

(HI,xn γ) 2000Pa31,2007Pa07

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Jean Blachot	NDS 113, 515 (2012)	1-Jan-2012

2000Pa31: $^{58}\text{Ni}(^{58}\text{Ni},2p\gamma)$: E=210 MeV. Measured $E\gamma$, $I\gamma$, $\gamma\gamma$, and $\gamma\gamma(\theta)$ (DCO) using JUROSPHERE spectrometer consisting of 7 TESSA-type, 5 NORDBALL-type and 14 EUROGAM-type HPGe detectors, each within a bismuth-germanate escape-suppression shield.

2007Pa07: E=240 MeV, target=1 mg/cm² on a thick ^{208}Pb backing. Measured $E\gamma$, $I\gamma$, $\gamma\gamma$, $p\gamma$ coin and lifetimes by Doppler-shift attenuation method using Gammasphere array of 98 HPGe detectors, and Microball charged particle detector array.

The level scheme is as given by **2000Pa31**. Previous measurements are:

1993Ru05: E=243 MeV.

Preliminary results were given in **1991RuZZ** and **1988RuZZ**.

Measured: ms, Compton suppressed Ge multi-detectors (polytessa). Measured lifetimes with plunger technique.

1998De29: E=215 MeV at "TASCC" (20 HP Ge detectors+71 element BGO), Measured lifetimes with plunger technique.

 ^{114}Xe Levels

E(level)	J π	T _{1/2} ^{†‡}	E(level)	J π	T _{1/2} ^{†‡}
0 [#]	0 ⁺		4815.5 [#] 5	14 ⁺	
450.07 [#] 19	2 ⁺	16.5 ps 11	4849.3 [@] 4	14 ⁺	
1068.92 [#] 25	4 ⁺	3.40 ps 21	5285.6 ^b 10	(14 ⁻)	
1148.7 [@] 4	2 ⁺		5452.1 ^{&} 4	15 ⁻	
1623.92 ^{&} 25	3 ⁻		5617.6 ^a 7	15 ⁻	
1776.7 [@] 4	4 ⁺		5635.3 [#] 7	16 ⁺	0.49 ps +21-13
1789.6 [#] 3	6 ⁺	2.08 ps 28	5712.0 [@] 4	16 ⁺	
2000.8 ^{&} 3	5 ⁻	22.9 ps 21	5720.1 7		
2356.4 [@] 4	6 ⁺		6157.6 ^b 11	(16 ⁻)	
2554.4 [#] 4	8 ⁺		6308.5 ^{&} 4	17 ⁻	
2559.4 ^{&} 4	7 ⁻	3.8 ps 8	6329.9 8		
2765.7 ^b 5	6 ⁻		6514.1 [#] 9	18 ⁺	0.34 ps +15-7
2920.2 ^a 5	7 ⁻		6537.3 ^a 8	17 ⁻	
2984.5 [@] 4	8 ⁺		6681.0 [@] 7	(18 ⁺)	
3095.4 ^b 5	8 ⁻		6851.4 ^{&} 5	19 ⁻	
3170.9 ^{&} 4	9 ⁻		7021.6 ^b 12	(18 ⁻)	
3289.6 ^a 4	9 ⁻		7357.3 ^a 13	(19 ⁻)	
3305.6 [#] 4	10 ⁺		7451.5 [#] 10	20 ⁺	0.24 ps +10-6
3613.3 [@] 4	10 ⁺		7545.4 ^{&} 5	21 ⁻	
3638.1 ^b 7	(10 ⁻)		7684.0 [@] 12	(20 ⁺)	
3863.9 ^a 4	11 ⁻		7898.4 ^b 12	(20 ⁻)	
3924.4 ^{&} 4	11 ⁻		8255.3 ^a 17	(21 ⁻)	
4046.4 [#] 4	12 ⁺		8379.9 ^{&} 7	23 ⁻	
4140.3 [@] 4	12 ⁺		8449.0 [#] 11	(22 ⁺)	0.18 ps +8-5
4407.7 ^b 9	(12 ⁻)		9371.5 ^{&} 9	(25 ⁻)	
4697.5 ^a 5	13 ⁻		9510.7 [#] 12	(24 ⁺)	0.132 ps +55-35
4736.3 ^{&} 4	13 ⁻		10583.5 ^{&} 14	(27 ⁻)	

[†] From RDM (**1998De29**) for levels below 2560 Kev.

[‡] From DSAM (**2007Pa07**), for levels below 2560 Kev assumed constant Q(transition)=3.0 5. In the spin range of 16 to 24, Q(transition)=3.0 5 which corresponds to deformation $\epsilon_2=0.19$ 3.

Continued on next page (footnotes at end of table)

(HI,xn γ) 2000Pa31,2007Pa07 (continued) ^{114}Xe Levels (continued)

- # Band(A): g.s. band.
 @ Band(B): 2⁺ band Q(0)=3.5.
 & Band(C): 3⁻ band. Q(0)=2.3.
^a Band(D): band based on 7⁻.
^b Band(E): band based on 6⁻.

 $\gamma(^{114}\text{Xe})$

R=I γ (measured backward, gated central)/I γ (measured central, gated backward).

E_γ [†]	I γ [‡]	E_i (level)	J $^\pi_i$	E_f	J $^\pi_f$	Mult. [#]	Comments
175.0 5	1.5	3095.4	8 ⁻	2920.2	7 ⁻	M1+E2	Mult.: R=0.82 12.
211.3 5	4.2	2000.8	5 ⁻	1789.6	6 ⁺	E1	B(E1)(W.u.)=0.000138 13 Mult.: R=0.63 5.
223.7 5	2.7	2000.8	5 ⁻	1776.7	4 ⁺	E1	B(E1)(W.u.)=7.5×10 ⁻⁵ 7 Mult.: R=0.63 5.
307.6 5	3.5	3613.3	10 ⁺	3305.6	10 ⁺	M1+E2	Mult.: R=1.00 9.
329.7 5	2.4	3095.4	8 ⁻	2765.7	6 ⁻	(E2)	Mult.: R=1.13 10.
369.3 5	1.3	3289.6	9 ⁻	2920.2	7 ⁻		
376.9 2	33	2000.8	5 ⁻	1623.92	3 ⁻	(E2)	B(E2)(W.u.)=81 8 Mult.: R=0.98 3.
442.5 5	1.7	3613.3	10 ⁺	3170.9	9 ⁻	E1	Mult.: R=0.66 8.
450.1 2	100	450.07	2 ⁺	0	0 ⁺	E2	B(E2)(W.u.)=57 4 Mult.: R=0.98 2.
527.1 2	17	4140.3	12 ⁺	3613.3	10 ⁺	(E2)	Mult.: R=1.05 5.
536.1 5	4.0	3095.4	8 ⁻	2559.4	7 ⁻	M1+E2	Mult.: R=0.66 6.
542.7 5	7.9	3638.1	(10 ⁻)	3095.4	8 ⁻		
542.9 2	20	6851.4	19 ⁻	6308.5	17 ⁻	(E2)	Mult.: R=1.02 4.
555.2 2	14	1623.92	3 ⁻	1068.92	4 ⁺	E1	Mult.: R=0.70 5.
558.7 2	37	2559.4	7 ⁻	2000.8	5 ⁻	(E2)	B(E2)(W.u.)=72 16 Mult.: R=1.02 4.
567.0 5	4.6	2356.4	6 ⁺	1789.6	6 ⁺	M1+E2	Mult.: R=0.91 8.
574.3 5	1.6	3863.9	11 ⁻	3289.6	9 ⁻		
580.1 5	6.6	2356.4	6 ⁺	1776.7	4 ⁺	(E2)	Mult.: R=0.95 7.
596.5 2	2.5	6308.5	17 ⁻	5712.0	16 ⁺		
609.8 5	2.5	6329.9		5720.1			
611.4 2	29	3170.9	9 ⁻	2559.4	7 ⁻	(E2)	Mult.: R=1.15 5.
619.0 2	88	1068.92	4 ⁺	450.07	2 ⁺	E2	B(E2)(W.u.)=56 4 Mult.: R=1.02 2.
628.0 5	1.4	1776.7	4 ⁺	1148.7	2 ⁺		
628.1 2	15	2984.5	8 ⁺	2356.4	6 ⁺	(E2)	Mult.: R=1.12 5 for 628.1+628.9.
628.9 2	14	3613.3	10 ⁺	2984.5	8 ⁺	(E2)	Mult.: R=1.12 5 for 628.1+628.9.
634.9 5	7.5	3924.4	11 ⁻	3289.6	9 ⁻	(E2)	Mult.: R=0.96 6.
691 1	3.0	6308.5	17 ⁻	5617.6	15 ⁻	(E2)	Mult.: R=1.08 9 for 691+692.9+694.0.
692.9 2	14	3863.9	11 ⁻	3170.9	9 ⁻	(E2)	Mult.: R=1.08 9 for 691+692.9+694.0.
694.0 2	17	7545.4	21 ⁻	6851.4	19 ⁻	(E2)	Mult.: R=1.08 9 for 691+692.9+694.0.
698.7 5	2.4	1148.7	2 ⁺	450.07	2 ⁺	M1,E2	Mult.: R=0.63 8.
708 1	1.4	1776.7	4 ⁺	1068.92	4 ⁺		
709.1 2	16	4849.3	14 ⁺	4140.3	12 ⁺	(E2)	Mult.: R=1.00 5.
715.9 2	25	5452.1	15 ⁻	4736.3	13 ⁻	(E2)	Mult.: R=1.05 4.
720.7 2	59	1789.6	6 ⁺	1068.92	4 ⁺	E2	B(E2)(W.u.)=43 6 Mult.: R=0.98 2.
730.1 5	8.5	3289.6	9 ⁻	2559.4	7 ⁻	(E2)	Mult.: R=1.09 9 for a composite peak.

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(HI,xny) 2000Pa31,2007Pa07 (continued) $\gamma(^{114}\text{Xe})$ (continued)

E_γ^\dagger	I_γ^\ddagger	$E_i(\text{level})$	J_i^π	E_f	J_f^π	Mult. [#]	Comments
735.7 5	9.7	3289.6	9 ⁻	2554.4	8 ⁺	E1	Mult.: R=0.72 7.
740.7 2	19	4046.4	12 ⁺	3305.6	10 ⁺	(E2)	Mult.: R=0.95 4.
751.1 2	26	3305.6	10 ⁺	2554.4	8 ⁺	(E2)	Mult.: R=0.97 4.
753.6 2	12	3924.4	11 ⁻	3170.9	9 ⁻	(E2)	Mult.: R=1.06 8 for 753.6+753.9.
753.9 5	2.6	5452.1	15 ⁻	4697.5	13 ⁻	(E2)	Mult.: R=1.06 8 for 753.6+753.9.
764.7 2	40	2554.4	8 ⁺	1789.6	6 ⁺	(E2)	Mult.: R=1.01 2.
764.8 5	2.5	2765.7	6 ⁻	2000.8	5 ⁻		
769.1 2	15	4815.5	14 ⁺	4046.4	12 ⁺	(E2)	Mult.: R=1.03 4.
769.6 5	5.9	2559.4	7 ⁻	1789.6	6 ⁺		
769.6 5	5.4	4407.7	(12 ⁻)	3638.1	(10 ⁻)		
802.0 5	3.9	4849.3	14 ⁺	4046.4	12 ⁺		
812.0 2	21	4736.3	13 ⁻	3924.4	11 ⁻	(E2)	Mult.: R=0.99 4.
819.8 5	8.4	5635.3	16 ⁺	4815.5	14 ⁺	E2	Mult.: R=0.91 7.
820 1	1.0	7357.3	(19 ⁻)	6537.3	17 ⁻		
832.9 5	9.2	4697.5	13 ⁻	3863.9	11 ⁻	(E2)	Mult.: R=1.07 10 for 832.9+834.5.
834.5 5	8	8379.9	23 ⁻	7545.4	21 ⁻	(E2)	Mult.: R=1.07 10 for 834.5+832.9.
835.1 5	<1	4140.3	12 ⁺	3305.6	10 ⁺		
856.4 2	26	6308.5	17 ⁻	5452.1	15 ⁻	(E2)	Mult.: R=1.02 4.
862.7 2	11	5712.0	16 ⁺	4849.3	14 ⁺	(E2)	Mult.: R=0.95 7.
864.0 5	1.6	7021.6	(18 ⁻)	6157.6	(16 ⁻)		
870.8 5	4.1	5720.1		4849.3	14 ⁺		
872.0 5	2.1	6157.6	(16 ⁻)	5285.6	(14 ⁻)		
872.5 5	4.3	4736.3	13 ⁻	3863.9	11 ⁻		
877 [@] 1	<1	7898.4	(20 ⁻)	7021.6	(18 ⁻)		
877.9 5	2.6	5285.6	(14 ⁻)	4407.7	(12 ⁻)		
878.8 5	4.3	6514.1	18 ⁺	5635.3	16 ⁺	E2	Mult.: R=0.93 8.
898 1	<1	8255.3	(21 ⁻)	7357.3	(19 ⁻)		
919.7 5	2.0	6537.3	17 ⁻	5617.6	15 ⁻	(E2)	Mult.: R=0.95 12 for 919.7+920.2.
920.2 5	3.0	5617.6	15 ⁻	4697.5	13 ⁻	(E2)	Mult.: R=0.95 12 for 919.7+920.2.
931 1	<1	2000.8	5 ⁻	1068.92	4 ⁺		
937.4 5	2.2	7451.5	20 ⁺	6514.1	18 ⁺	(E2)	Mult.: R=1.09 11.
969.0 5	5.5	6681.0	(18 ⁺)	5712.0	16 ⁺		
977 1	<1	2765.7	6 ⁻	1789.6	6 ⁺		
991.6 5	3.6	9371.5	(25 ⁻)	8379.9	23 ⁻		
997.5 5	1.5	8449.0	(22 ⁺)	7451.5	20 ⁺		
1003 1	<1	7684.0	(20 ⁺)	6681.0	(18 ⁺)		
1059.0 5	1.1	3613.3	10 ⁺	2554.4	8 ⁺		
1061.7 5	1.0	9510.7	(24 ⁺)	8449.0	(22 ⁺)		
1130.2 5	2.5	2920.2	7 ⁻	1789.6	6 ⁺	E1	Mult.: R=0.64 7.
1148.5 5	1.4	1148.7	2 ⁺	0	0 ⁺		
1173.7 2	19	1623.92	3 ⁻	450.07	2 ⁺	E1	Mult.: R=0.68 4.
1194.7 5	3.2	2984.5	8 ⁺	1789.6	6 ⁺	(E2)	Mult.: R=1.01 10.
1212 1	<1	10583.5	(27 ⁻)	9371.5	(25 ⁻)		

[†] $\Delta(E_\gamma)$ assigned as 0.2 keV for strong (taken as $I_\gamma > 10$) and 0.5 keV for $I_\gamma < 10$, based on a general statement by 2000Pa31.

[‡] Uncertainties are 5% for $I_\gamma > 10$ and 10% for $I_\gamma < 10$.

[#] When gated by a stretched E2, $R \approx 1.00$ is taken to give stretched Q (assumed E2) or D+Q with $\Delta J = 0$. $R \approx 0.65$ are expected for stretched D (assumed E1).

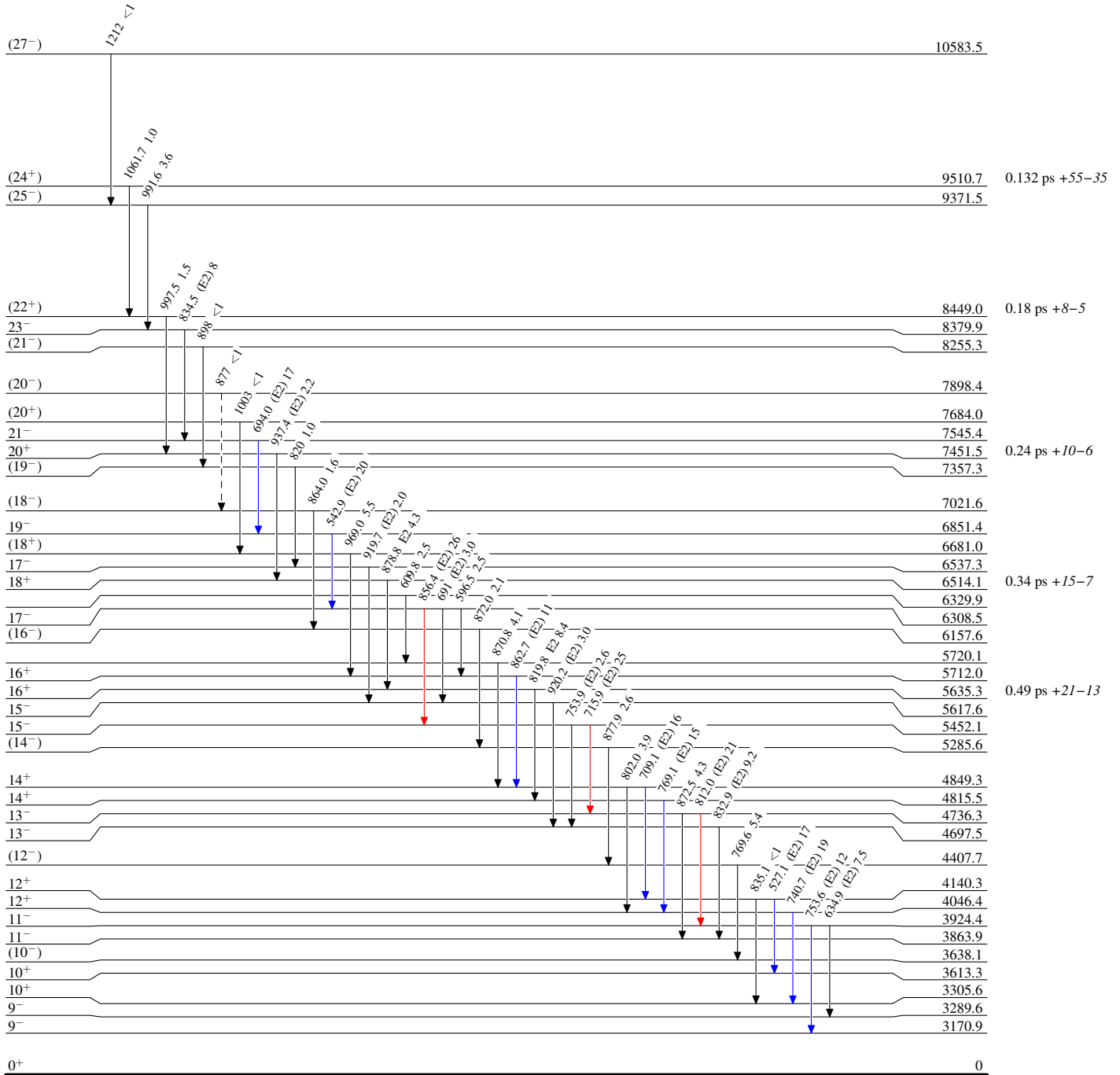
[@] Placement of transition in the level scheme is uncertain.

(HI,xn γ) 2000Pa31,2007Pa07

Legend

Level Scheme
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)

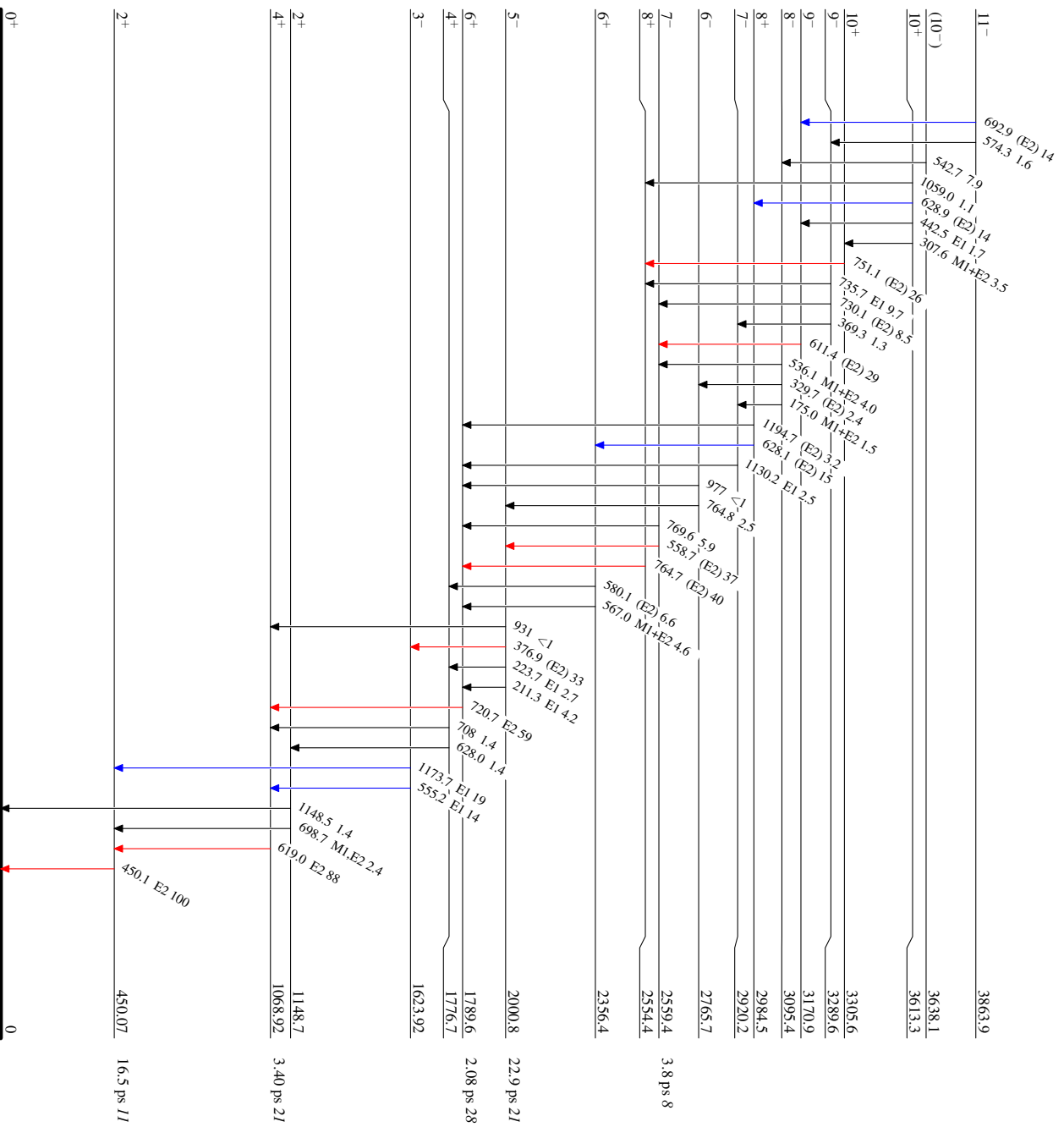
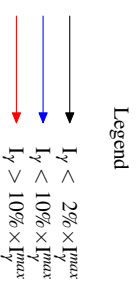


$^{114}_{54}\text{Xe}_{60}$

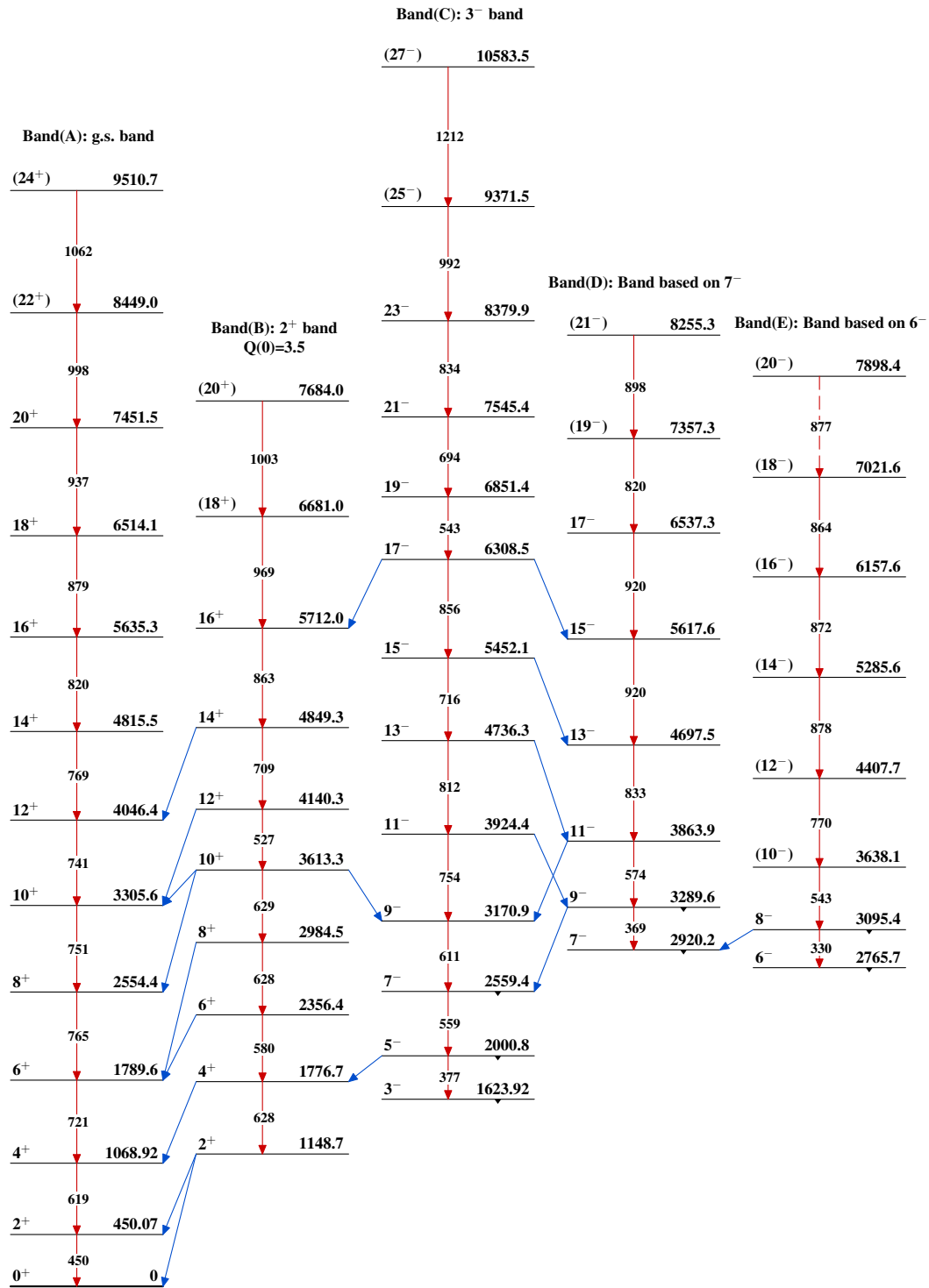
(HJ,xny) 2000Pa31,2007Pa07

Level Scheme (continued)

Intensities: Relative I_γ



¹¹⁴Xe₆₀
⁵⁴Xe₆₀

(HL,xn γ) 2000Pa31,2007Pa07 $^{114}_{54}\text{Xe}_{60}$