^{65}Cu(^{18}O,p2nγ),^{65}Cu(^{19}F,2p2nγ) 1995Do15,2001Mu25,1981Fu03

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh	NDS 105, 223 (2005)	22-Jun-2005

Includes ^{50}Ti(^{37}Cl,AP2NG) reaction.

1995Do15: ^{65}Cu(^{18}O,p2nγ) E=65 MeV. Measured Eγ, Iγ, $\gamma\gamma$ and $\gamma\gamma(\theta)$(DCO) using Pitt-FSU array comprised of 90 high purity Compton-suppressed Ge detectors and a 28-element Bismuth Germanate multiplicity filter. PGe detectors.

2001Mu25 (also 2001Ja17): ^{65}Cu(^{19}F,2p2nγ) E=74 MeV. Measured lifetimes by DSA method using three Clovers and one HPGe detector, all with anti-Compton shields.

1981Fu03: ^{65}Cu(^{18}O,p2nγ) E=46 MeV. Measured γ, $T_{1/2}$ (RDM). All the results from this paper are given in ^{78}Se(α,2nγ), ^{80}Se(α,4nγ) dataset.

Others:

1999SuZU: ^{50}Ti(^{37}Cl,PA2NG) E=150 MeV. Measured Eγ, Iγ, $\gamma\gamma$ with GEMINI array of 11 BGO anti-Compton suppressed Ge detectors and Si ball of 21 detector segments for charged-particle detection. The level scheme given by 1999SuZU agrees with that presented here from 1995Do15 with the exception of four additional levels.

1975Fr04: ^{65}Cu(^{18}O,p2nγ) E=52.5 MeV. Measured γ, $T_{1/2}$ (RDM and DSA method).

1975We23: ^{65}Cu(^{16}O,p) yield measurement through 617γ.

^{80}Kr Levels

E(level)[†]	J$^\pi$	$T_{1/2}$[‡]	Comments
0.0[@]	0^+		
616.78[@] *18*	2^+	8.3 ps *7*	$T_{1/2}$: other: 8.8 ps *5* (RDM,1975Fr04).
1256.56[e] *20*	2^+		
1436.49[@] *22*	4^+	1.7 ps *2*	$T_{1/2}$: from DSAM and RDM (1975Fr04).
1788.43[e] *21*	3^+		
2146.39[e] *23*	4^+		
2392.73[@] *24*	6^+	0.34 ps *+12−8*	$T_{1/2}$: other: 0.52 ps *14* (DSAM,1975Fr04).
2439.8[a] *4*	3^-		
2660.26[e] *25*	5^+		
2793.62[d] *25*	4^-		
2860.18[a] *25*	5^-		
3040.5 *3*	(5^-)		
3042.20[d] *24*	6^-		
3110.9[e] *3*	6^+		
3173.5 *3*	(5^-)		
3346.5[c] *3*	6^-		
3410.9[@] *3*	8^+	0.30 ps *+6−5*	$T_{1/2}$: other: 0.4 ps (DSAM,1975Fr04).
3488.7 *4*	6^-		
3531.0 *3*	7^-		
3559.3[a] *3*	7^-		
3582.7[b] *3*	7^-		
3635.8[e] *5*	7^+		
3700.7[&] *4*	8^+		
3917.5 *5*	(8^+)		
4040.7?[#] *10*	(8^+)		
4127.2[c] *4*			
4163.9[d] *4*	(8^-)		
4379.0[&] *4*	10^+	0.40 ps *+8−7*	
4394.7[a] *3*	9^-		
4563.5[b] *3*	9^-		

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^{65}Cu(^{18}O,p2nγ),^{65}Cu(^{19}F,2p2nγ) 1995Do15,2001Mu25,1981Fu03 (continued)

^{80}Kr Levels (continued)

E(level)[†]	Jπ	$T_{1/2}$[‡]	E(level)[†]	Jπ	$T_{1/2}$[‡]
4650.1[@] *4*	10^+		6523.2[a] *6*	13^-	
4752.9?[#] *10*	(9^+)		6682.9[&] *6*	14^+	0.18 ps *+6−5*
4976.2 *6*	(10^+)		7222.9[@] *9*	14^+	
5160.2[c] *5*	(10^-)		7638.9?[#] *10*	(13^+)	
5375.3[d] *5*	(10^-)		7772.0[a] *9*	15^-	
5398.4[a] *5*	11^-		8089.4[&] *9*	16^+	0.21 ps *8*
5439.3[&] *5*	12^+	0.23 ps *+4−5*	8566?[@]	(16^+)	
5666.5[b] *5*	(11^-)		9196.2[a] *11*	(17^-)	
5891.2[@] *5*	12^+		9692.0[&] *11*	18^+	0.12 ps *5*
6182.4[c] *6*	(12^-)		10845.2[a] *15*	(19^-)	
6195.9?[#] *10*	(11^+)		11485.0[&] *23*	20^+	<0.10 ps

[†] From least-squares fit to Eγ′s.
[‡] From DSAM in (^{19}F,2p2nγ) (2001Mu25), unless otherwise stated. See also ^{78}Se(α,2nγ),^{80}Se(α,4nγ) dataset for lifetime measurements for many levels by DSAM and RDM in several reactions (1981Fu03).
[#] From 1999SuZU only, treated As tentative by the evaluator.
[@] Band(A): g.s. band.
[&] Band(B): band based on 8^+.
[a] Band(C): 3^- (octupole) band.
[b] Band(D): γ cascade based on 7^-.
[c] Band(E): γ cascade based on 6^-.
[d] Band(F): γ cascade based on 4^-.
[e] Band(G): γ band.

γ(^{80}Kr)

E_γ[†]	I_γ[†]	E_i(level)	J_i^π	E_f	J_f^π	Mult.	Comments
182.1 *2*	5 *1*	3042.20	6^-	2860.18	5^-		DCO=1.13 *10*.
216.8[#] *4*	1	3917.5	(8^+)	3700.7	8^+		
248.5 *2*	5 *1*	3042.20	6^-	2793.62	4^-	Q	DCO=1.04 *11*. Additional information 17.
271.1 *2*	3 *1*	4650.1	10^+	4379.0	10^+	D	DCO=1.21 *13*; ; ΔJ=0 transition. Additional information 30.
289.8 *2*	4 *1*	3700.7	8^+	3410.9	8^+	D	DCO=1.24 *10*; ΔJ=0, dipole transition. Additional information 25.
313.3 *2*	1	3173.5	(5^-)	2860.18	5^-		
326[#] *1*	<1	4976.2	(10^+)	4650.1	10^+		
351.9 *2*	1	1788.43	3^+	1436.49	4^+		Additional information 5.
353.7 *3*	1	2793.62	4^-	2439.8	3^-		
381.8 *3*	1	3042.20	6^-	2660.26	5^+		
420.1 *3*	1	3531.0	7^-	3110.9	6^+		Additional information 20.
420.3 *4*	1	2860.18	5^-	2439.8	3^-		Additional information 14.
436.1[#] *4*	<1	4563.5	9^-	4127.2			
452.0 *5*	2 *1*	5891.2	12^+	5439.3	12^+		
486.2 *3*	1	3346.5	6^-	2860.18	5^-		
488.8 *2*	6 *1*	3531.0	7^-	3042.20	6^-	D	DCO=0.40 *10*. Additional information 21.

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^{65}Cu(^{18}O,p2nγ),^{65}Cu(^{19}F,2p2nγ) 1995Do15,2001Mu25,1981Fu03 (continued)

γ(^{80}Kr) (continued)

E_γ †	I_γ †	E_i(level)	J_i^π	E_f	J_f^π	Mult.	Comments
490.5 *4*	<1	3531.0	7^-	3040.5	(5^-)		
507# *1*	<1	3917.5	(8^+)	3410.9	8^+		
517.0 *2*	7 *1*	3559.3	7^-	3042.20	6^-	D	DCO=0.39 *8*.
531.8 *2*	4 *1*	1788.43	3^+	1256.56	2^+		Additional information 6.
553 *1*	<1	3346.5	6^-	2793.62	4^-		
582 *1*	1	4163.9	(8^-)	3582.7	7^-		
596.1 *4*	1	4127.2		3531.0	7^-		
597# *1*	<1	4976.2	(10^+)	4379.0	10^+		
616.8 *2*	100	616.78	2^+	0.0	0^+	E2	DCO=1.01 *4*. Additional information 1.
628.4 *3*	1	3488.7	6^-	2860.18	5^-		
632.7 *3*	1	4163.9	(8^-)	3531.0	7^-		
639.8 *2*	6 *1*	1256.56	2^+	616.78	2^+		DCO=1.04 *5*. Additional information 2.
647.3 *3*	1	2793.62	4^-	2146.39	4^+		
647.7 *3*	1	3040.5	(5^-)	2392.73	6^+		
649.6 *3*	1	3042.20	6^-	2392.73	6^+		
678.3 *3*	1	4379.0	10^+	3700.7	8^+		
686.2 *3*	3 *1*	3346.5	6^-	2660.26	5^+	D	DCO=0.57 *9*. Additional information 18.
695.1 *4*	1	3488.7	6^-	2793.62	4^-		
699.2 *3*	2 *1*	3559.3	7^-	2860.18	5^-		
709.9 *3*	2 *1*	2146.39	4^+	1436.49	4^+		Additional information 8.
718.1 *4*	<1	3110.9	6^+	2392.73	6^+		
722.4 *3*	4 *1*	3582.7	7^-	2860.18	5^-	Q	DCO=1.06 *9*. Additional information 22.
780.7 *3*	1	3173.5	(5^-)	2392.73	6^+		
780.7 *3*	4 *1*	4127.2		3346.5	6^-		
811.8 *3*	4 *1*	4394.7	9^-	3582.7	7^-	Q	DCO=1.13 *9*.
819.8 *2*	79 *3*	1436.49	4^+	616.78	2^+	E2	DCO=1.03 *4*. Additional information 4.
835.4 *3*	7 *1*	4394.7	9^-	3559.3	7^-	Q	DCO=1.07 *14*. Additional information 28.
863.6 *3*	5 *1*	4394.7	9^-	3531.0	7^-	(Q)	DCO=0.92 *14*. Additional information 29.
871.7 *2*	3 *1*	2660.26	5^+	1788.43	3^+		Additional information 12.
889.9 *2*	4 *1*	2146.39	4^+	1256.56	2^+		Additional information 9.
894.2 *3*	2 *1*	3040.5	(5^-)	2146.39	4^+		Additional information 16.
949.4 *3*	4 *2*	4650.1	10^+	3700.7	8^+		
954 *1*	1	3346.5	6^-	2392.73	6^+		
956.3 *2*	71 *3*	2392.73	6^+	1436.49	4^+	E2	DCO=1.03 *4*. Additional information 10.
964.5 *3*	3 *1*	3110.9	6^+	2146.39	4^+		DCO=0.9 *4*.
968.0 *2*	40 *2*	4379.0	10^+	3410.9	8^+	E2	DCO=1.03 *4*. Additional information 27.
975.5 *4*	1	3635.8	7^+	2660.26	5^+		Additional information 24.
980.8 *3*	4 *1*	4563.5	9^-	3582.7	7^-		
984.1 *4*	1	4394.7	9^-	3410.9	8^+		
1003.7 *3*	12 *2*	5398.4	11^-	4394.7	9^-	Q	DCO=1.61 *10*.
1005.1 *3*	10 *2*	2793.62	4^-	1788.43	3^+		Additional information 13.
1018.2 *2*	58 *3*	3410.9	8^+	2392.73	6^+	E2	DCO=1.03 *4*. Additional information 19.
1022.2 *4*	1	6182.4	(12^-)	5160.2	(10^-)		
1033.0# *4*	2 *1*	4563.5	9^-	3531.0	7^-		
1033.0 *3*	4 *1*	5160.2	(10^-)	4127.2			

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^{65}Cu(^{18}O,p2nγ),^{65}Cu(^{19}F,2p2nγ) 1995Do15,2001Mu25,1981Fu03 (continued)

γ(^{80}Kr) (continued)

E_γ †	I_γ †	E_i(level)	J_i^π	E_f	J_f^π	Mult.	Comments
1060.3 *3*	32 *3*	5439.3	12^+	4379.0	10^+	E2	DCO=1.05 *6*. Additional information 32.
1096.1 *5*	<1	3488.7	6^-	2392.73	6^+		
1103.0 *3*	3 *1*	5666.5	(11^-)	4563.5	9^-		
1121.8 *3*	3 *1*	4163.9	(8^-)	3042.20	6^-		Additional information 26.
1124.8 *4*	7 *1*	6523.2	13^-	5398.4	11^-	Q	DCO=1.05 *10*.
1138.1 *3*	1	3531.0	7^-	2392.73	6^+		
1152.4 *4*	1	4563.5	9^-	3410.9	8^+		
1166.6 *3*	1	3559.3	7^-	2392.73	6^+		
1171.6 *2*	4 *1*	1788.43	3^+	616.78	2^+		Additional information 7.
1190.0 *3*	4 *1*	3582.7	7^-	2392.73	6^+	D	DCO=0.40 *8*. Additional information 23.
1211.4 *4*	1	5375.3	(10^-)	4163.9	(8^-)		
1224.0 *4*	1	2660.26	5^+	1436.49	4^+		
1239.0 *4*	6 *2*	4650.1	10^+	3410.9	8^+	(Q)	DCO=0.95 *11*. Additional information 31.
1241.1 *4*	6 *2*	5891.2	12^+	4650.1	10^+	Q	DCO=1.07 *10*.
1243.6 *4*	20 *3*	6682.9	14^+	5439.3	12^+	(E2)	DCO=1.01 *10*.
1248.8 *6*	4 *1*	7772.0	15^-	6523.2	13^-	Q	DCO=1.03 *12*.
1256.5 *3*	2 *1*	1256.56	2^+	0.0	0^+		Additional information 3.
1308.3 *5*	2 *1*	3700.7	8^+	2392.73	6^+		
1331.7 *7*	4 *1*	7222.9	14^+	5891.2	12^+	(Q)	DCO=0.92 *10*.
1342‡		4752.9?	(9^+)	3410.9	8^+		
1343# *1*	1 *1*	8566?	(16^+)	7222.9	14^+	(Q)	DCO=0.84 *17*.
1357.1 *4*	2 *1*	2793.62	4^-	1436.49	4^+		
1406.5 *6*	13 *3*	8089.4	16^+	6682.9	14^+	(E2)	DCO=1.03 *9*.
1423.7 *3*	11 *2*	2860.18	5^-	1436.49	4^+		Additional information 15.
1424.2 *7*	2 *1*	9196.2	(17^-)	7772.0	15^-		
1443‡		6195.9?	(11^+)	4752.9?	(9^+)		
1443‡		7638.9?	(13^+)	6195.9?	(11^+)		
1524.6 *8*	1	3917.5	(8^+)	2392.73	6^+		
1565.4 *8*	2 *1*	4976.2	(10^+)	3410.9	8^+	(Q)	DCO=0.92 *15*.
1602.6 *7*	6 *2*	9692.0	18^+	8089.4	16^+	(E2)	DCO=0.99 *12*.
1648‡		4040.7?	(8^+)	2392.73	6^+		
1649 *1*	2 *1*	10845.2	(19^-)	9196.2	(17^-)		E_γ: 1565 In 1999SuZU. A 1648γ In 1999SuZU is shown to feed the 2393, 6^+ level.
1793 *2*	2 *1*	11485.0	20^+	9692.0	18^+	(E2)	DCO=1.00 *19*.
1822.4 *7*	1	2439.8	3^-	616.78	2^+		Additional information 11.

† From (^{18}O,p2nγ) (1995Do15), unless otherwise stated.
‡ From 1999SuZU only.
# Placement of transition in the level scheme is uncertain.

^{65}Cu(^{18}O,p2nγ),^{65}Cu(^{19}F,2p2nγ) 1995Do15,2001Mu25,1981Fu03

Level Scheme

Intensities: Relative I_γ

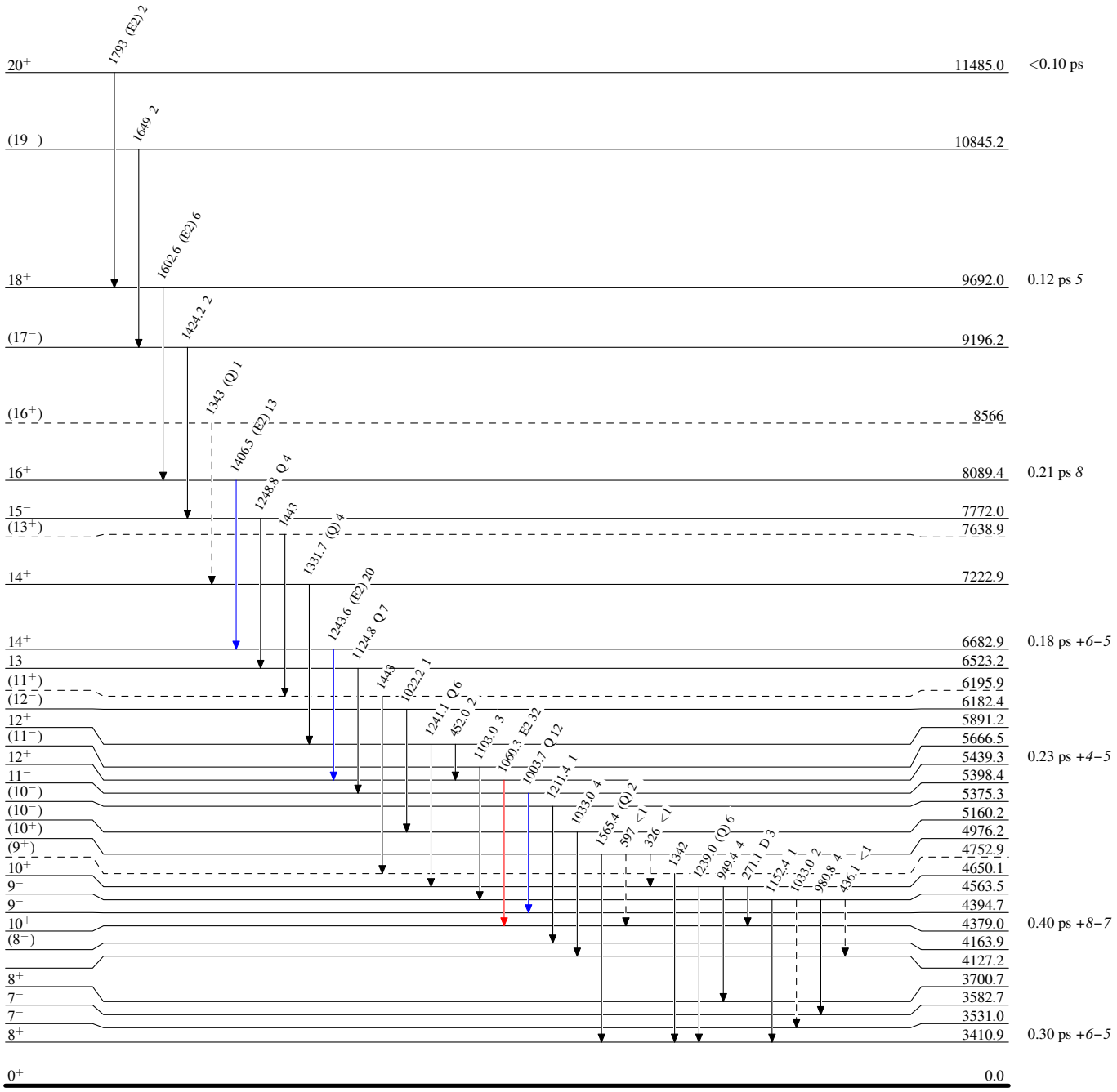
Legend

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

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

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

γ Decay (Uncertain)



$^{80}_{36}Kr_{44}$

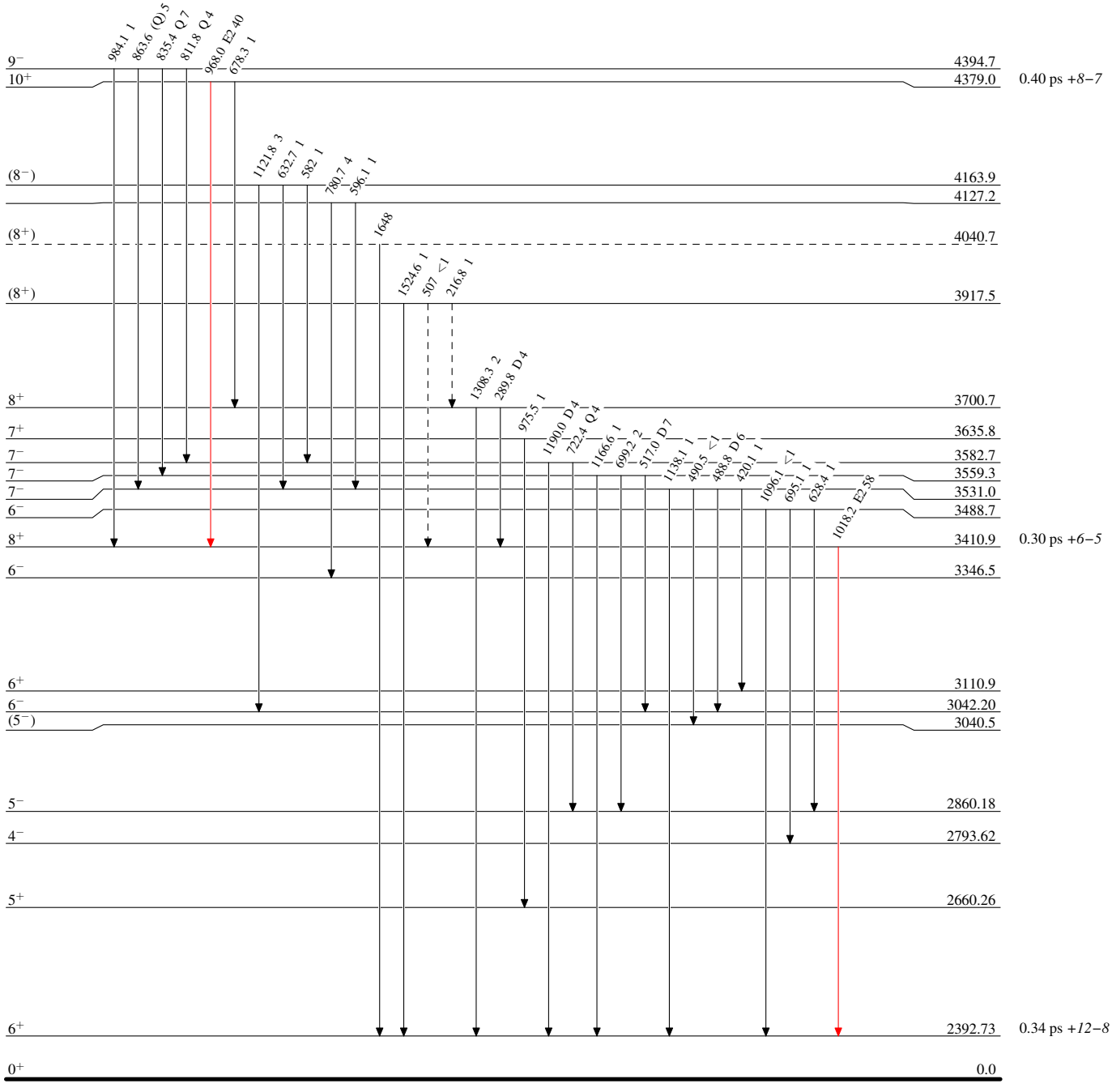
^{65}Cu(^{18}O,p2nγ),^{65}Cu(^{19}F,2p2nγ) 1995Do15,2001Mu25,1981Fu03

Legend

Level Scheme (continued)

Intensities: Relative I_γ

$I_\gamma < 2\% \times I_\gamma^{max}$
$I_\gamma < 10\% \times I_\gamma^{max}$
$I_\gamma > 10\% \times I_\gamma^{max}$
γ Decay (Uncertain)



$^{80}_{36}Kr_{44}$

^{65}Cu(^{18}O,p2nγ),^{65}Cu(^{19}F,2p2nγ) 1995Do15,2001Mu25,1981Fu03

Level Scheme (continued)

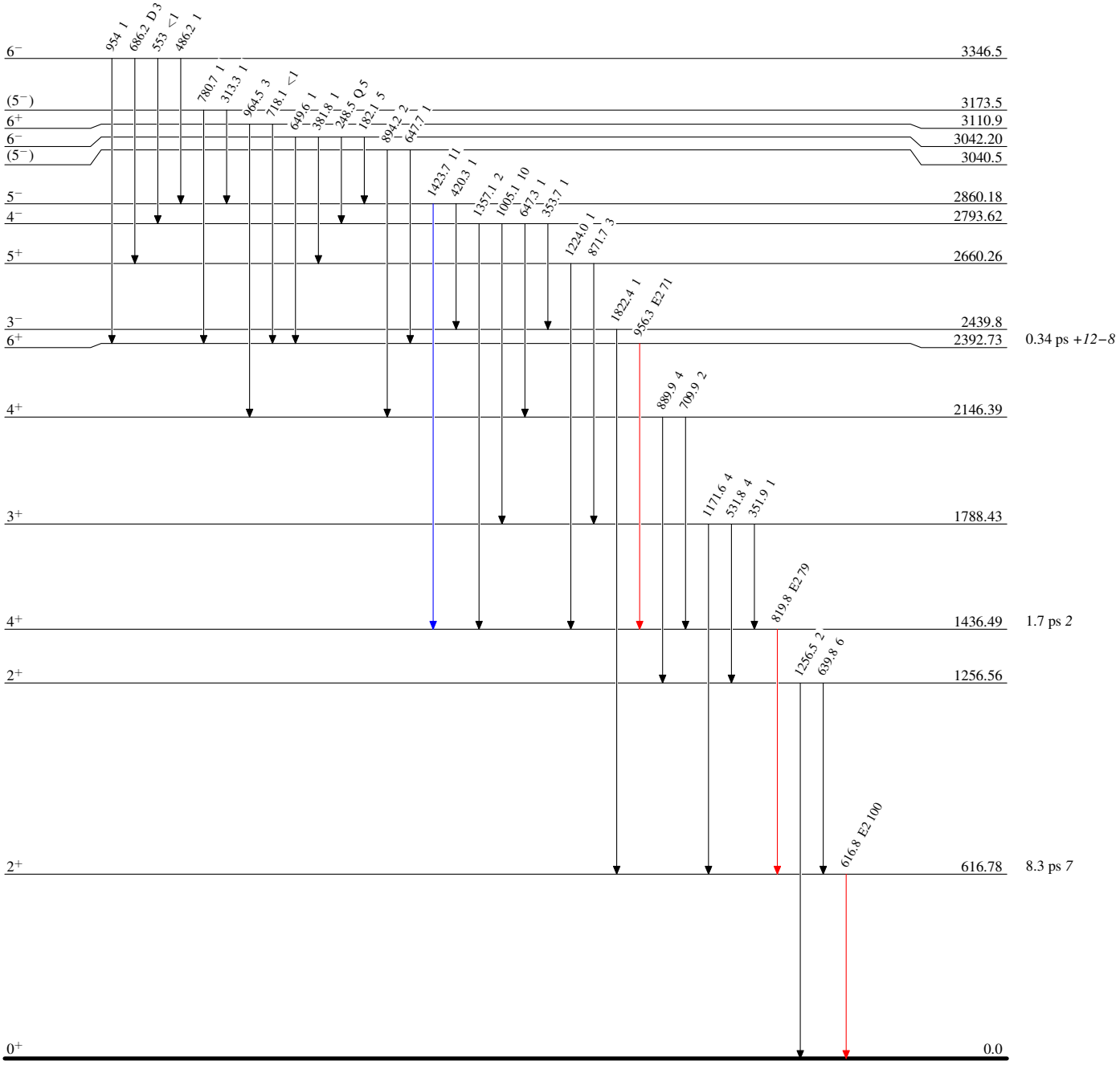
Intensities: Relative I_γ

Legend

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

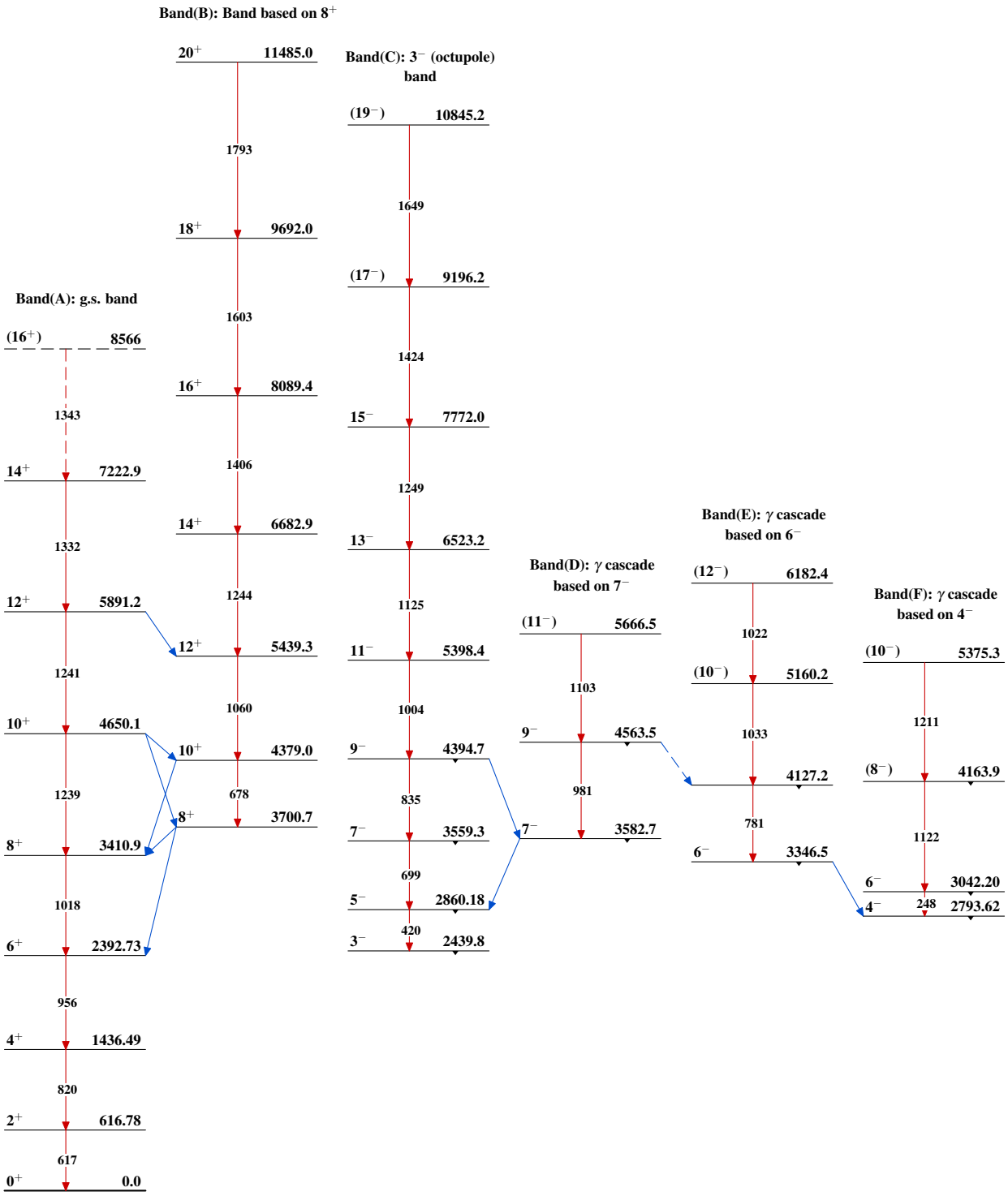
$I_\gamma < 10\% \times I_\gamma^{max}$

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



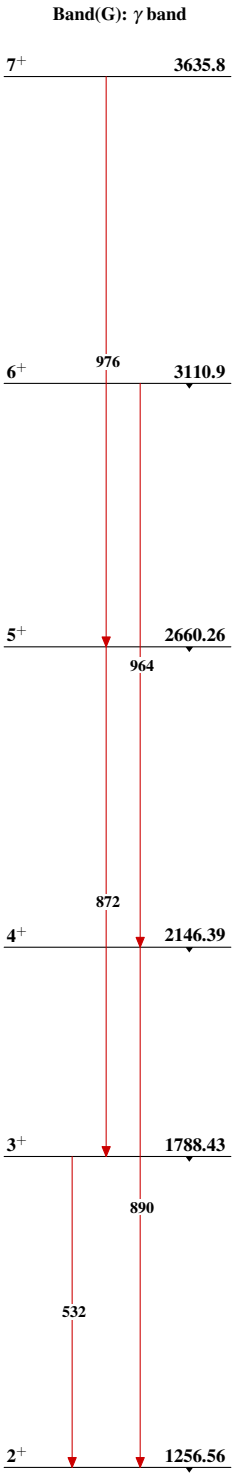
$^{80}_{36}Kr_{44}$

$^{65}Cu(^{18}O,p2n\gamma),^{65}Cu(^{19}F,2p2n\gamma)$ 1995Do15,2001Mu25,1981Fu03



$^{80}_{36}Kr_{44}$

^{65}Cu(^{18}O,p2nγ),^{65}Cu(^{19}F,2p2nγ) 1995Do15,2001Mu25,1981Fu03 (continued)



$^{80}_{36}Kr_{44}$