^{68}Zn(^{12}C,2nγ) E=36 MeV 1985Wi01,1982An06

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Ameenah R. Farhan, Balraj Singh	NDS 110, 1917 (2009)	30-Jun-2009

1985WI01: Measured Eγ, lifetimes by DSAM and recoil-distance Doppler-shift (RDDS) methods.
1982An06 (many authors are common with 1985Wi01): Measured Eγ, Iγ, Measured lifetimes by line shapes, DSAM and recoil-distance Doppler-shift (RDDS) methods.

^{78}Kr Levels

E(level)[†]	J$^\pi$[a]	T$_{1/2}$[‡]	Comments
0.0[b]	0$^+$		
454.9[b] 4	2$^+$	22.9[&] ps 21	
1119.1[b] 5	4$^+$	2.56[&] ps 35	
1147.3[c] 4	2$^+$	3.1[#&] ps 6	
1564.3[c] 5	3$^+$	5.1[#&] ps 4	
1872.0[c] 5	4$^+$	2.1[#&] ps 7	
1977.3[b] 6	6$^+$	0.59 ps 14	T$_{1/2}$: average of 0.48 ps 14 (DSAM) and 0.69 ps 14 (RDDS) (1985Wi01). Additional information 1.
2299.1[c] 6	5$^+$	1.10[#&] ps 28	
2398.8[d] 8	3$^-$	0.62[@] ps 14	
2730.1[c] 7	(6$^+$)	1.4[#&] ps 7	
2749.0[d] 6	5$^-$	0.76[@] ps +62−28	Additional information 2.
2763.4[e] 6	(4$^-$)	2.08 ps 35	T$_{1/2}$: effective half-life (1985Wi01) from RDDS method. Other: >1.4 ps from DSAM (1985Wi01).
2993.0[b] 7	8$^+$	0.25[@] ps 4	T$_{1/2}$: 0.26 ps 6 (DSAM,1982An06).
3063.7 8	(4$^+$,5,6$^+$)	1.0[#@] ps +8−4	
3202.0[c] 6	(7$^+$)	0.62[#@] ps 21	T$_{1/2}$: 0.49 ps 14 (DSAM,1982An06).
3219.5[e] 6	(6$^-$)	4.9[&] ps 14	Additional information 3.
3287.6[d] 7	7$^-$	1.94[&] ps 21	
3606.8 7	7$^-$	1.9[#@] ps 5	T$_{1/2}$: 2.1 ps +10−8 from RDDS In (^{12}C,2nγ) (1982An06). J$^\pi$: (8$^+$) In 1982An06.
3705.3 8	(7$^+$)		
3768.8[c] 9	(8$^+$)	0.190[#] ps 35	T$_{1/2}$: weighted average of 0.16 ps 5 (line shape), 0.208 ps 35 (DSAM In (α,2nγ)) and 0.187 ps 35 (DSAM In (^{12}C,2nγ)) (1982An06).
3772.3? 8		0.62[#@] ps +49−21	
3793.3 8		>0.7[#@] ps	
3918.0[e] 7	(8$^-$)	0.83[&] ps 35	Additional information 4.
4027.9[d] 7	(9$^-$)	1.05 ps 35	T$_{1/2}$: average of 0.97 ps 35 (DSAM) and 1.2 ps 5 (RDDS) (1985Wi01). Additional information 5.
4105.6[b] 7	(10$^+$)	0.208[@] ps 35	T$_{1/2}$: 0.21 ps 4 (DSAM,1982An06).
4253.2[c] 8	(9$^+$)	0.14[#@] ps 4	T$_{1/2}$: unweighted average of 0.083 ps 28 (DSAM), 0.125 ps 35 (RDDS), 0.21 ps 8 (RDDS) (1982An06).
4396.3 7	(10$^+$)	0.146[@] ps 28	T$_{1/2}$: 0.10 ps 4 (DSAM,1982An06).
4807.9[e] 8	(10$^-$)	1.25[@] ps 35	T$_{1/2}$: 1.11 ps 35 (RDDS, effective half-life,1985Wi01). Additional information 6.
4953.3[c] 10	(10$^+$)	0.45[#@] ps 17	T$_{1/2}$: 0.24 ps 9 (DSAM,1982An06).
4964.8[d] 9	(11$^-$)	0.38[@] ps 7	T$_{1/2}$: 0.49 ps +35−21 (DSAM,1982An06).
5217.7[b] 8	(12$^+$)	0.17[@] ps 10	

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^{68}Zn(^{12}C,2nγ) E=36 MeV 1985Wi01,1982An06 (continued)

^{78}Kr Levels (continued)

E(level)[†]	J$^{\pi}$[a]	T$_{1/2}$[‡]	Comments
5442.7[c] *10*	(11$^+$)	0.24[#@] ps *10*	T$_{1/2}$: 0.21 ps *8* (DSAM,1982An06).
6480.7[b] *10*	(14$^+$)		

[†] From least-squares fitting to Eγ's, assuming Δ(Eγ)=0.5 keV for each γ ray.
[‡] 1985Wi01 and 1982An06 measured lifetimes by line shapes and DSAM (τ<2 ps) and by recoil-distance Doppler-shift (RDDS) methods for longer lifetimes. Values are from 1985Wi01 unless otherwise stated. The information about half-lives is about the same in this dataset and in (α,2nγ). The effective lifetimes are upper limits since corrections for possible side feedings are not applied.
[#] From 1982An06 (DSAM or RDDS).
[@] From DSAM.
[&] From RDDS.
[a] As proposed by 1982An06 based on earlier J$^{\pi}$ assignments for low-lying levels and band assignments. The assignments are mostly the same In 'Adopted Levels', except that some are given In parentheses there.
[b] Band(A): g.s. band.
[c] Band(B): γ band.
[d] Band(C): 3$^-$ band.
[e] Band(D): 4$^-$ band.

γ(^{78}Kr)

E$_{\gamma}$[†]	I$_{\gamma}$[‡]	E$_i$(level)	J$_i^{\pi}$	E$_f$	J$_f^{\pi}$	Comments
290.1	1.4	4396.3	(10$^+$)	4105.6	(10$^+$)	I$_{\gamma}$: Iγ(290γ)/Iγ(1403γ)=12 *4*/88 *12* (1985Wi01).
350.2		2749.0	5$^-$	2398.8	3$^-$	I$_{\gamma}$: Iγ(350)/Iγ(1630γ)=4 *2*/96 *10* (1985Wi01).
417.0	1.9	1564.3	3$^+$	1147.3	2$^+$	
445.0		1564.3	3$^+$	1119.1	4$^+$	
454.9	100	454.9	2$^+$	0.0	0$^+$	Additional information 7.
456	<0.5	3219.5	(6$^-$)	2763.4	(4$^-$)	I$_{\gamma}$: Iγ(456)/Iγ(920)=<10/>38 (1985Wi01).
470.4	0.9	3219.5	(6$^-$)	2749.0	5$^-$	Additional information 12.
						I$_{\gamma}$: Iγ(470)/Iγ(920)=>14/>38 (1985Wi01).
488[@]		3219.5	(6$^-$)	2730.1	(6$^+$)	
538.7	3.8	3287.6	7$^-$	2749.0	5$^-$	Iγ(539)/Iγ(1310)=43 *4*/57 *6* (1985Wi01).
						Additional information 13.
613.8	2	3606.8	7$^-$	2993.0	8$^+$	
664.2	78	1119.1	4$^+$	454.9	2$^+$	
692.7	6.3	1147.3	2$^+$	454.9	2$^+$	
698.4	3.6	3918.0	(8$^-$)	3219.5	(6$^-$)	Additional information 15.
716	0.2	3918.0	(8$^-$)	3202.0	(7$^+$)	I$_{\gamma}$: Iγ(716)/Iγ(698)=6 *3*/94 *15* (1985Wi01).
724.8	8.4	1872.0	4$^+$	1147.3	2$^+$	
734.8	6.7	2299.1	5$^+$	1564.3	3$^+$	
740.1	6.6	4027.9	(9$^-$)	3287.6	7$^-$	Additional information 16.
753.1	4.7	1872.0	4$^+$	1119.1	4$^+$	
753.1[@]		2730.1	(6$^+$)	1977.3	6$^+$	
790		4396.3	(10$^+$)	3606.8	7$^-$	
821	0.2	5217.7	(12$^+$)	4396.3	(10$^+$)	I$_{\gamma}$: Iγ(821γ)/Iγ(1112.5γ from 5217 level)=9 *4*/91 *20* from $\gamma\gamma$ (1985Wi01).
858	11	2730.1	(6$^+$)	1872.0	4$^+$	
858.4	50	1977.3	6$^+$	1119.1	4$^+$	Additional information 8.
889.9	0.8	4807.9	(10$^-$)	3918.0	(8$^-$)	Additional information 18.
902.7	3.6	3202.0	(7$^+$)	2299.1	5$^+$	
920.5	1.8	3219.5	(6$^-$)	2299.1	5$^+$	

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^{68}Zn(^{12}C,2nγ) E=36 MeV 1985Wi01,1982An06 (continued)

γ(^{78}Kr) (continued)

E_γ †	I_γ ‡	E_i(level)	J_i^π	E_f	J_f^π	Comments
925		3918.0	(8^-)	2993.0	8^+	
936.9	3.0	4964.8	(11^-)	4027.9	(9^-)	Additional information 19.
1015.4	21	2993.0	8^+	1977.3	6^+	Additional information 11.
1035		4027.9	(9^-)	2993.0	8^+	
1038.7	2.5	3768.8	(8^+)	2730.1	(6^+)	
1051.2	2.5	4253.2	(9^+)	3202.0	(7^+)	
1086.4		3063.7	$(4^+,5,6^+)$	1977.3	6^+	
1109.5	7.2	1564.3	3^+	454.9	2^+	
1112.5#	7.8#	4105.6	(10^+)	2993.0	8^+	
1112.5#	2.4#	5217.7	(12^+)	4105.6	(10^+)	
1147.3	4.5	1147.3	2^+	0.0	0^+	
1180.0	1.8	2299.1	5^+	1119.1	4^+	
1184.5	1.9	4953.3	(10^+)	3768.8	(8^+)	
1189.4	1.8	5442.7	(11^+)	4253.2	(9^+)	
1199.2	1.2	2763.4	(4^-)	1564.3	3^+	Additional information 10.
1225		3202.0	(7^+)	1977.3	6^+	
1242.1	≈1.8	3219.5	(6^-)	1977.3	6^+	I_γ: Iγ(1242)/Iγ(920)=>38/>38 (1985Wi01).
1263		6480.7	(14^+)	5217.7	(12^+)	
1310.1	3.1	3287.6	7^-	1977.3	6^+	Additional information 14.
1402.8	3.0	4396.3	(10^+)	2993.0	8^+	Additional information 17. I_γ: see 290.1γ. Transition is placed from the 4396 level by 1985Wi01 and 1982An06. A 1402.5γ is placed by 1989Gr21 from an 8469 level. The 8469 level would not likely have been populated by 1985Wi01 or 1982An06.
1416.9		1872.0	4^+	454.9	2^+	
1629.8		2749.0	5^-	1119.1	4^+	Additional information 9.
1630.0		3606.8	7^-	1977.3	6^+	
1644.0	0.9	2763.4	(4^-)	1119.1	4^+	I_γ: Iγ(1644)/Iγ(1199)=43 *5*/57 *7* (1985Wi01).
1728		3705.3	(7^+)	1977.3	6^+	
1795		3772.3?		1977.3	6^+	
1816		3793.3		1977.3	6^+	
1944 *2*		2398.8	3^-	454.9	2^+	

† From 1985Wi01 and/or 1982An06. Values are nearly the same in the two papers. If available, value given here is from 1985Wi01.
‡ From 1982An06. 1985Wi01 list branching ratios.
# Multiply placed with intensity suitably divided.
@ Placement of transition in the level scheme is uncertain.

^{68}Zn(^{12}C,2nγ) E=36 MeV 1985Wi01,1982An06

Level Scheme

Intensities: Relative I_γ

@ Multiply placed: intensity suitably divided

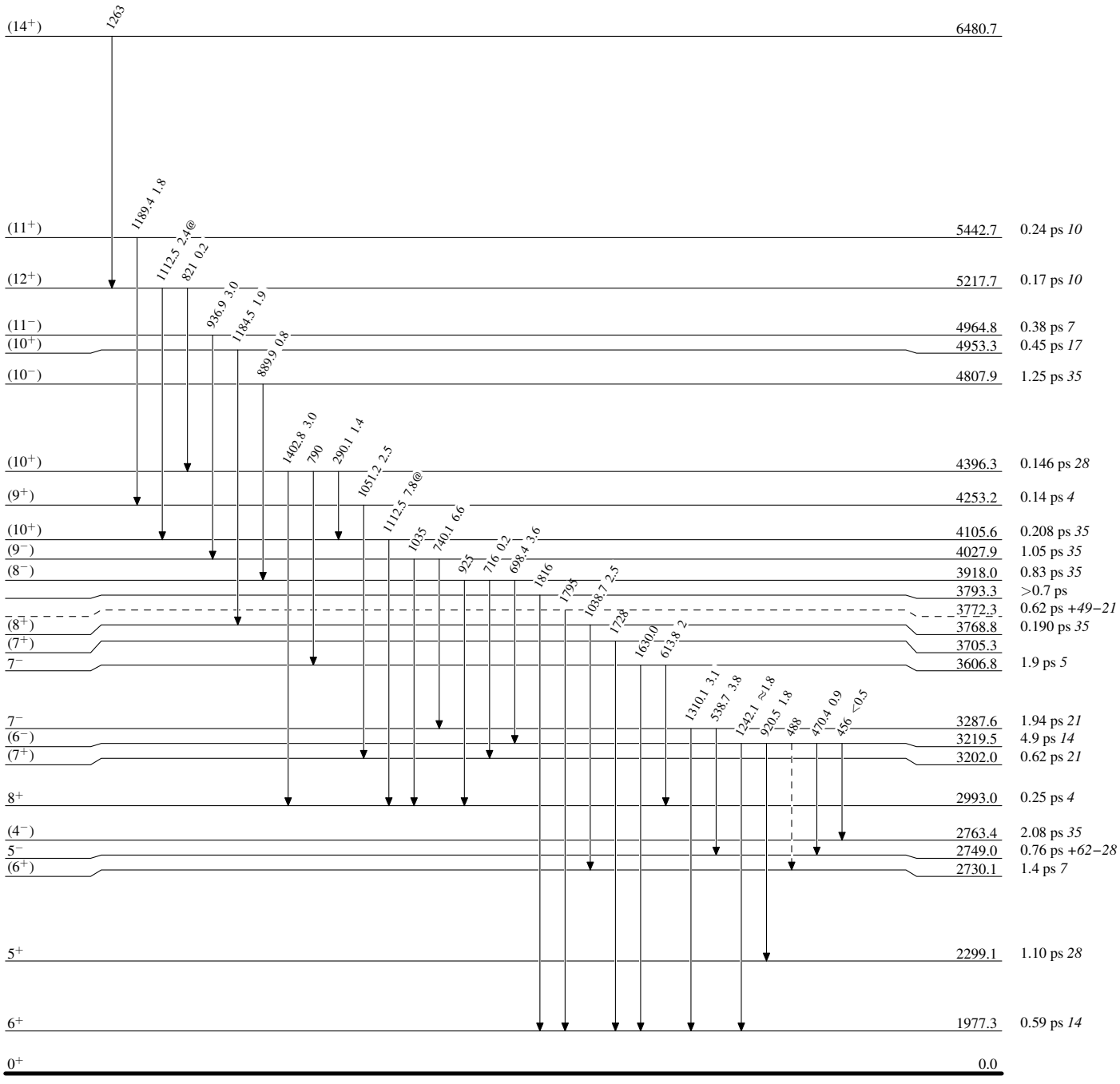
Legend

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

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

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

γ Decay (Uncertain)



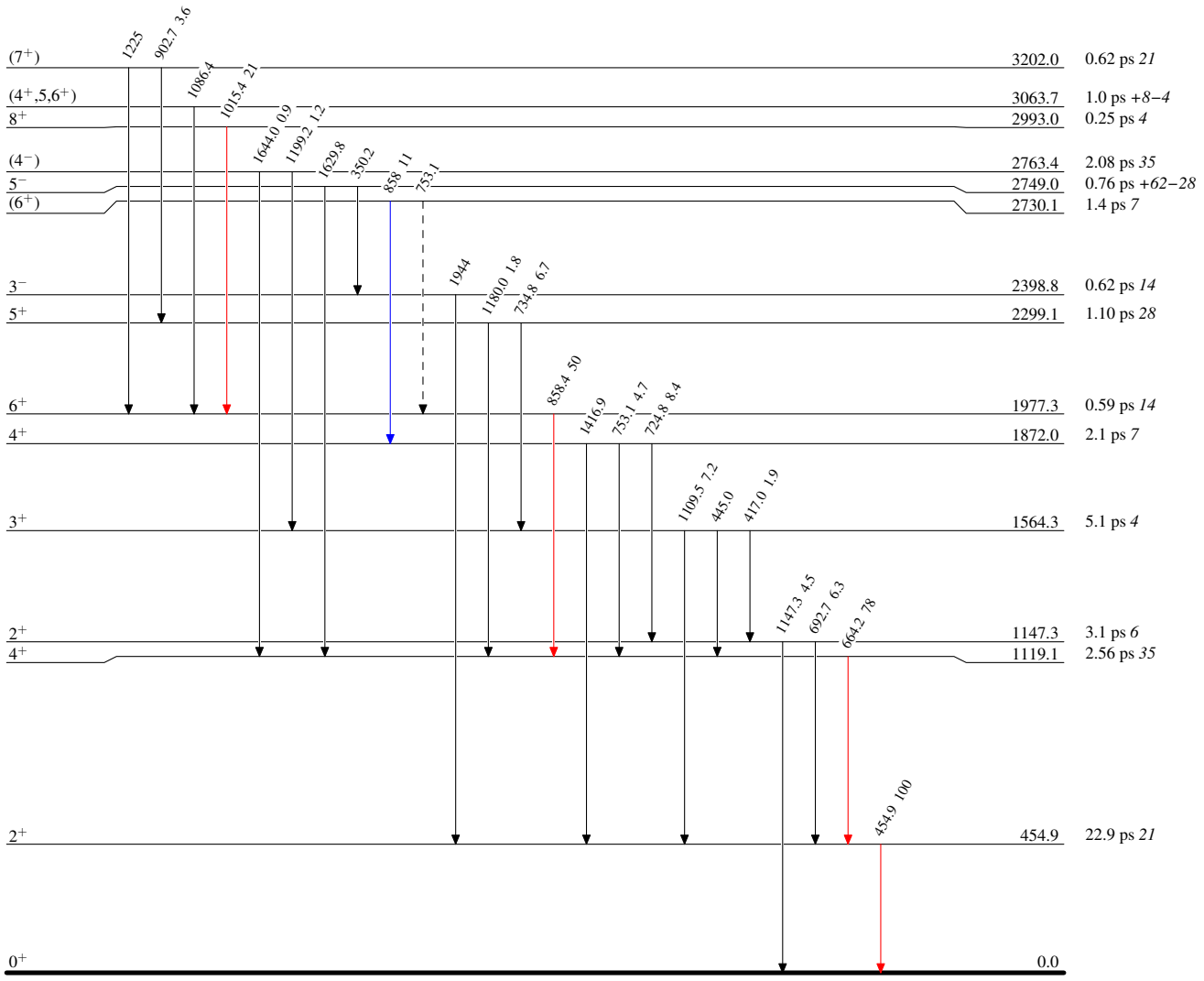
$^{78}_{36}Kr_{42}$

^{68}Zn(^{12}C,2nγ) E=36 MeV 1985Wi01,1982An06

Level Scheme (continued)

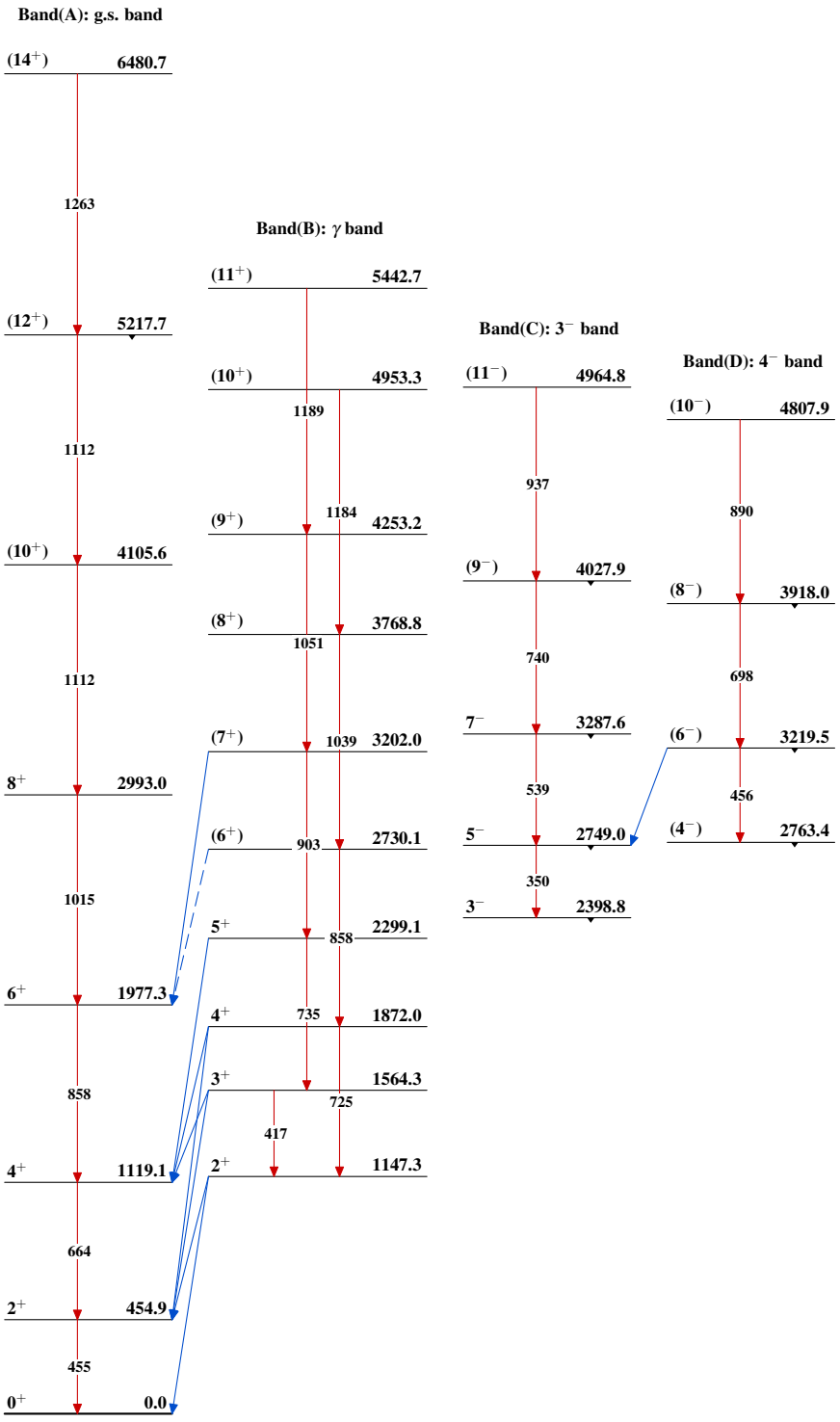
Intensities: Relative I_γ
@ Multiply placed: intensity suitably divided

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



$^{78}_{36}Kr_{42}$

^{68}Zn(^{12}C,2nγ) E=36 MeV 1985Wi01,1982An06



$^{78}_{36}Kr_{42}$