^{58}Ni(^{64}Zn,2p$\alpha\gamma$) 1998Se08,1998De29,1995Pa21

History			
Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Jean Blachot	NDS 111, 717 (2010)	1-Dec-2009

Taken from XUNDL.
Includes ^{58}Ni(^{60}Ni,2pγ) E= 223 MeV (1998De29) and ^{90}Zr(^{31}P,P4NG) E= 150 MeV (1995Pa21).
Additional information 1.
1998Se08: ^{58}Ni(^{64}Zn,2p$\alpha\gamma$) E=265 MeV. High-spin states in the even ^{116}Xe isotope have been studied with the Gammasphere array. (56 HP Ge detectors) Several new rotational bands have been identified in these nuclei, and previously observed bands have been extended. A strongly coupled (ΔJ=1) rotational band attributed to the (ν,h$_{11/2}$)(g$_{7/2}$,d$_{5/2}$) configuration and a decoupled (ΔJ=2) rotational band identified with the π[h$_{11/2}$ g$_{7/2}$] configuration have been found. Experimental observations also suggest that another rotational band may be understood within the framework of smooth band termination. Proposed configuration assignments are given in 1998Se08.
1998De29: ^{58}Ni(^{60}Ni,2pγ) E=223 MeV at "TASCC" (20 HP Ge detectors+71 element BGO), Measured lifetimes with plunger technique.
1995Pa21: ^{90}Zr(^{31}P,p4nγ) E= 150 MeV, data reported for four bands up to J^π=34$^+$.
The level scheme is as given by 1998Se08.

^{116}Xe Levels

E(level)‡	Jπ#	T$_{1/2}$†	E(level)‡	Jπ#	E(level)‡	Jπ#
0.0[e]	0$^+$		4699.1[d] 4	14$^+$	11457.8[e] 10	(28$^+$)
393.6[e] 2	2$^+$	24.3 ps 9	4934.3[g] 4	14$^-$	12408[i] 3	(29$^-$)
917.9[e] 3	4$^+$	3.33 ps 14	5163.0[i] 4	15$^-$	12702.9[e] 11	(30$^+$)
1016.3[c] 3	2$^+$		5300.6[e] 4	16$^+$	13654[i] 3	(31$^-$)
1533.7[e] 3	6$^+$	1.66 ps 14	5302.1[g] 4	15$^-$	14028.0[e] 12	(32$^+$)
1557.7[c] 3	4$^+$		5393.1 8	(15$^-$)	14926[i] 3	(33$^-$)
1979.9[i] 3	5$^-$		5541.9[d] 4	16$^+$	15433.2[e] 14	(34$^+$)
2118.0[c] 3	6$^+$		5713.4[g] 4	16$^-$	16908.5[e] 20	(36$^+$)
2210.7[e] 3	8$^+$	1.18 ps 14	5990.3 9	(16$^-$)	18392[e] 3	(38$^+$)
2445.2[i] 3	7$^-$	2.1 ps 8	6016.1[i] 5	17$^-$	20009[e] 3	(40$^+$)
2607.2[g] 3	6$^-$		6110.8[g] 4	(17$^-$)	20148 3	(40$^+$)
2774.7[c] 3	8$^+$		6195.2[e] 4	(18$^+$)	21707[e] 3	(42$^+$)
2931.9[e] 3	10$^+$	0.76 ps 14	6468.7[d] 4	(18$^+$)	21996 4	(42$^+$)
2981.9[i] 3	9$^-$	2.6 ps 3	6756.9 16	(18$^-$)	23483[e] 4	(44$^+$)
3079.1[g] 3	8$^-$		6920.1[i] 5	(19$^-$)	x	
3271.8[g] 3	9$^-$		6982.2[g] 5	(19$^-$)	2775+x[@b]	(10$^+$)
3457.3[d] 3	10$^+$		7147.8[e] 5	(20$^+$)	3517+x[b]	(12$^+$)
3555.2[j] 14	(9$^+$)		7467.0[d] 5	(20$^+$)	4269+x[b]	(14$^+$)
3627.9[i] 3	11$^-$	1.7 ps 2	7852.8 6	(21$^-$)	5031+x[b]	(16$^+$)
3633.4[g] 3	10$^-$		7923.1[i] 13	(21$^-$)	5870+x[b]	(18$^+$)
3683.5[e] 4	12$^+$		8150.5[e] 6	(22$^+$)	y	
3855.7[g] 3	11$^-$		8490.1[d] 6	(22$^+$)	3633+y[&h]	(12$^-$)
3856.4[j] 20	(10$^+$)		8868.1 7	(23$^-$)	4312+y[h]	(14$^-$)
3960.7 3			8993.1[i] 19	(23$^-$)	5060+y[h]	(16$^-$)
3979.0[d] 4	12$^+$		9198.2[e] 7	(24$^+$)	5867+y[h]	(18$^-$)
4171.4[j] 24	(11$^+$)		9467.1 13	(23)	6699+y[h]	(20$^-$)
4238.3[g] 3	12$^-$		9970.1 15	(25$^-$)	7531+y[h]	(22$^-$)
4363.4[i] 4	13$^-$		10063.1[i] 24	(25$^-$)	8398+y[h]	(24$^-$)
4465.5[e] 4	14$^+$		10294.0[e] 10	(26$^+$)	9358+y[h]	(26$^-$)
4486[j] 3	(12$^+$)		10422.7 18	(25)	10473+y[h]	(28$^-$)
4548.0[g] 4	13$^-$		11201[i] 3	(27$^-$)	z	

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^{58}Ni(^{64}Zn,2p$\alpha\gamma$) 1998Se08,1998De29,1995Pa21 (continued)

^{116}Xe Levels (continued)

E(level)‡	Jπ#	E(level)‡	Jπ#	E(level)‡	Jπ#	E(level)‡	Jπ#
5300+z[a f]	(20+)	6062+z[f]	(22+)	8716+z[f]	(28+)	12556+z[f]	(34+)
		6926+z[f]	(24+)	9807+z[f]	(30+)	14409+z[f]	(36+)
		7817+z[f]	(26+)	11093+z[f]	(32+)		

† From RDM (1998De29).
‡ From least-squares fit (by compiler) to Eγ′s.
# From 1998Se08, based on their γγ(θ)(DCO) data and band assignments.
@ This level feeds 2775, 8+ level.
& This level feeds 3633, 10− level.
a This level feeds 5300, 16+ level.
b Band(A): Band 1 based on (10+), not connected.
c Band(B): Band 2: quasi-rotational band.
d Band(C): Band 3 based on 10+.
e Band(D): band 4: ground-state, Yrast band.
f Band(E): Band 5 based on (20+), not connected.
g Band(F): Band 6 based on 6−.
h Band(G): Band 7 based on (12−), not connected.
i Band(H): Band 8 based on 5−.
j Band(I): Band 9.

γ(^{116}Xe)

Eγ‡	Iγ‡	Ei(level)	J^π_i	E_f	J^π_f	Mult.†	Comments
184.8 *2*	1.1 *1*	4548.0	13−	4363.4	13−	M1+E2	DCO= 2.3 *3*.
227.8 *2*	3.7 *1*	3855.7	11−	3627.9	11−	M1+E2	DCO= 3.47 *16*.
230.1 *7*	5.8 *2*	5393.1	(15−)	5163.0	15−		
233.7 *2*	2.3 *1*	4699.1	14+	4465.5	14+	M1+E2	DCO= 3.00 *19*, 0.83 *14*.
241.4 *2*	1.7 *1*	5541.9	16+	5300.6	16+	M1+E2	DCO= 2.8 *4*.
273.3 *3*	0.8 *1*	6468.7	(18+)	6195.2	(18+)		
277.6 *2*	2.0 *1*	4238.3	12−	3960.7			
290.0 *2*	4.7 *2*	3271.8	9−	2981.9	9−	M1+E2	DCO= 3.71 *22*, 0.96 *12*.
295.4 *2*	2.2 *1*	3979.0	12+	3683.5	12+	M1+E2	DCO= 4.04 *23*, 0.94 *16*.
301.2 *14*	≤0.5	3856.4	(10+)	3555.2	(9+)		
309.5 *2*	4.6 *5*	4548.0	13−	4238.3	12−	M1+E2	DCO= 2.44 *14*, 0.67 *7*.
315.0& *14*	≤0.5&	4171.4	(11+)	3856.4	(10+)		
315.0& *14*	≤0.5&	4486	(12+)	4171.4	(11+)		
319.2 *3*	1.4 *1*	7467.0	(20+)	7147.8	(20+)		
327.4 *2*	≤0.5	3960.7		3633.4	10−		
332.6 *2*	2.2 *1*	3960.7		3627.9	11−		
367.7 *2*	2.7 *3*	5302.1	15−	4934.3	14−	M1+E2	DCO= 2.10 *15*, 0.66 *7*.
382.6 *2*	1.1 *1*	4238.3	12−	3855.7	11−	M1+E2	DCO= 2.6 *5*, 0.65 *26*.
386.3 *2*	3.3 *3*	4934.3	14−	4548.0	13−	M1+E2	DCO= 2.50 *19*, 0.72 *7*.
393.6 *2*	104.6 *19*	393.6	2+	0.0	0+	E2	B(E2)(W.u.)=73 *3* DCO=4.00 and 1.00 defined as standard by geometry and syst.
411.2 *2*	1.6 *2*	5713.4	16−	5302.1	15−		
465.2 *2*	6.4 *2*	2445.2	7−	1979.9	5−	E2	B(E2)(W.u.)=7.E+1 *3* DCO= 3.82 *18*, 0.91 *8*.

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^{58}Ni(^{64}Zn,2p$\alpha\gamma$) 1998Se08,1998De29,1995Pa21 (continued)

$\gamma(^{116}Xe)$ (continued)

E_γ[‡]	I_γ[‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[†]	Comments
472.0 *2*	7.3 *6*	3079.1	8^-	2607.2	6^-	E2	DCO= 3.95 *23*.
521.6 *2*	1.1 *2*	3979.0	12^+	3457.3	10^+		
524.2 *2*	100 *3*	917.9	4^+	393.6	2^+	E2	B(E2)(W.u.)=128 *6* DCO= 3.99 *3*, 0.99 *1*.
525.4 *4*	≤0.5	3457.3	10^+	2931.9	10^+		
536.9 *2*	21.8 *7*	2981.9	9^-	2445.2	7^-	E2	B(E2)(W.u.)=88 *11* DCO= 4.05 *10*, 0.97 *6*.
541.6 *2*	1.1 *1*	1557.7	4^+	1016.3	2^+		
554.3 *2*	5.3 *3*	3633.4	10^-	3079.1	8^-	E2	DCO= 3.78 *12*, 0.99 *7*.
560.4 *2*	2.9 *2*	2118.0	6^+	1557.7	4^+		
583.8 *2*	9.8 *3*	3855.7	11^-	3271.8	9^-	E2	DCO= 3.37 *18*, 1.01 *8*.
584.0 *2*	0.6 *1*	2118.0	6^+	1533.7	6^+		
597.2 *4*	2.9 *1*	5990.3	(16^-)	5393.1	(15^-)		
605.0 *2*	2.7 *3*	4238.3	12^-	3633.4	10^-	E2	DCO= 4.2 *3*, 0.96 *16*.
615.6 *2*	93 *3*	1533.7	6^+	917.9	4^+	E2	B(E2)(W.u.)=115 *10* DCO= 4.10 *2*, 0.99 *1*.
622.8 *2*	≤0.5	1016.3	2^+	393.6	2^+		
627.4 *2*	1.3 *2*	2607.2	6^-	1979.9	5^-		
634.0 *2*	1.5 *2*	3079.1	8^-	2445.2	7^-		
639.8 *2*	1.2 *1*	1557.7	4^+	917.9	4^+		
645.9 *2*	24.0 *8*	3627.9	11^-	2981.9	9^-	E2	B(E2)(W.u.)=88 *11* DCO= 3.96 *5*, 0.91 *2*.
651.5 *2*	2.0 *3*	3633.4	10^-	2981.9	9^-		
656.5 *2*	2.7 *1*	2774.7	8^+	2118.0	6^+		
677.2 *2*	60.7 *19*	2210.7	8^+	1533.7	6^+	E2	B(E2)(W.u.)=100 *12* DCO= 4.01 *3*, 0.95 *2*.
679[#] *1*	1.4[@]	4312+y	(14^-)	3633+y	(12^-)		
682.5 *2*	1.3 *1*	3457.3	10^+	2774.7	8^+		
692.2 *2*	9.5 *10*	4548.0	13^-	3855.7	11^-		DCO= 3.65 *24*, 0.95 *10*.
696.0 *2*	5.8 *6*	4934.3	14^-	4238.3	12^-	E2	DCO= 3.48 *20*, 0.88 *10*.
720.0 *2*	4.7 *2*	4699.1	14^+	3979.0	12^+		
721.2 *2*	39.0 *12*	2931.9	10^+	2210.7	8^+	E2	B(E2)(W.u.)=114 *21* DCO= 3.87 *5*, 0.96 *2*.
735.7 *2*	20.0 *6*	4363.4	13^-	3627.9	11^-		
742[#] *1*	1.8[@]	3517+x	(12^+)	2775+x	(10^+)		
748[#] *1*	4.0[@]	5060+y	(16^-)	4312+y	(14^-)		
751.7 *2*	31.2 *10*	3683.5	12^+	2931.9	10^+	E2	DCO= 3.80 *9*, 0.93 *2*.
752[#] *1*	1.6[@]	4269+x	(14^+)	3517+x	(12^+)		
754.2 *2*	8.0 *8*	5302.1	15^-	4548.0	13^-	E2	
762[#] *1*	1.0[@]	5031+x	(16^+)	4269+x	(14^+)		
762[#] *1*	4.5[@]	6062+z	(22^+)	5300+z	(20^+)		
766.6 *13*	1.1 *3*	6756.9	(18^-)	5990.3	(16^-)		
771.1 *2*	14.2 *6*	2981.9	9^-	2210.7	8^+	E1	B(E1)(W.u.)=9.4×10^{-5} *12* DCO= 2.18 *8*, 0.52 *5*.
779.1 *2*	4.3 *4*	5713.4	16^-	4934.3	14^-		
782.1 *2*	25.8 *8*	4465.5	14^+	3683.5	12^+	E2	DCO= 3.77 *12*.
799.6 *2*	15.8 *5*	5163.0	15^-	4363.4	13^-	E2	DCO= 3.64 *11*, 0.91 *6*.
807[#] *1*	3.5[@]	5867+y	(18^-)	5060+y	(16^-)		
808.7 *2*	7.2 *2*	6110.8	(17^-)	5302.1	15^-	(E2)	DCO= 3.28 *13*.
826.4 *2*	1.3 *2*	3271.8	9^-	2445.2	7^-		
832[&#] *1*	5.0[&@]	6699+y	(20^-)	5867+y	(18^-)		
832[&#] *1*	5.0[&@]	7531+y	(22^-)	6699+y	(20^-)		
835.2 *2*	21.8 *6*	5300.6	16^+	4465.5	14^+	E2	DCO= 3.59 *19*.

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^{58}Ni(^{64}Zn,2p$\alpha\gamma$) 1998Se08,1998De29,1995Pa21 (continued)

$\gamma(^{116}Xe)$ (continued)

E_γ[‡]	I_γ[‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[†]	Comments
839[#] *1*	0.9[@]	5870+x	(18^+)	5031+x	(16^+)		
842.7 *2*	5.0 *3*	5541.9	16^+	4699.1	14^+	E2	DCO= 4.1 *6*.
853.1 *2*	7.3 *3*	6016.1	17^-	5163.0	15^-	E2	DCO= 3.8 *3*, 1.00 *13*.
864[#] *1*	4.5[@]	6926+z	(24^+)	6062+z	(22^+)		
867[#] *1*	2.5[@]	8398+y	(24^-)	7531+y	(22^-)		
868.4 *2*	10.7 *5*	3079.1	8^-	2210.7	8^+	E1	DCO= 3.29 *19*.
871.4 *3*	6.0 *1*	6982.2	(19^-)	6110.8	(17^-)		
891[#] *1*	4.2[@]	7817+z	(26^+)	6926+z	(24^+)		
894.5 *2*	16.6 *5*	6195.2	(18^+)	5300.6	16^+		
899[#] *1*	4.2[@]	8716+z	(28^+)	7817+z	(26^+)		
904.0 *2*	6.6 *2*	6920.1	(19^-)	6016.1	17^-		
911.6 *2*	26.7 *9*	2445.2	7^-	1533.7	6^+	E1	B(E1)(W.u.)=0.00014 *6* DCO= 2.14 *4*, 0.54 *2*.
926.9 *2*	4.7 *1*	6468.7	(18^+)	5541.9	16^+		
932.7 *3*	2.2 *2*	7852.8	(21^-)	6920.1	(19^-)		
952.6 *3*	7.6 *2*	7147.8	(20^+)	6195.2	(18^+)		
955.6 *12*	2.0 *1*	10422.7	(25)	9467.1	(23)		
960[#] *1*	1.0[@]	9358+y	(26^-)	8398+y	(24^-)		
977.0 *12*	3.3 *2*	9467.1	(23)	8490.1	(22^+)		
998.3 *4*	4.4 *2*	7467.0	(20^+)	6468.7	(18^+)		
1002.7 *3*	3.5 *1*	8150.5	(22^+)	7147.8	(20^+)		
1003.0 *12*	1.1 *2*	7923.1	(21^-)	6920.1	(19^-)		
1015.3 *3*	1.1 *2*	8868.1	(23^-)	7852.8	(21^-)		
1016.6 *14*	≤0.5	1016.3	2^+	0.0	0^+		
1023.1 *3*	3.4 *2*	8490.1	(22^+)	7467.0	(20^+)		
1047.7 *3*	2.9 *1*	9198.2	(24^+)	8150.5	(22^+)		
1061.3 *2*	3.0 *1*	3271.8	9^-	2210.7	8^+		
1061.9 *2*	5.3 *4*	1979.9	5^-	917.9	4^+	E1	DCO= 2.09 *6*, 0.56 *4*.
1070.0[&] *14*	1.3[&] *2*	8993.1	(23^-)	7923.1	(21^-)		
1070.0[&] *14*	1.3[&] *2*	10063.1	(25^-)	8993.1	(23^-)		
1073.4 *2*	4.7 *3*	2607.2	6^-	1533.7	6^+	E1	DCO= 3.5 *3*.
1091[#] *1*	3.0[@]	9807+z	(30^+)	8716+z	(28^+)		
1095.8 *7*	2.5 *1*	10294.0	(26^+)	9198.2	(24^+)		
1102.0 *14*	≤0.5	9970.1	(25^-)	8868.1	(23^-)		
1115[#] *1*	0.7[@]	10473+y	(28^-)	9358+y	(26^-)		
1138.0 *12*	≤0.5	11201	(27^-)	10063.1	(25^-)		
1163.8 *4*	2.1 *2*	11457.8	(28^+)	10294.0	(26^+)		
1207.0 *12*	≤0.5	12408	(29^-)	11201	(27^-)		
1245.1 *3*	1.4 *2*	12702.9	(30^+)	11457.8	(28^+)		
1246.0 *12*	≤0.5	13654	(31^-)	12408	(29^-)		
1246.8 *2*	≤0.5	3457.3	10^+	2210.7	8^+		
1272.0 *12*	≤0.5	14926	(33^-)	13654	(31^-)		
1286[#] *1*	1.7[@]	11093+z	(32^+)	9807+z	(30^+)		
1325.1 *4*	1.2 *1*	14028.0	(32^+)	12702.9	(30^+)		
1344.5 *14*	2.2 *10*	3555.2	(9^+)	2210.7	8^+		
1405.2 *8*	1.1 *2*	15433.2	(34^+)	14028.0	(32^+)		
1463[#] *1*	0.7[@]	12556+z	(34^+)	11093+z	(32^+)		
1475.3 *14*	0.6 *2*	16908.5	(36^+)	15433.2	(34^+)		
1483.5 *17*	≤0.5	18392	(38^+)	16908.5	(36^+)		
1616.6 *15*	≤0.5	20009	(40^+)	18392	(38^+)		
1698.0 *17*	≤0.5	21707	(42^+)	20009	(40^+)		
1756 *2*	≤0.5	20148	(40^+)	18392	(38^+)		
1776[a] *2*	≤0.5	23483	(44^+)	21707	(42^+)		

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^{58}Ni(^{64}Zn,2p$\alpha\gamma$) 1998Se08,1998De29,1995Pa21 (continued)

$\gamma(^{116}Xe)$ (continued)

E_γ ‡	I_γ ‡	E_i(level)	J_i^π	E_f	J_f^π
1848 *2*	≤0.5	21996	(42^+)	20148	(40^+)
1853# *1*	≤0.5@	14409+z	(36^+)	12556+z	(34^+)

† From DCO (1998Se08). Multipolarities are assigned here (by compiler) to only those transitions where $\gamma\gamma(\theta)$(DCO) measurements are given by authors. For most other transitions multipolarities are quoted by 1998Se08 as implied by ΔJ^π.
‡ From 1998Se08. Intensities normalized to 100 for 524.2γ.
# From figure 1 (1998Se08). Uncertainty assigned (compiler) as 1 keV.
@ Estimated (from RADWARE) from Γ of arrows in figure 1 of 1998Se08.
& Multiply placed with undivided intensity.
a Placement of transition in the level scheme is uncertain.

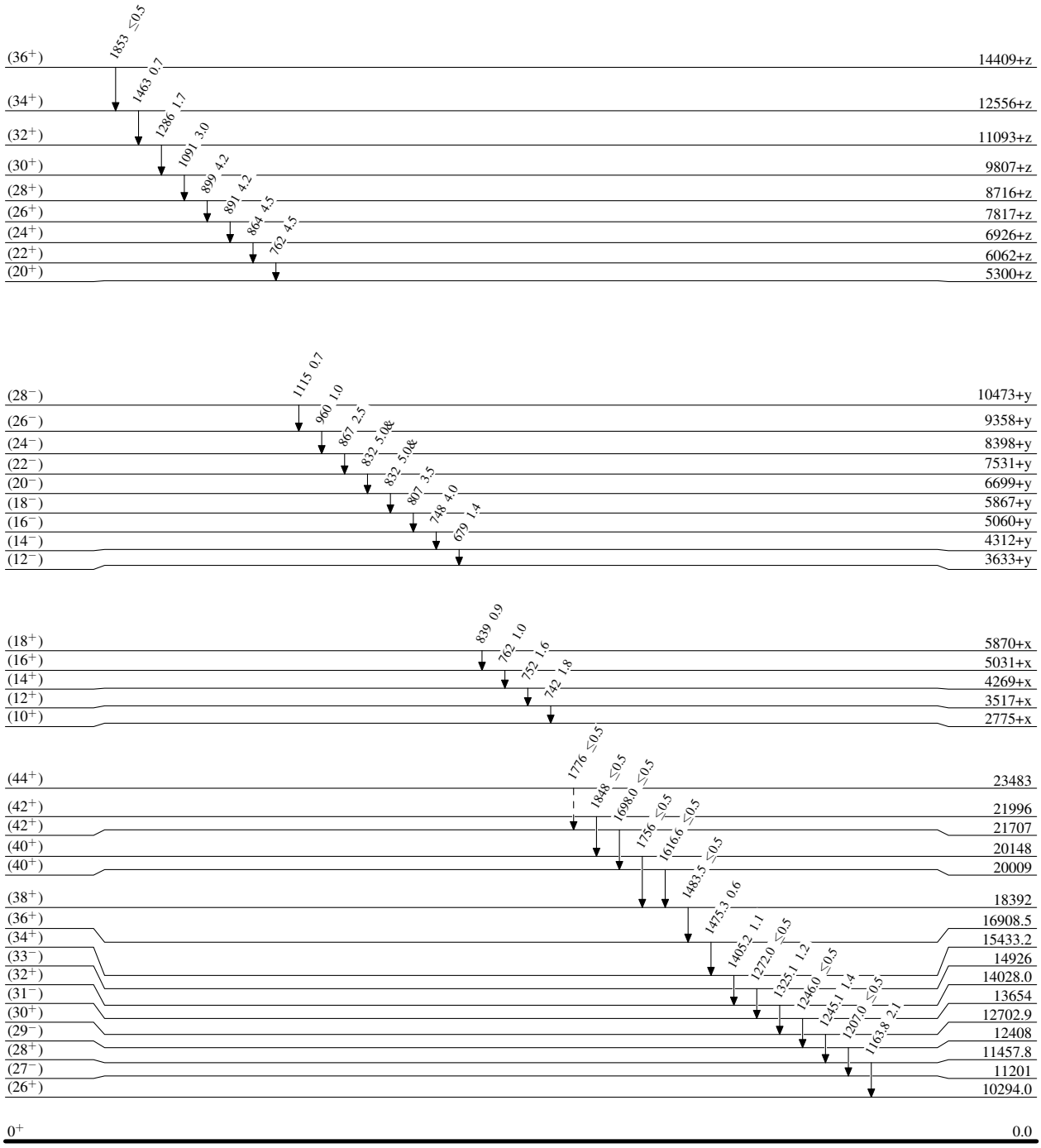
^{58}Ni(^{64}Zn,2p$\alpha\gamma$) 1998Se08,1998De29,1995Pa21

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)

Level Scheme

Intensities: Relative I_γ
& Multiply placed: undivided intensity given



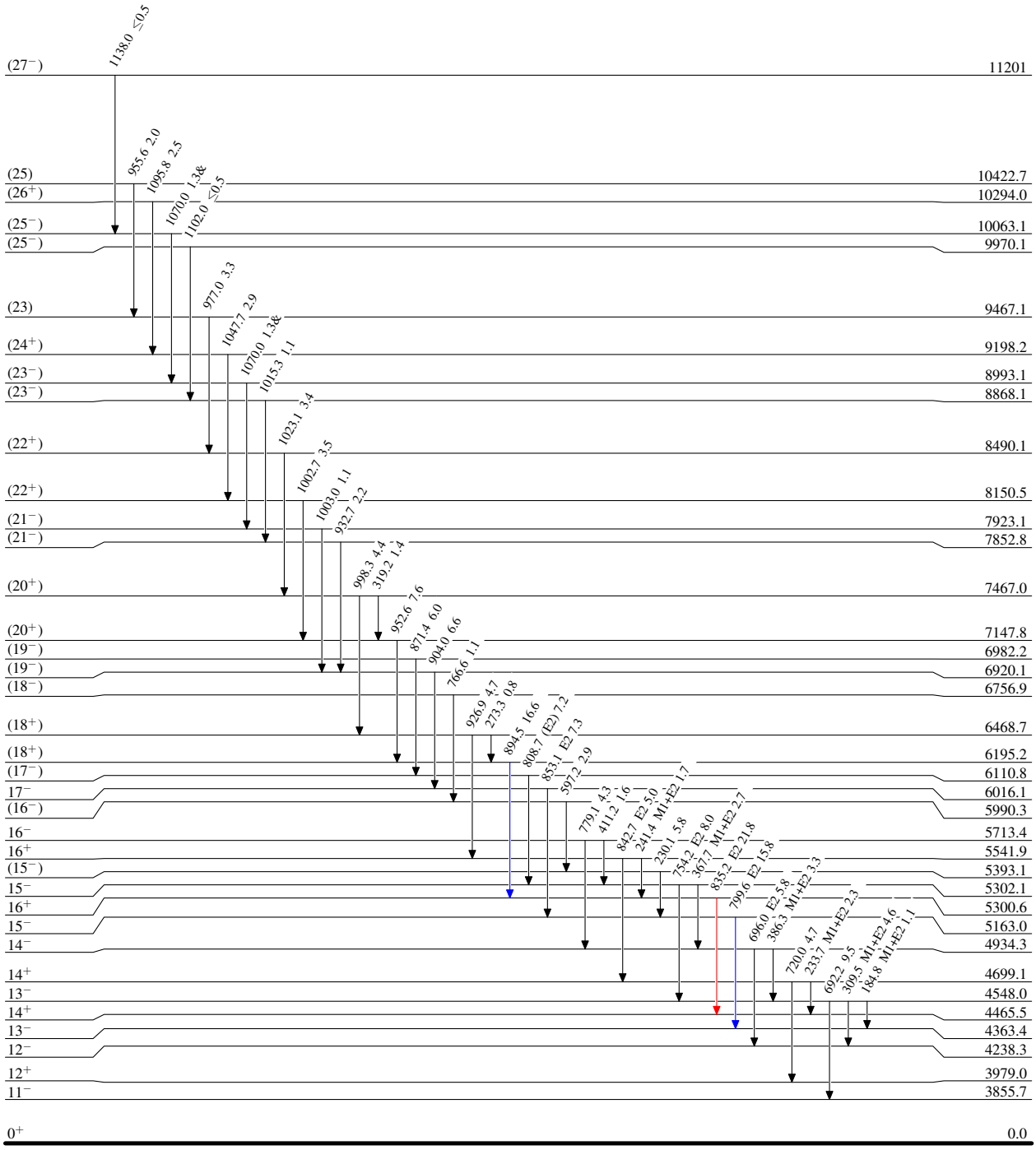
$^{116}_{54}Xe_{62}$

^{58}Ni(^{64}Zn,2p$\alpha\gamma$) 1998Se08,1998De29,1995Pa21

Level Scheme (continued)

Intensities: Relative I_γ
& Multiply placed: undivided intensity given

Legend
$I_\gamma < 2\% \times I_\gamma^{max}$
$I_\gamma < 10\% \times I_\gamma^{max}$
$I_\gamma > 10\% \times I_\gamma^{max}$



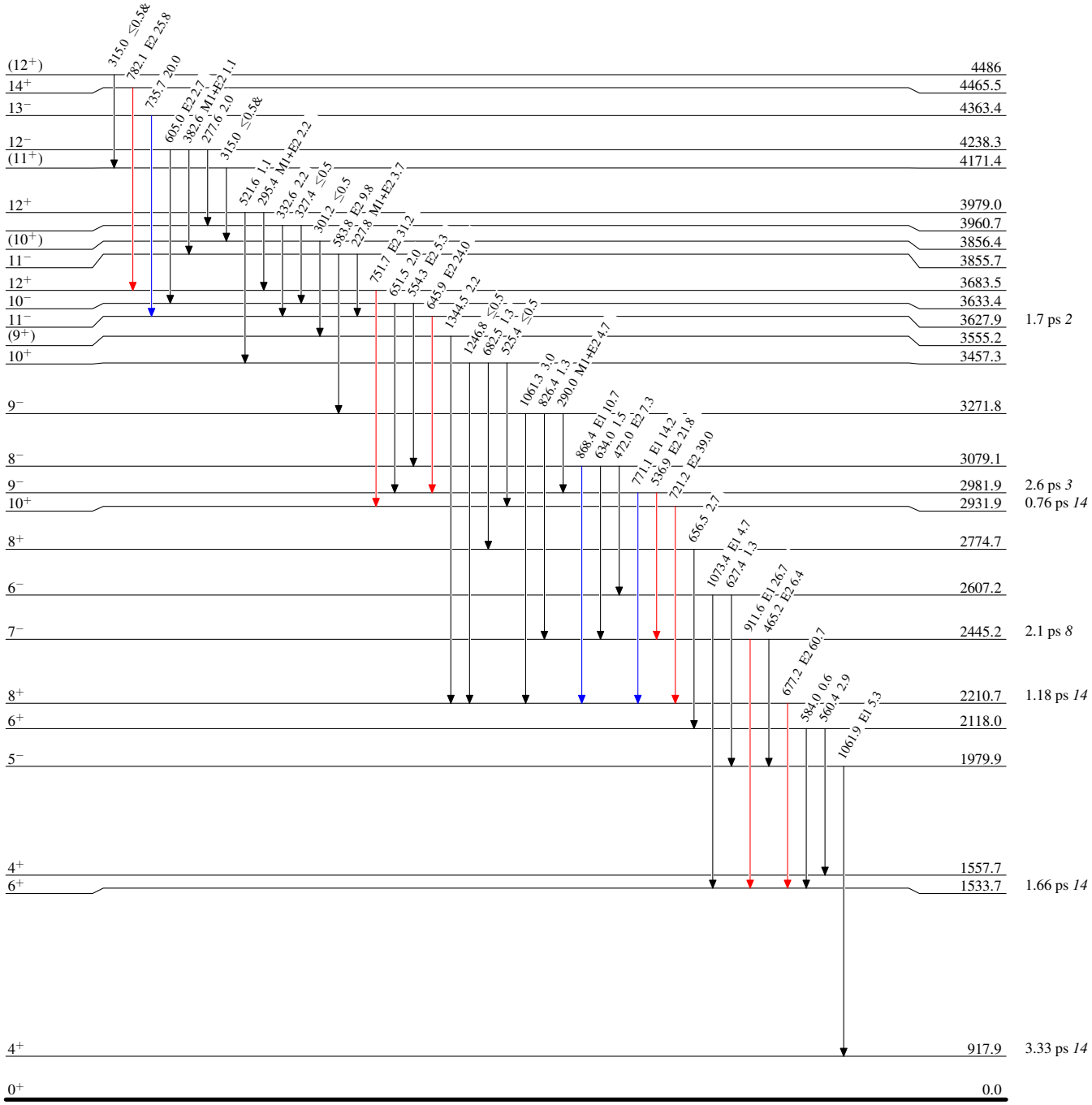
$^{116}_{54}Xe_{62}$

^{58}Ni(^{64}Zn,2p$\alpha\gamma$) 1998Se08,1998De29,1995Pa21

Level Scheme (continued)

Intensities: Relative I_γ
& Multiply placed: undivided intensity given

Legend
$I_\gamma < 2\% \times I_\gamma^{max}$
$I_\gamma < 10\% \times I_\gamma^{max}$
$I_\gamma > 10\% \times I_\gamma^{max}$



$^{116}_{54}Xe_{62}$

^{58}Ni(^{64}Zn,2p$\alpha\gamma$) 1998Se08,1998De29,1995Pa21

Level Scheme (continued)

Intensities: Relative I_γ
& Multiply placed: undivided intensity given

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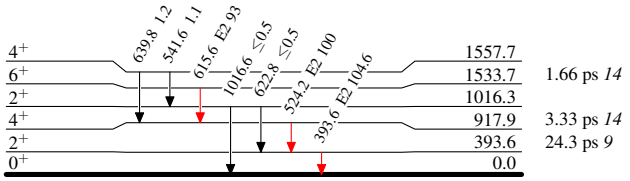
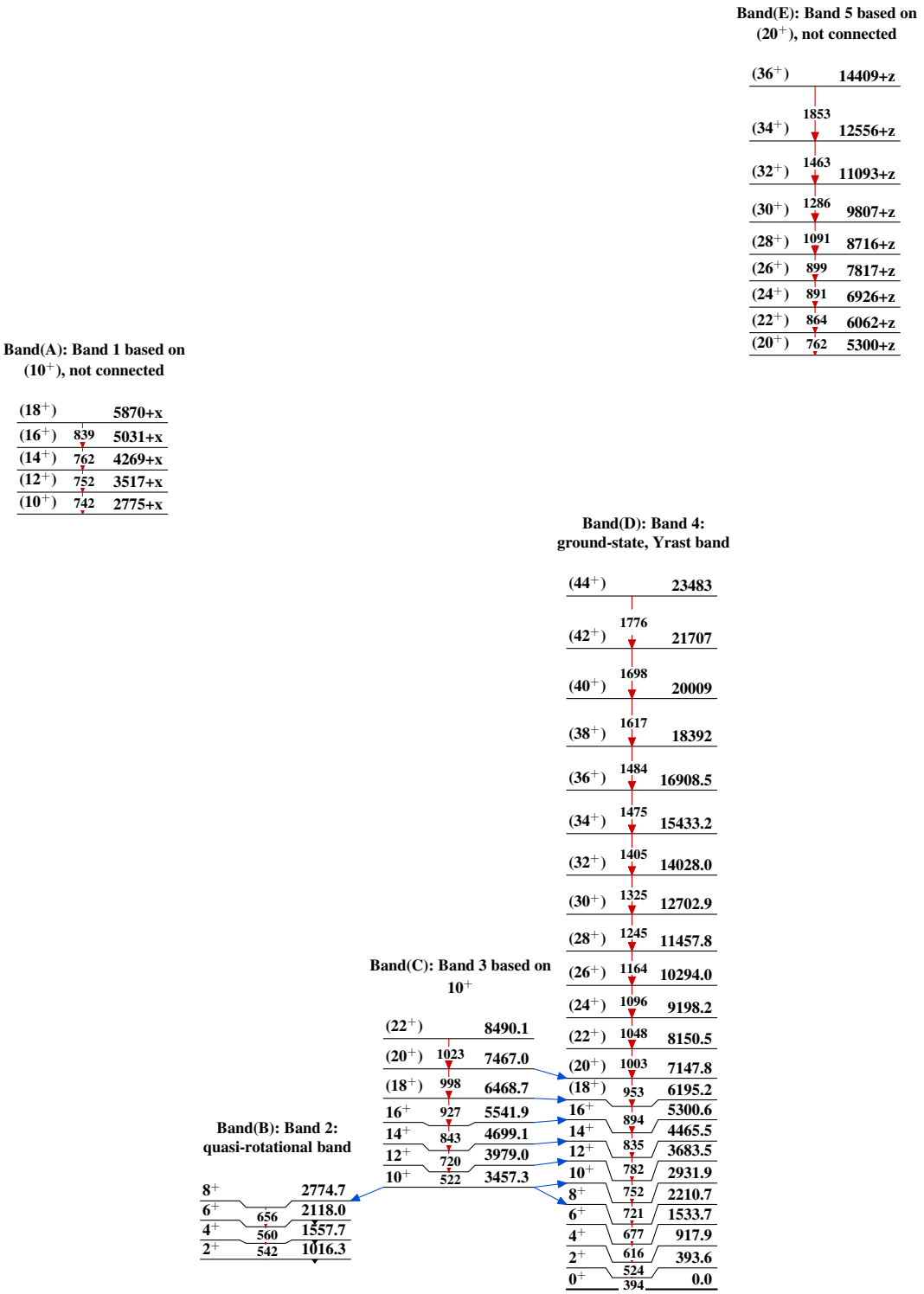


$^{116}_{54}Xe_{62}$

^{58}Ni(^{64}Zn,2p$\alpha\gamma$) 1998Se08,1998De29,1995Pa21



$^{116}_{54}Xe_{62}$

^{58}Ni(^{64}Zn,2p$\alpha\gamma$) 1998Se08,1998De29,1995Pa21 (continued)