^{109}Ag(^{86}Kr,4nγ) 2015Ny02

History			
Type	Author	Citation	Literature Cutoff Date
Full Evaluation	M. S. Basunia	NDS 195,368 (2024)	1-Dec-2023

Slightly edited the dataset by B. Singh (McMaster) in the ENSDF, dated 29-Feb-2016.

2015Ny02: E(^{86})Kr=380 MeV from K=130 cyclotron at JYFL facility. Measured Eγ, Iγ, Eα, fusion products recoiling out of the target, $\gamma(\theta)$, (recoil)$\gamma\gamma$-coin, (recoil)α-coin, $\alpha\gamma\gamma$-coin. Gamma rays were detected using JUROGAM array of 43 Compton-suppressed HPGe detectors. Reaction residues recoiling out of the target were separated from the primary beam using the gas-filled recoil separator RITU, and collected in the GREAT spectrometer for particle identification based on tof and energy loss information. Recoil-decay tagging (RDT) method. Deduced levels, J, π, normal deformation and superdeformed bands, configurations. This work is an improvement over their previous high-spin study reported in 2004Ni06 (also 2003NiZZ, 2001Ni04).

^{191}Bi Levels

E(level)[†]	J$^{\pi}$	T$_{1/2}$[‡]	Comments
0.0	9/2$^-$		
148.7[@] *5*	7/2$^-$		
242[&] *4*	1/2$^+$	125 ms *8*	Additional information 1. E(level): From Adopted Levels. Other: 241 keV in 2015Ny02.
343.8[@] *6*	(9/2$^-$)		
422.7 *5*	(5/2$^+$)		
429.7[#] *5*	13/2$^+$	562 ns *10*	
481.2[a] *7*	(3/2$^+$)		
485.7[@] *4*	(11/2$^-$)		
609.9[&] *6*	(5/2$^+$)		
692.4[@] *4*	(13/2$^-$)		
720.0 *8*	(7/2$^+$)		
747.4[#] *8*	15/2$^+$		
824.9[a] *7*	(7/2$^+$)		
881.0 *7*	(9/2$^+$)		
934.1[&] *7*	(9/2$^+$)		
1016.5[@] *6*	(15/2$^-$)		
1025.7[#] *8*	17/2$^+$		
1176.8[a] *8*	(11/2$^+$)		
1247.3[@] *6*	(17/2$^-$)		
1256.1 *13*			
1332.4[&] *8*	(13/2$^+$)		
1350.2[#] *9*	19/2$^+$		
1356.3? *12*	(13/2$^+$)		
1598.0[#] *9*	21/2$^+$		
1616.5[@] *8*	(19/2$^-$)		
1623.2?[a] *9*	(15/2$^+$)		
1815.2[&] *13*	(17/2$^+$)		
1825.1[@] *9*	(21/2$^-$)		
1982.5[#] *10*	23/2$^+$		
2066.2 *11*			
2194.6[#] *12*	25/2$^+$		
2342.2 *15*			
2358.9?[#] *15*	(27/2)		
2368.4[&] *15*	(21/2$^+$)		

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^{109}Ag(^{86}Kr,4nγ) 2015Ny02 (continued)

^{191}Bi Levels (continued)

E(level)[†]	J$^\pi$	Comments
2508.7?[#] *17*	(29/2)	
2560.2 *14*		
2670.8?[#] *22*	(31/2)	
2914.6?[#] *25*	(33/2)	
2943.3 *16*		
2983.9[&] *16*	(25/2$^+$)	
x[b]	(11/2$^+$)	Additional information 2.
126.6+x[b] *4*	(15/2$^+$)	
294.3+x[b] *6*	(19/2$^+$)	
503.0+x[b] *7*	(23/2$^+$)	
752.5+x[b] *8*	(27/2$^+$)	
1042.5+x[b] *9*	(31/2$^+$)	
1373.2+x[b] *10*	(35/2$^+$)	
1743.6+x[b] *13*	(39/2$^+$)	
2154.4+x[b] *14*	(43/2$^+$)	
2602.7+x[b] *15*	(47/2$^+$)	
y[c]	(9/2$^+$)	Additional information 3.
140.3+y[c] *6*	(13/2$^+$)	
320.9+y[c] *11*	(17/2$^+$)	
541.4+y[c] *13*	(21/2$^+$)	
801.5+y[c] *14*	(25/2$^+$)	
1100.6+y[c] *15*	(29/2$^+$)	
1439.3+y[c] *16*	(33/2$^+$)	
1816.9+y[c] *17*	(37/2$^+$)	
2230.5+y[c] *19*	(41/2$^+$)	

[†] From least-squares fit to Eγ data, including the questionable γ transitions.
[‡] From Adopted Levels.
[#] Band(A): Band built on $\pi i_{13/2}$.
[@] Band(B): Band built on $\pi f_{7/2}$.
[&] Band(C): Band built on intruder $s_{1/2}$.
[a] Band(D): Band based on (3/2$^+$).
[b] Band(E): SD-1 band, built on π1/2[651],α=−1/2. Band observed in 1/2$^+$ state α-tagged $\gamma\gamma$-coin data, not in recoil-gated $\gamma\gamma$ coin data.
[c] Band(e): SD-2 band, built on π1/2[651],α=+1/2. Band observed in 1/2$^+$ state α-tagged $\gamma\gamma$-coin data, not in recoil-gated $\gamma\gamma$ coin data.

γ(^{191}Bi)

E$_\gamma$	I$_\gamma$[@]	E$_i$(level)	J$_i^\pi$	E$_f$	J$_f^\pi$	Mult.[&]	α[a]	Comments
93[b] *4*		242	1/2$^+$	148.7	7/2$^-$	[E3]	2.8×10^2 *8*	α(L)=2.0×10^2 *6*; α(M)=59 *17* α(N)=15 *4*; α(O)=2.8 *8*; α(P)=0.21 *6* E$_\gamma$: from level-energy difference.
126.6[#] *4*	0.26 *8*	126.6+x	(15/2$^+$)	x	(11/2$^+$)			
128.3 *7*	0.8 *4*	609.9	(5/2$^+$)	481.2	(3/2$^+$)			
140.3[#] *6*	0.19 *5*	140.3+y	(13/2$^+$)	y	(9/2$^+$)			
142.0 *9*	5.0 *20*	485.7	(11/2$^-$)	343.8	(9/2$^-$)			

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^{109}Ag(^{86}Kr,4nγ) 2015Ny02 (continued)

γ(^{191}Bi) (continued)

E_γ	I_γ [@]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[&]	Comments
148.5 *5*	19 *5*	148.7	7/2$^-$	0.0	9/2$^-$	(D)	R(exp)=0.9 *3*.
149.8[b] *8*	6 *3*	2508.7?	(29/2)	2358.9?	(27/2)		
160.5[b] *9*	0.15 *9*	881.0	(9/2$^+$)	720.0	(7/2$^+$)		
162.1[b] *14*	6 *4*	2670.8?	(31/2)	2508.7?	(29/2)		
164.3[b] *8*	8 *3*	2358.9?	(27/2)	2194.6	25/2$^+$		
167.7[#] *4*	0.46 *9*	294.3+x	(19/2$^+$)	126.6+x	(15/2$^+$)		
180.6[#] *9*	0.35 *12*	320.9+y	(17/2$^+$)	140.3+y	(13/2$^+$)		
180.6 *5*	11.3 *7*	422.7	(5/2$^+$)	242	1/2$^+$		
187.0 *4*	4.8 *5*	609.9	(5/2$^+$)	422.7	(5/2$^+$)		
194.6 *9*	8 *3*	343.8	(9/2$^-$)	148.7	7/2$^-$	(D)	R(exp)=1.4 *6*.
206.6 *9*	20 *6*	692.4	(13/2$^-$)	485.7	(11/2$^-$)	(D)	R(exp)=1.3 *4*.
208.4 *9*	6 *3*	1825.1	(21/2$^-$)	1616.5	(19/2$^-$)		
208.7[#] *3*	0.59 *11*	503.0+x	(23/2$^+$)	294.3+x	(19/2$^+$)		
212.2 *9*	7 *5*	2194.6	25/2$^+$	1982.5	23/2$^+$		
214.3 *10*	0.7 *3*	934.1	(9/2$^+$)	720.0	(7/2$^+$)		
214.5 *8*	0.5 *3*	824.9	(7/2$^+$)	609.9	(5/2$^+$)		
220.5[#] *7*	0.41 *9*	541.4+y	(21/2$^+$)	320.9+y	(17/2$^+$)		
230.7 *6*	7 *4*	1247.3	(17/2$^-$)	1016.5	(15/2$^-$)		
239.2 *13*	0.7 *2*	481.2	(3/2$^+$)	242	1/2$^+$		
243.2 *10*	1.2 *3*	1176.8	(11/2$^+$)	934.1	(9/2$^+$)		
243.8[b] *11*	5 *3*	2914.6?	(33/2)	2670.8?	(31/2)		
247.8 *5*	16 *4*	1598.0	21/2$^+$	1350.2	19/2$^+$	D	R(exp)=0.53 *14*.
249.5[#] *4*	0.70 *13*	752.5+x	(27/2$^+$)	503.0+x	(23/2$^+$)		
260.1[#] *5*	0.39 *8*	801.5+y	(25/2$^+$)	541.4+y	(21/2$^+$)		
270.9 *6*	0.9 *3*	881.0	(9/2$^+$)	609.9	(5/2$^+$)		
278.3 *5*	52 *9*	1025.7	17/2$^+$	747.4	15/2$^+$	D	R(exp)=0.68 *14*.
290.0[#] *4*	0.6 *2*	1042.5+x	(31/2$^+$)	752.5+x	(27/2$^+$)		
290.2[b] *14*	0.8 *3*	1623.2?	(15/2$^+$)	1332.4	(13/2$^+$)		
296.9 *11*	2.1 *4*	720.0	(7/2$^+$)	422.7	(5/2$^+$)		
299.1[#] *6*	0.15 *12*	1100.6+y	(29/2$^+$)	801.5+y	(25/2$^+$)		
317.7 *6*	100 *15*	747.4	15/2$^+$	429.7	13/2$^+$	D	R(exp)=0.7 *3*.
323.4 *6*	36 *11*	1016.5	(15/2$^-$)	692.4	(13/2$^-$)		
324.2 *4*	11.0 *9*	934.1	(9/2$^+$)	609.9	(5/2$^+$)		
324.2 *5*	33 *7*	1350.2	19/2$^+$	1025.7	17/2$^+$	(D)	R(exp)=1.1 *3*.
330.7[#] *4*	0.52 *15*	1373.2+x	(35/2$^+$)	1042.5+x	(31/2$^+$)		
338.7[#] *5*	0.23 *13*	1439.3+y	(33/2$^+$)	1100.6+y	(29/2$^+$)		
344.1 *7*	2.3 *3*	824.9	(7/2$^+$)	481.2	(3/2$^+$)		
348.0 *9*	8 *5*	692.4	(13/2$^-$)	343.8	(9/2$^-$)	(Q)	R(exp)=0.8 *3*.
351.9 *5*	2.2 *4*	1176.8	(11/2$^+$)	824.9	(7/2$^+$)		
[x]355.4[†] *4*	11 *3*						
368.5 *14*	3.0 *4*	609.9	(5/2$^+$)	242	1/2$^+$		
369.0 *7*	13 *4*	1616.5	(19/2$^-$)	1247.3	(17/2$^-$)	D	R(exp)=0.8 *2*.
370.4[#] *9*	0.49 *15*	1743.6+x	(39/2$^+$)	1373.2+x	(35/2$^+$)		
377.6[#] *5*	0.16 *13*	1816.9+y	(37/2$^+$)	1439.3+y	(33/2$^+$)		
384.8 *7*	12 *3*	1982.5	23/2$^+$	1598.0	21/2$^+$	D	R(exp)=0.50 *12*.
398.3 *5*	8.7 *6*	1332.4	(13/2$^+$)	934.1	(9/2$^+$)		
402.0[b] *11*	<0.3	824.9	(7/2$^+$)	422.7	(5/2$^+$)		
410.8[#] *5*	0.18 *10*	2154.4+x	(43/2$^+$)	1743.6+x	(39/2$^+$)		
413.6[#] *9*	0.17 *13*	2230.5+y	(41/2$^+$)	1816.9+y	(37/2$^+$)		

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^{109}Ag(^{86}Kr,4nγ) 2015Ny02 (continued)

$\gamma(^{191}Bi)$ (continued)

E_γ	I_γ [@]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[&]	α[a]	Comments
429.7 *5*		429.7	13/2$^+$	0.0	9/2$^-$	M2	0.542 *8*	α(K)=0.418 *6*; α(L)=0.0938 *14*; α(M)=0.02288 *33* α(N)=0.00589 *9*; α(O)=0.001197 *17*; α(P)=0.0001391 *20* E_γ,Mult.: from Adopted Gammas (In 2015Ny02 taken from their earlier publication 2004Ni06).
446.4[b] *5*	1.4 *3*	1623.2?	(15/2$^+$)	1176.8	(11/2$^+$)			
448.3[#] *5*	0.09 *7*	2602.7+x	(47/2$^+$)	2154.4+x	(43/2$^+$)			
459.0 *7*	2.1 *3*	881.0	(9/2$^+$)	422.7	(5/2$^+$)			
468.2 *6*	11 *4*	2066.2		1598.0	21/2$^+$			
475.3[b] *10*	1.3 *3*	1356.3?	(13/2$^+$)	881.0	(9/2$^+$)			
482.8 *10*	6.6 *6*	1815.2	(17/2$^+$)	1332.4	(13/2$^+$)			
486.0 *5*	45 *9*	485.7	(11/2$^-$)	0.0	9/2$^-$	(D)		R(exp)=1.2 *7*.
494.0 *8*	6 *3*	2560.2		2066.2				
508.7 *10*	15 *5*	1256.1		747.4	15/2$^+$			
527.0 *7*	2.3 *4*	2342.2		1815.2	(17/2$^+$)			
531.3 *6*	30 *6*	1016.5	(15/2$^-$)	485.7	(11/2$^-$)	(Q)		R(exp)=1.1 *5*.
[x]542.5[†] *5*	10 *3*							
553.2 *7*	1.8 *3*	2368.4	(21/2$^+$)	1815.2	(17/2$^+$)			
555.0 *7*	25 *5*	1247.3	(17/2$^-$)	692.4	(13/2$^-$)	(Q)		R(exp)=0.9 *3*.
572.9 *8*	22 *4*	1598.0	21/2$^+$	1025.7	17/2$^+$	(Q)		R(exp)=0.8 *5*.
577.9 *9*	19 *7*	1825.1	(21/2$^-$)	1247.3	(17/2$^-$)	(Q)		R(exp)=1.5 *9*.
[x]584.1[‡] *6*	6 *2*							
[x]594.9[‡] *6*	6 *2*							
596.0 *9*	33 *3*	1025.7	17/2$^+$	429.7	13/2$^+$	(Q)		R(exp)=0.8 *4*.
596.4 *15*	5.0 *20*	2194.6	25/2$^+$	1598.0	21/2$^+$			
600.4 *11*	14 *6*	1616.5	(19/2$^-$)	1016.5	(15/2$^-$)			
601.1 *6*	0.4 *3*	2943.3		2342.2				
602.8 *10*	20 *3*	1350.2	19/2$^+$	747.4	15/2$^+$			
615.5 *6*	0.6 *3*	2983.9	(25/2$^+$)	2368.4	(21/2$^+$)			
[x]620.4[‡] *7*	5 *2*							
632.0 *7*	7 *3*	1982.5	23/2$^+$	1350.2	19/2$^+$	(Q)		R(exp)=1.5 *11*.
692.3 *5*	27 *6*	692.4	(13/2$^-$)	0.0	9/2$^-$	(Q)		R(exp)=1.3 *8*.

[†] Observed in the 1/2$^+$ isomer α-tagged spectrum, but not placed in level scheme.
[‡] Observed in the 9/2$^-$ isomer α-tagged spectrum, but not placed in level scheme.
[#] Observed in the 1/2$^+$ isomer α-tagged spectrum, but no connection with the normal-deformed band is established. Also the two SD bands are not interconnected.
[@] Relative intensity with respect to Iγ(317)=100 *15*. Authors of 2015Ny02 reports with rexpect to Iγ(317)=1000 *150*.
[&] Assumed by the evaluator, based on R(exp)=I(157.6°)/I(85.84°+94.19°) and initial, final J^π values of the γ transition proposed by the authors of 2015Ny02. Expected values are 1.3 for stretched quadrupoles and 0.7 for stretched dipoles, for deviated values mutipolarities are listed as tentative in parentheses.
[a] Additional information 4.
[b] Placement of transition in the level scheme is uncertain.
[x] γ ray not placed in level scheme.

^{109}Ag(^{86}Kr,4nγ) 2015Ny02

Level Scheme

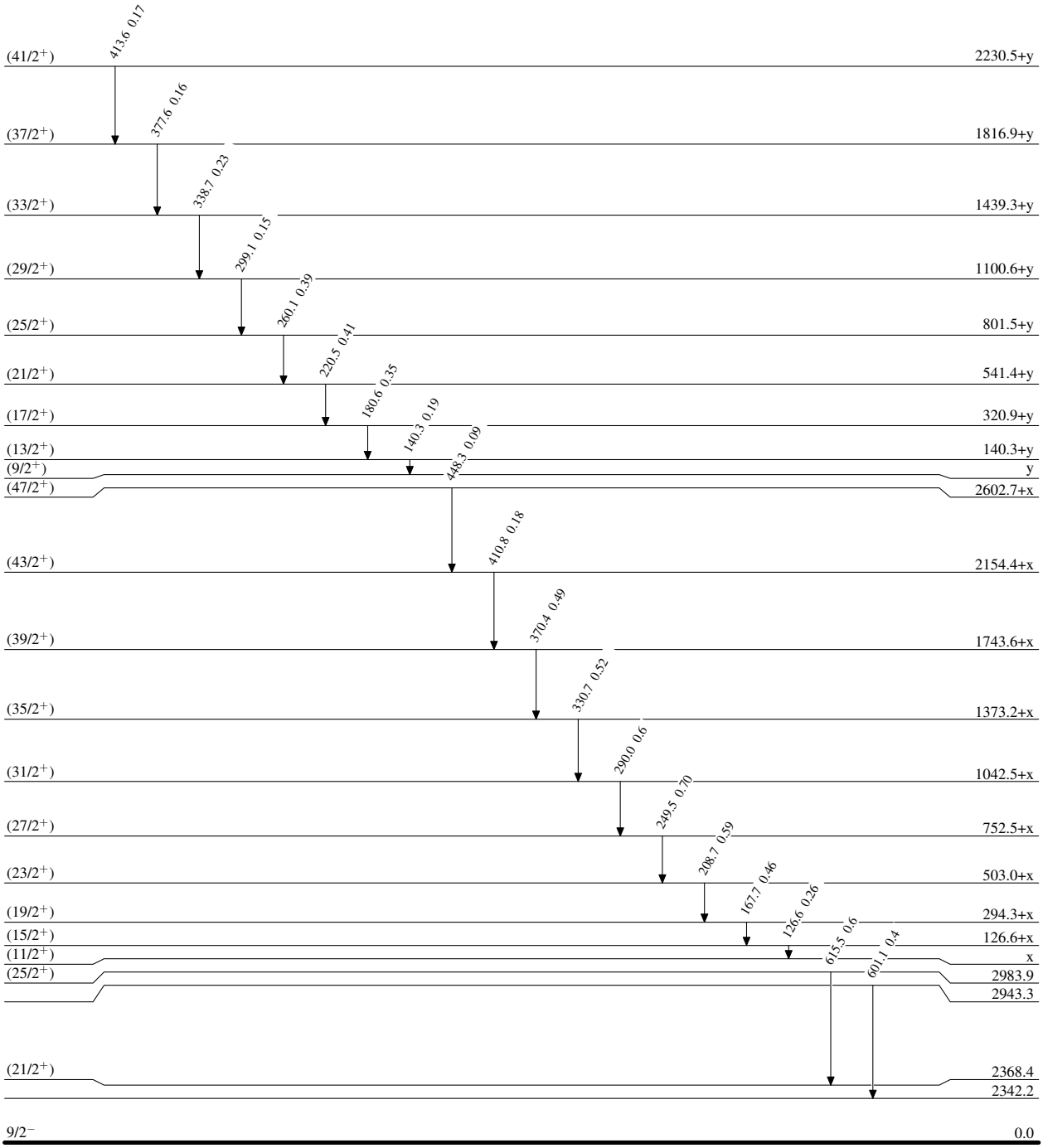
Intensities: Relative I_γ

Legend

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

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

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



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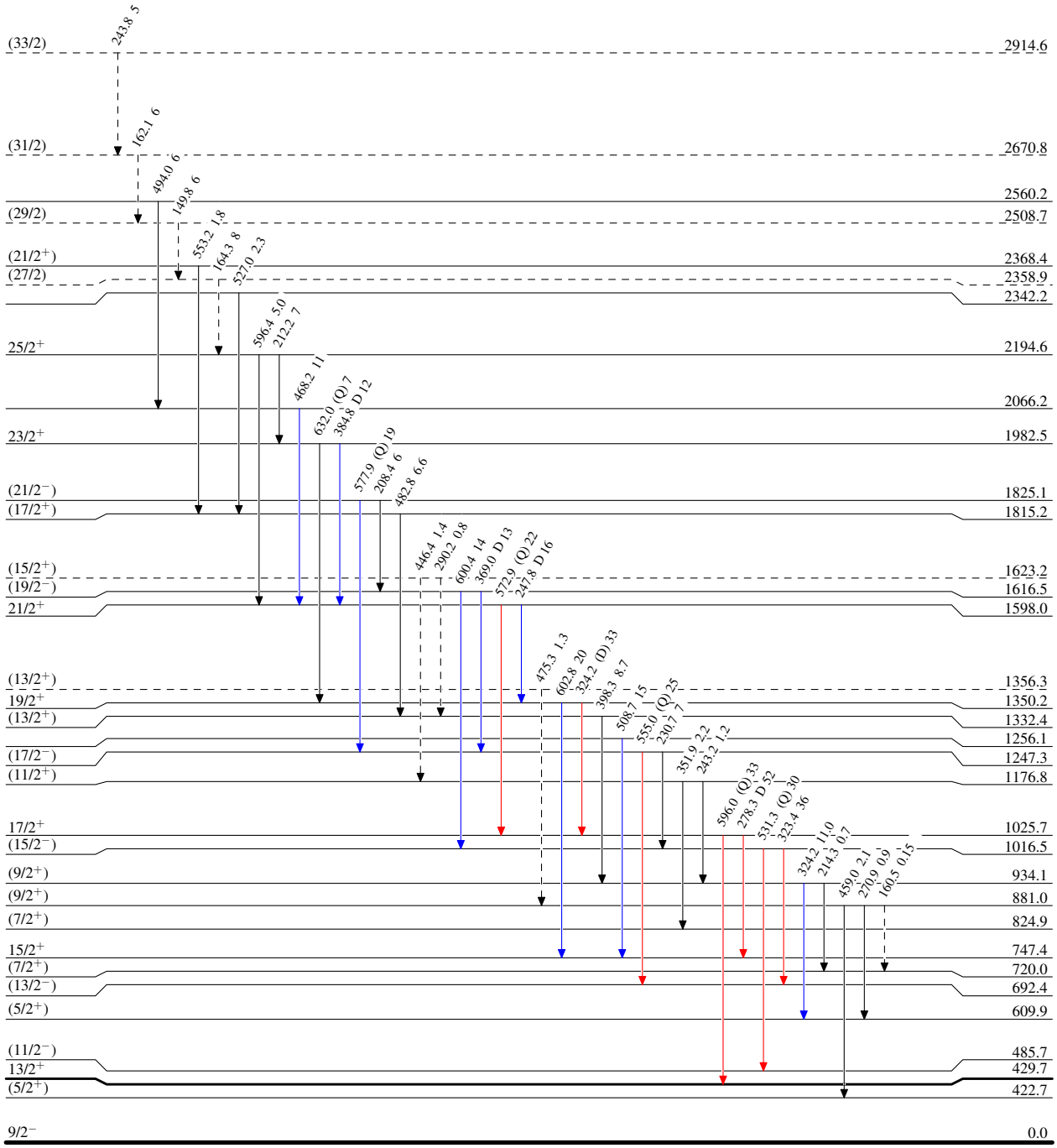
^{109}Ag(^{86}Kr,4nγ) 2015Ny02

Level Scheme (continued)

Intensities: Relative I_γ

Legend

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



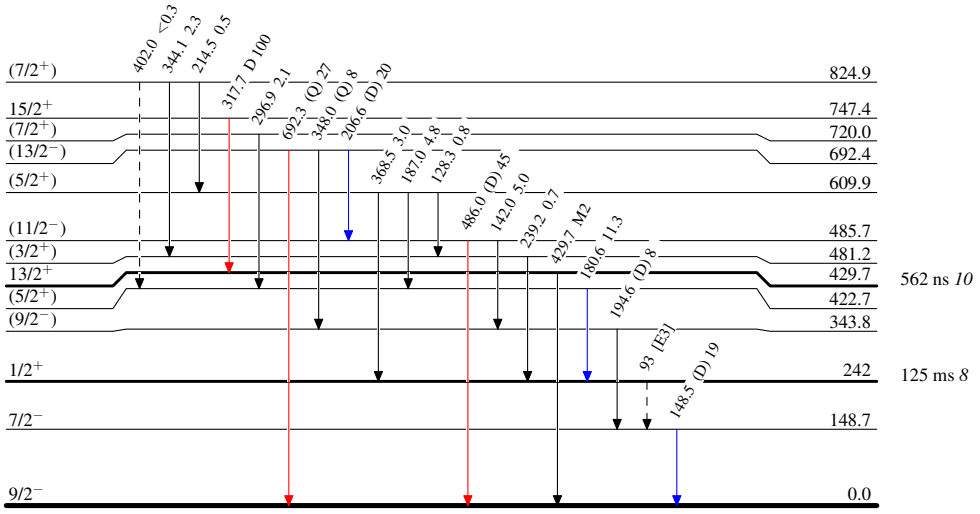
$^{191}_{83}Bi_{108}$

^{109}Ag(^{86}Kr,4nγ) 2015Ny02

Level Scheme (continued)

Intensities: Relative I_γ

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



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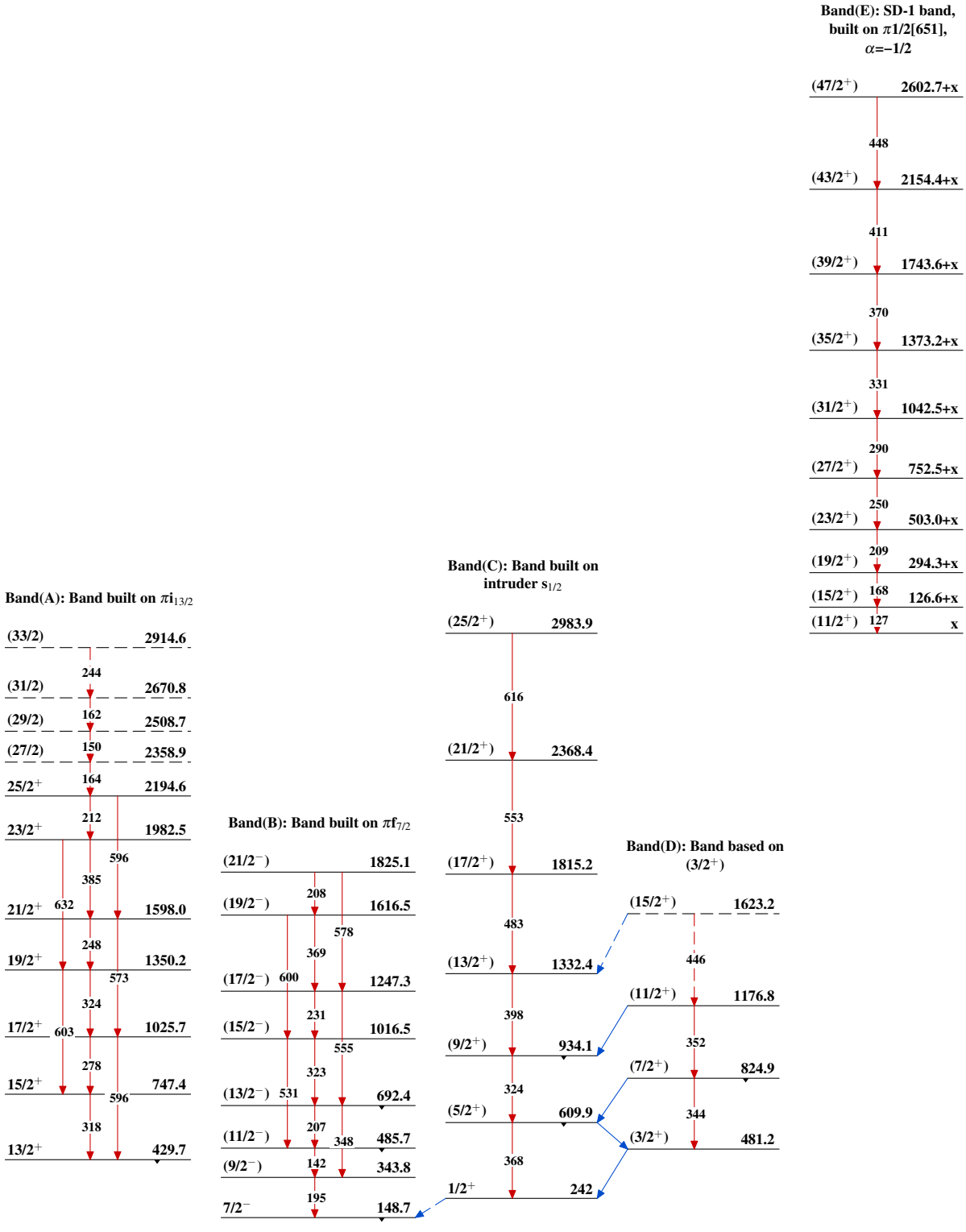

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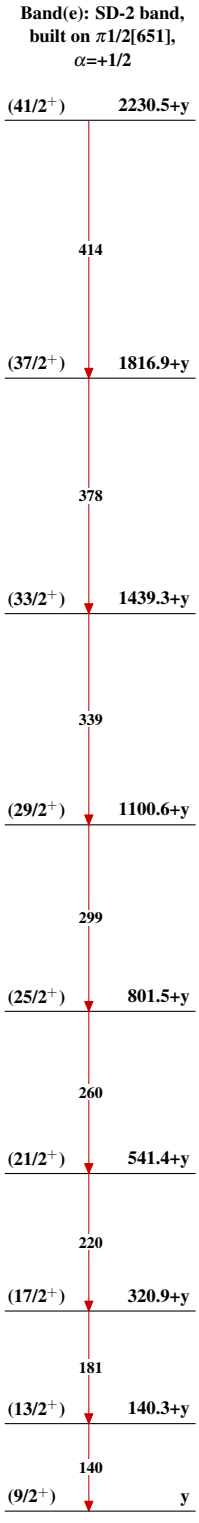
^{109}Ag(^{86}Kr,4nγ) 2015Ny02 (continued)



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