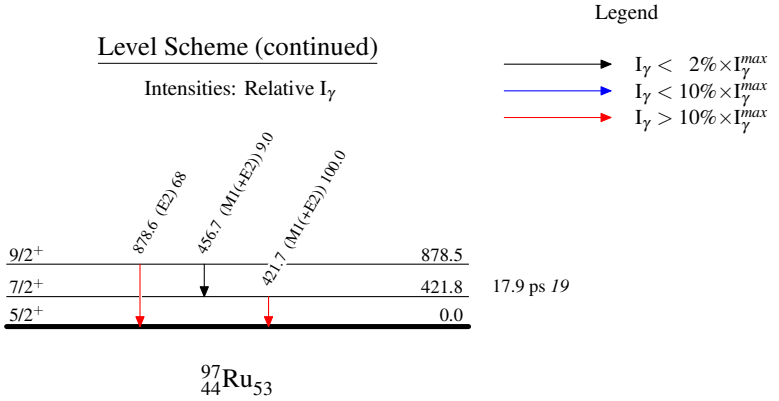


$^{97}_{44}Ru_{53}$

^{65}Cu(^{36}S,p3nγ) 1998Kh01,2000Kh02

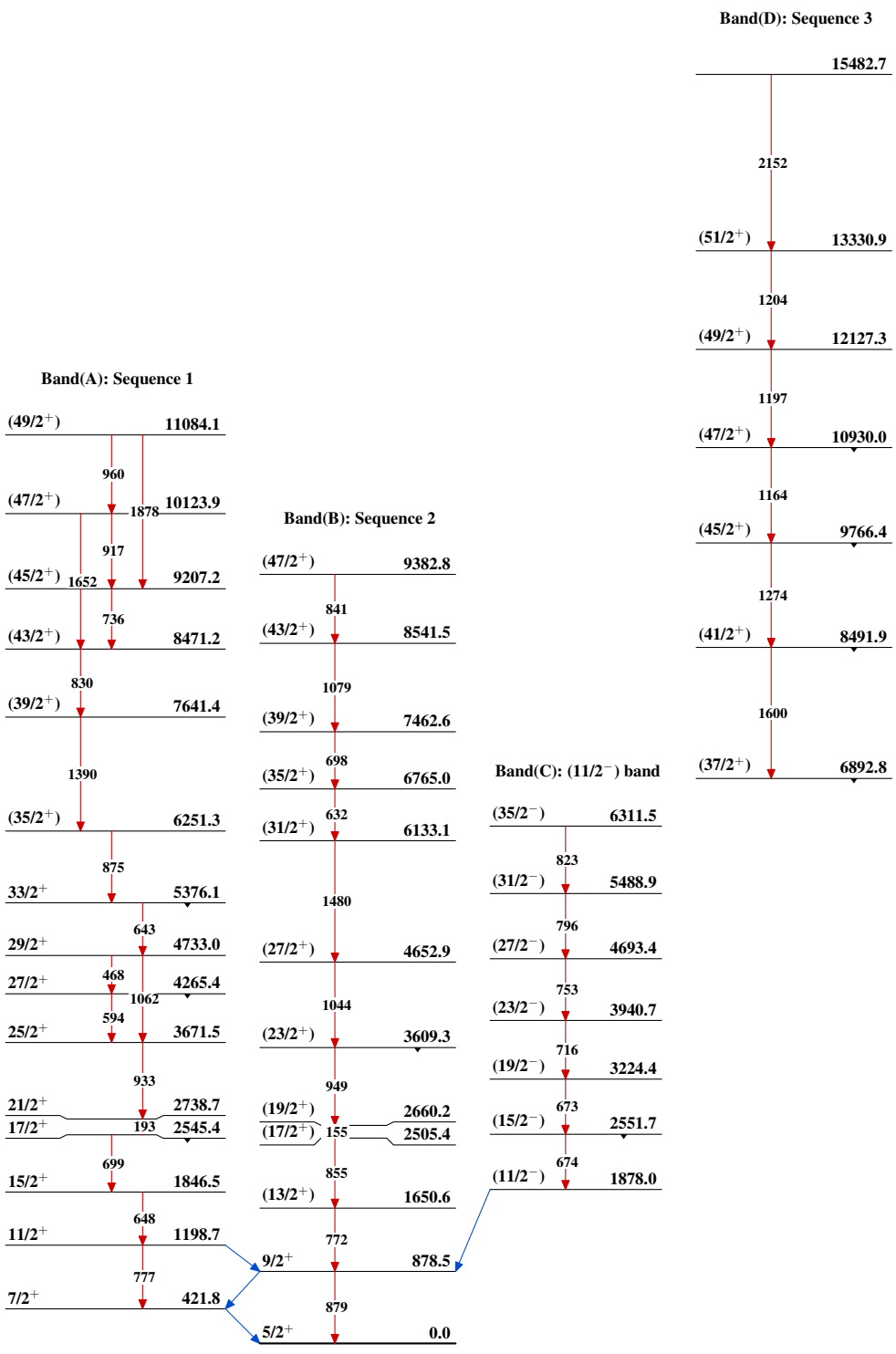
Level Scheme (continued)

Intensities: Relative I_γ



$^{97}_{44}Ru_{53}$

$^{65}Cu(^{36}S,p3n\gamma)$ 1998Kh01,2000Kh02



$^{97}_{44}Ru_{53}$