^{65}Cu(^{18}O,p3nγ) 1994Jo08

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh	NDS 135, 193 (2016)	31-May-2016

Includes ^{63}Cu(^{19}F,2pnγ) and ^{70}Ge(^{12}C,2pnγ) from 1982Pa20; ^{72}Ge(^{10}B,p2nγ) from 1980Cl04; ^{50}Ti(^{37}Cl,pα3nγ) from 1999SuZU.

1994Jo08: E=65 MeV. Measured Eγ, Iγ, $\gamma\gamma$, and $\gamma\gamma(\theta)$(DCO) using an array comprised of 9 Compton-suppressed HPGe detectors and a 28-element BGO sum energy and multiplicity filter.

Other heavy-ion in-beam γ-ray studies:

1982Pa20: ^{63}Cu(^{19}F,2pnγ),E=46-62 MeV; ^{70}Ge(^{12}C,2pnγ), E=33-48 MeV. Lifetime measurements using DSA and RDDS methods.

1981ClZZ, 1980Cl04: ^{72}Ge(^{10}B,p2nγ) E=40 MeV. Measured γ, $\gamma\gamma$, $\gamma(\theta)$. Only three levels reported.

1999SuZU: ^{50}Ti(^{37}Cl,pα3nγ) E=150 MeV. Measured γ, $\gamma\gamma$. The level scheme given by 1999SuZU is almost identical to that in 1994Jo08. Details of γ-ray energies, intensities, DCO ratios, etc. Are not available.

^{79}Kr Levels

E(level)[†]	J$^{\pi}$[‡]	T$_{1/2}$	Comments
0.0[c]	1/2$^-$		
129.48[@] *22*	7/2$^+$	50 s *3*	%IT=100 T$_{1/2}$: from Adopted Levels.
146.84[&] *21*	5/2$^-$		
148.6[#] *3*	9/2$^+$		
182.67[d] *15*	3/2$^-$		
401.75[c] *15*	5/2$^-$		
449.55[a] *20*	7/2$^-$		
694.52[d] *20*	7/2$^-$		
814.00[&] *22*	9/2$^-$		
896.62[@] *25*	11/2$^+$		
975.9[#] *3*	13/2$^+$	1.87 ps *21*	T$_{1/2}$: RDDS (1982Pa20).
1063.22[c] *21*	9/2$^-$		
1171.12[a] *23*	11/2$^-$		
1450.40[d] *25*	11/2$^-$		
1662.07[&] *24*	13/2$^-$		
1885.0[@] *3*	15/2$^+$		
1915.75[c] *24*	13/2$^-$		
2002.2[#] *3*	17/2$^+$	0.62 ps *21*	T$_{1/2}$: RDDS (1982Pa20).
2056.49[a] *25*	15/2$^-$		
2415.4[d] *11*	15/2$^-$		
2643.2[&] *3*	17/2$^-$		
2857.5[b] *4*	(17/2$^-$)		
2930.1[c] *4*	17/2$^-$		
2979.6[@] *3*	19/2$^+$		
3062.0[a] *3*	19/2$^-$		
3146.4[#] *4*	21/2$^+$	0.32 ps *11*	T$_{1/2}$: RDDS (1982PA20).
3214.1[b] *3*	19/2$^-$		
3382.4[d] *15*	(19/2$^-$)		
3585.1[b] *3*	21/2$^-$		
3619.3 *4*	21/2$^+$		
3655.4[&] *4*	21/2$^-$		

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^{65}Cu(^{18}O,p3nγ) 1994Jo08 (continued)

^{79}Kr Levels (continued)

E(level)[†]	Jπ[‡]	E(level)[†]	Jπ[‡]	E(level)[†]	Jπ[‡]	E(level)[†]	Jπ[‡]
3846.3[@] 4	23/2+	4658.0? 5	(25/2+)	5993.9[&] 21	(29/2−)	8401.0[#] 8	37/2+
4063?[c]	(21/2−)	4708.8[&] 5	25/2−	6250.4[@] 5	31/2+	9704[@] 4	(39/2+)
4087.5[a] 5	23/2−	4900.1[@] 4	27/2+	6446.2[a] 11	(31/2−)	10040.0[#] 22	41/2+
4132.8[b] 5	23/2−	5164.8[a] 7	27/2−	6891.0[#] 5	33/2+	11822[@] 4	(45/2+)
4300.1[#] 4	25/2+	5524.3[#] 4	29/2+	7903.9[@] 8	35/2+		

[†] From least-squares fit to Eγ data.
[‡] As proposed by 1994Jo08, based on γγ(θ)(DCO) data, expectation that near yrast states are populated, and systematics of rotational bands.
[#] Band(A): Yrast Band,α=+1/2.
[@] Band(a): Yrast Band,α=−1/2.
[&] Band(B): Band based on 5/2−,α=+1/2.
[a] Band(b): Band based on 5/2−,α=−1/2.
[b] Band(C): Sequence based on (17/2−).
[c] Band(D): Band based on 1/2−,α=+1/2.
[d] Band(d): Band based on 1/2−,α=−1/2.

γ(^{79}Kr)

Eγ	Iγ[†]	Ei(level)	Jπi	Ef	Jπf	Mult.	Comments
19.1 1		148.6	9/2+	129.48	7/2+		Eγ: from Adopted Gammas.
79.3 8	1.0 5	975.9	13/2+	896.62	11/2+		
117.1 4	1.0 5	2002.2	17/2+	1885.0	15/2+		
129.4 4		129.48	7/2+	0.0	1/2−	E3	Mult.: from Adopted Gammas.
146.7 3		146.84	5/2−	0.0	1/2−		
166.6 3	2 1	3146.4	21/2+	2979.6	19/2+		
182.7 2	47 4	182.67	3/2−	0.0	1/2−		
219.0 2	23 2	401.75	5/2−	182.67	3/2−		DCO=0.86 13
227.1 3	2 1	3846.3	23/2+	3619.3	21/2+		
267.0 3	3 1	449.55	7/2−	182.67	3/2−		
283.9 3	2 1	3214.1	19/2−	2930.1	17/2−		
292.7 2	12 2	694.52	7/2−	401.75	5/2−		DCO=0.86 9
302.6 2	52 4	449.55	7/2−	146.84	5/2−		DCO=0.98 4
320.0 2	20 2	449.55	7/2−	129.48	7/2+		DCO=1.13 4
356.5 3	2 1	3214.1	19/2−	2857.5	(17/2−)		
356.8 3	2 1	1171.12	11/2−	814.00	9/2−		
357.7 4	7 3	4658.0?	(25/2+)	4300.1	25/2+		DCO=0.76 10
364.1 3	4 1	814.00	9/2−	449.55	7/2−		
368.6 4	3 1	1063.22	9/2−	694.52	7/2−		
371.0 2	8 2	3585.1	21/2−	3214.1	19/2−		DCO=0.52 2
386.9 4	1.0 5	1450.40	11/2−	1063.22	9/2−		
394.4 3	1.0 5	2056.49	15/2−	1662.07	13/2−		
401.8 2	24 4	401.75	5/2−	0.0	1/2−		DCO=0.82 8
453.8 3	13 2	4300.1	25/2+	3846.3	23/2+		DCO=0.55 9
464.9 6	1.0 4	1915.75	13/2−	1450.40	11/2−		
473.0 2	5 1	3619.3	21/2+	3146.4	21/2+		
490.5 3	1.0 5	1662.07	13/2−	1171.12	11/2−		
497.1 4	2 1	8401.0	37/2+	7903.9	35/2+		DCO=1.5 4
502.5 4	2 1	4087.5	23/2−	3585.1	21/2−		

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^{65}Cu(^{18}O,p3nγ) 1994Jo08 (continued)

γ(^{79}Kr) (continued)

E_γ	I_γ[†]	E_i(level)	J^π_i	E_f	J^π_f	Comments
512.0 3	15 2	694.52	7/2⁻	182.67	3/2⁻	DCO=0.61 12
547.7 4	3 1	4132.8	23/2⁻	3585.1	21/2⁻	
570.9 4	2 1	3214.1	19/2⁻	2643.2	17/2⁻	
587.1 6	2 1	2643.2	17/2⁻	2056.49	15/2⁻	
600.0 2	17 2	4900.1	27/2⁺	4300.1	25/2⁺	DCO=0.51 4
613.5 7	1.0 4	1063.22	9/2⁻	449.55	7/2⁻	
624.3 2	15 2	5524.3	29/2⁺	4900.1	27/2⁺	DCO=0.52 9
640.6 2	9 2	6891.0	33/2⁺	6250.4	31/2⁺	DCO=0.47 8
654.9 4	4 1	3585.1	21/2⁻	2930.1	17/2⁻	
661.5 2	17 1	1063.22	9/2⁻	401.75	5/2⁻	DCO=1.28 9
667.2 2	46 3	814.00	9/2⁻	146.84	5/2⁻	DCO=0.99 6
684.5 2	6 1	814.00	9/2⁻	129.48	7/2⁺	
700.0 2	28 1	3846.3	23/2⁺	3146.4	21/2⁺	DCO=0.50 7
721.6 2	45 2	1171.12	11/2⁻	449.55	7/2⁻	DCO=0.99 4
726.0 4	6 1	6250.4	31/2⁺	5524.3	29/2⁺	
744.2 6	1.0 4	1915.75	13/2⁻	1171.12	11/2⁻	
748.0 2	25 5	896.62	11/2⁺	148.6	9/2⁺	
755.9 2	10 1	1450.40	11/2⁻	694.52	7/2⁻	DCO=0.97 4
758.3 3	2 1	2643.2	17/2⁻	1885.0	15/2⁺	
765.7 3	3 1	1662.07	13/2⁻	896.62	11/2⁺	
767.2 2	5 3	896.62	11/2⁺	129.48	7/2⁺	
800.7 6	2 1	2857.5	(17/2⁻)	2056.49	15/2⁻	
811.9 5	2 1	4658.0?	(25/2⁺)	3846.3	23/2⁺	DCO=0.67 26
827.3 2	100.0 5	975.9	13/2⁺	148.6	9/2⁺	DCO=1.05 5
848.1 2	40 4	1662.07	13/2⁻	814.00	9/2⁻	DCO=1.02 5
852.6 2	13 2	1915.75	13/2⁻	1063.22	9/2⁻	DCO=1.16 10
867.1 4	5 1	3846.3	23/2⁺	2979.6	19/2⁺	DCO=1.01 16
885.5 2	41 4	2056.49	15/2⁻	1171.12	11/2⁻	DCO=0.96 6
909.2 2	8 3	1885.0	15/2⁺	975.9	13/2⁺	DCO=0.30 12
941.8 4	6 1	2857.5	(17/2⁻)	1915.75	13/2⁻	
941.8 5	5 1	3585.1	21/2⁻	2643.2	17/2⁻	
965 1	5 2	2415.4	15/2⁻	1450.40	11/2⁻	
967 1	2 1	3382.4	(19/2⁻)	2415.4	15/2⁻	
977.3 2	10 2	2979.6	19/2⁺	2002.2	17/2⁺	
981.1 2	35 3	2643.2	17/2⁻	1662.07	13/2⁻	DCO=1.05 6
988.3 2	7 3	1885.0	15/2⁺	896.62	11/2⁺	
1005.5 2	29 2	3062.0	19/2⁻	2056.49	15/2⁻	DCO=1.07 7
1012.2 3	26 4	3655.4	21/2⁻	2643.2	17/2⁻	
(1013)	<1	7903.9	35/2⁺	6891.0	33/2⁺	
1014.2 4	7 3	2930.1	17/2⁻	1915.75	13/2⁻	
1025.4 6	13 3	4087.5	23/2⁻	3062.0	19/2⁻	DCO=1.06 11
1026.3 2	95 1	2002.2	17/2⁺	975.9	13/2⁺	DCO=0.98 8
1053.4 3	12 1	4708.8	25/2⁻	3655.4	21/2⁻	DCO=1.02 13
1053.9 3	10 2	4900.1	27/2⁺	3846.3	23/2⁺	DCO=0.98 6
1060.1 8	1.0 7	3062.0	19/2⁻	2002.2	17/2⁺	
1077.3 5	9 1	5164.8	27/2⁻	4087.5	23/2⁻	DCO=1.06 4
1079.7 6	7 2	2056.49	15/2⁻	975.9	13/2⁺	
1094.6 2	6 2	2979.6	19/2⁺	1885.0	15/2⁺	
1133[‡] 1	2 1	4063?	(21/2⁻)	2930.1	17/2⁻	
1144.2 2	68 1	3146.4	21/2⁺	2002.2	17/2⁺	DCO=1.02 7
1153.5 2	30 2	4300.1	25/2⁺	3146.4	21/2⁺	DCO=1.05 8
1157.7 3	15 2	3214.1	19/2⁻	2056.49	15/2⁻	DCO=1.07 5
1224.0 3	11 2	5524.3	29/2⁺	4300.1	25/2⁺	DCO=1.00 5
1281.4 8	6 1	6446.2	(31/2⁻)	5164.8	27/2⁻	DCO=1.25 14
1285 2	5 2	5993.9	(29/2⁻)	4708.8	25/2⁻	

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^{65}Cu(^{18}O,p3nγ) 1994Jo08 (continued)

γ(^{79}Kr) (continued)

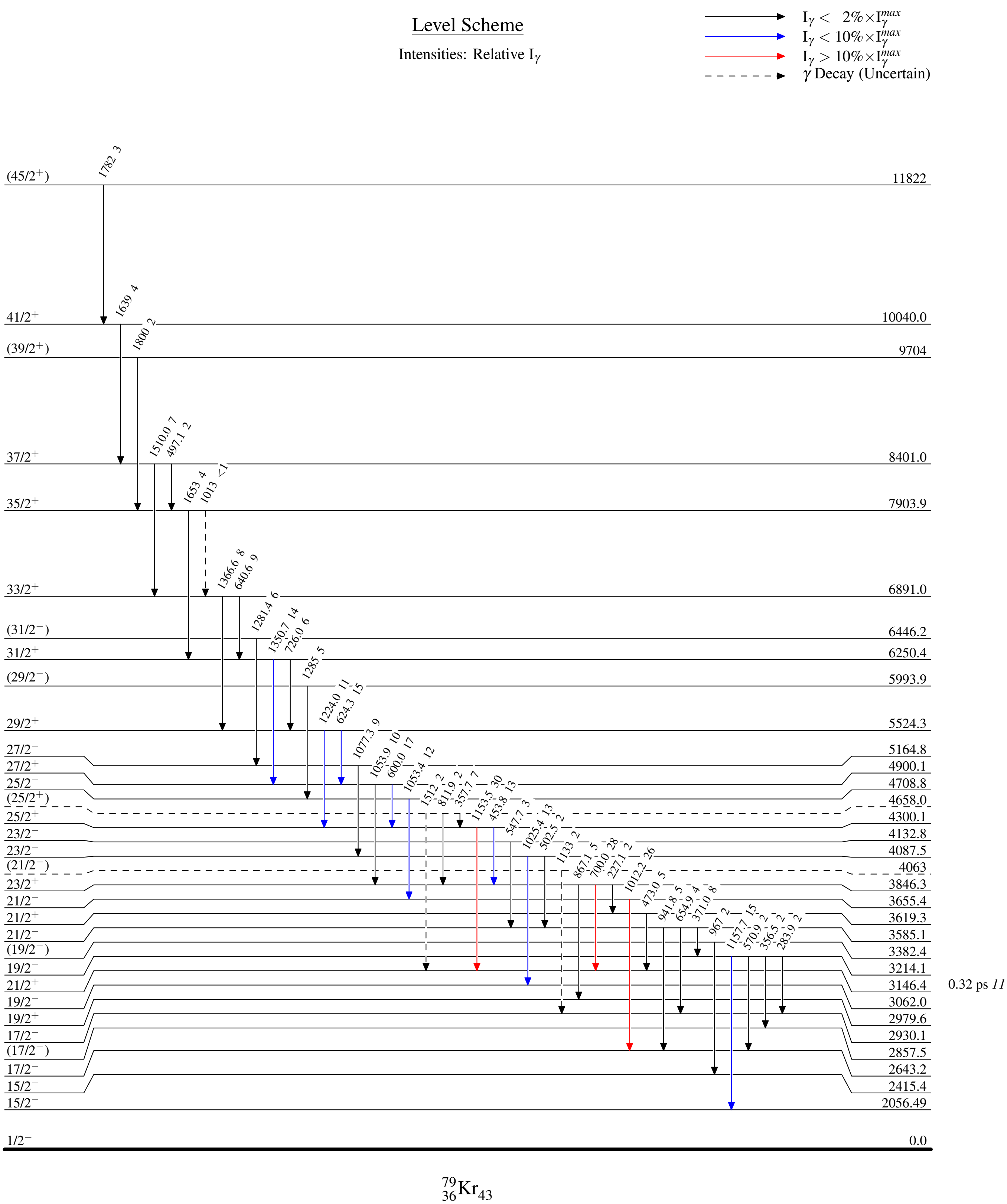
E_γ	I_γ †	E_i(level)	J^π_i	E_f	J^π_f	Comments
1350.7 *5*	14 *2*	6250.4	31/2+	4900.1	27/2+	DCO=0.99 *5*
1366.6 *5*	8 *2*	6891.0	33/2+	5524.3	29/2+	DCO=1.01 *5*
1510.0 *8*	7 *2*	8401.0	37/2+	6891.0	33/2+	DCO=0.97 *6*
1512‡ *1*	2 *1*	4658.0?	(25/2+)	3146.4	21/2+	
1639 *2*	4 *1*	10040.0	41/2+	8401.0	37/2+	DCO=1.06 *8*
1653 *2*	4 *1*	7903.9	35/2+	6250.4	31/2+	DCO=0.97 *10*
1782 *3*	3 *1*	11822	(45/2+)	10040.0	41/2+	
1800 *4*	2 *1*	9704	(39/2+)	7903.9	35/2+	

† 1994Jo08 also list branching ratios from each level, which in most cases appear to be deduced from the listed relative intensities.
‡ Placement of transition in the level scheme is uncertain.

^{65}Cu(^{18}O,p3nγ) 1994Jo08

Level Scheme

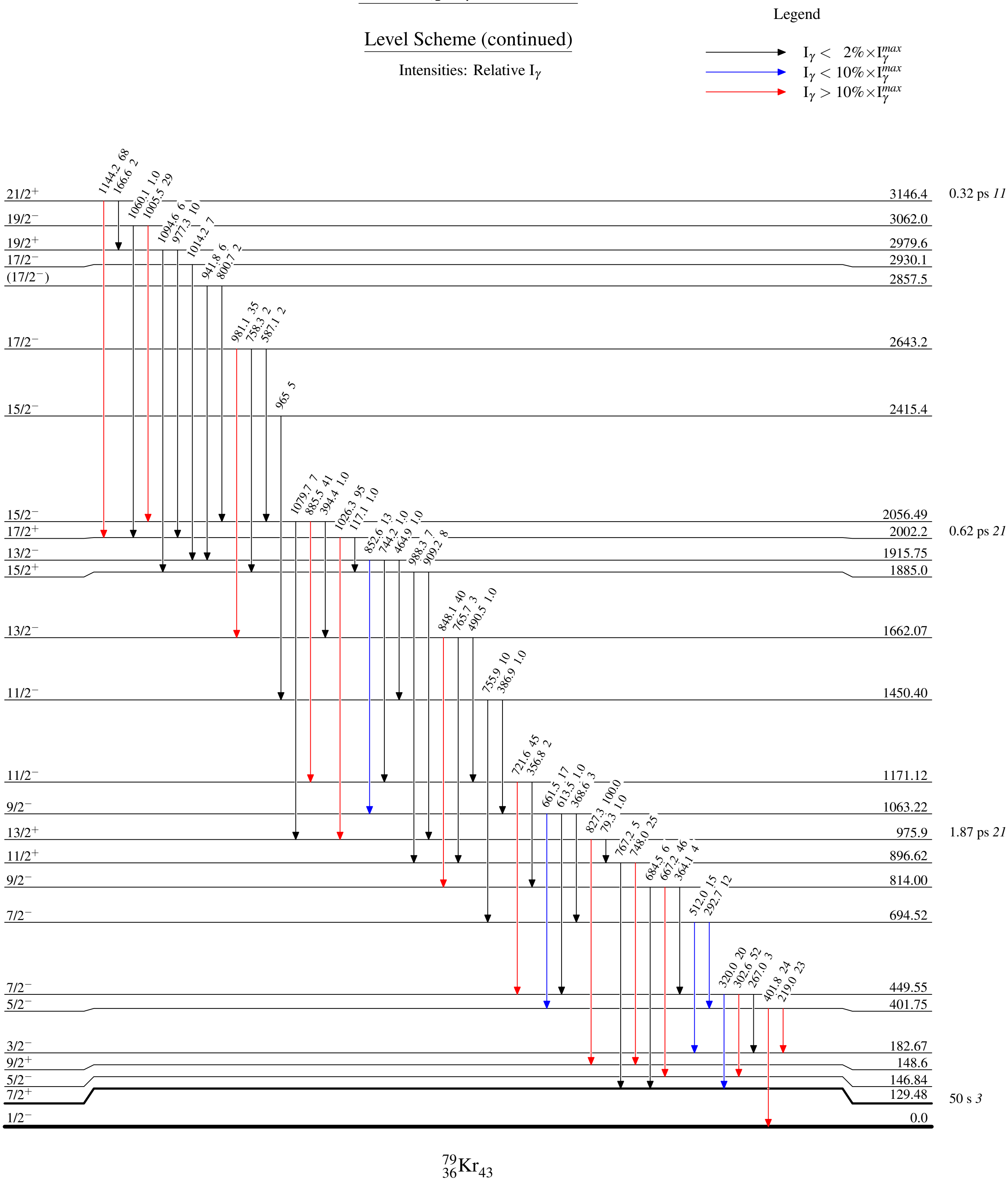
Intensities: Relative I_γ



$^{65}Cu(^{18}O,p3n\gamma)$ 1994Jo08

Level Scheme (continued)

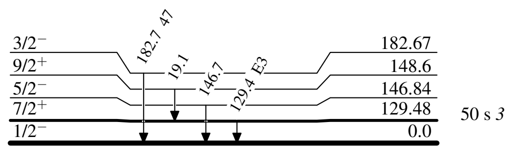
Intensities: Relative I_γ



^{65}Cu(^{18}O,p3nγ) 1994Jo08

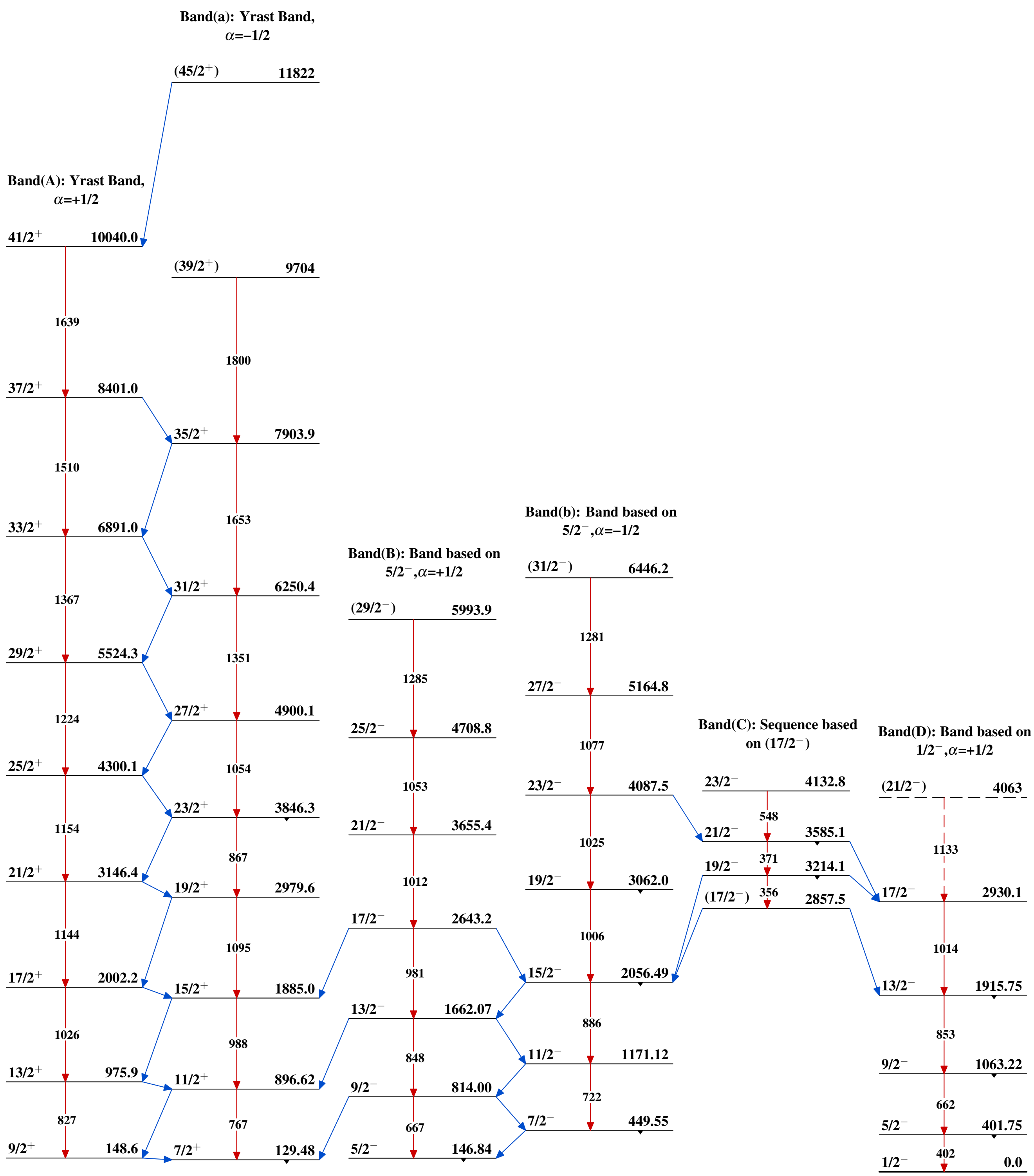
Level Scheme (continued)

Intensities: Relative I_γ



$^{79}_{36}Kr_{43}$

$^{65}Cu(^{18}O,p3n\gamma)$ 1994Jo08



$^{79}_{36}Kr_{43}$

$^{65}Cu(^{18}O,p3n\gamma)$ 1994Jo08 (continued)