^{59}Ni(n,γ) E=thermal 2004Ra23

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	E. Browne, J. K. Tuli	NDS 114, 1849 (2013)	31-Dec-2012

Additional information 1.
E=thermal. Measured Eγ, Iγ, $\gamma\gamma$ with a coaxial intrinsic Ge detector positioned inside a NaI(Tl) annulus. Other: 1975Wi06.

^{60}Ni Levels

E(level)†	J$^\pi$	E(level)†	J$^\pi$	E(level)†	E(level)†	J$^\pi$
0.0	0$^+$	4111.96 *9*		5902.44 *7*	7473.50 *24*	
1332.535 *18*	2$^+$	4318.58 *5*	2$^+$‡	5918.55 *21*	7495.3 *4*	
2158.671 *19*	2$^+$	4335.55 *4*		5967.8 *3*	7552.0 *3*	
2284.822 *25*	0$^+$	4355.57 *12*		6066.70 *11*	7684.1 *4*	
2505.79 *3*	4$^+$	4493.17 *6*	2$^+$	6239.2 *3*	7690.1 *3*	
2625.98 *3*	3$^+$	4534.13 *14*		6327.23 *15*	7761.7 *3*	
3119.44 *18*	4$^+$	4547.99 *3*	1$^+$,2$^+$	6362.06 *17*	7798.9 *3*	
3123.744 *21*	2$^+$	4577.45 *6*	2$^+$	6382.4 *4*	7818.04 *13*	
3186.23 *4*	3$^+$	4760.24 *9*		6465.26 *16*	7950.95 *24*	
3193.890 *20*	1$^+$	4779.16 *6*		6489.17 *23*	8286.3 *3*	
3268.96 *4*	2$^+$	4843.93 *8*		6516.73 *24*	8504.7 *3*	
3317.85 *3*	0$^+$	4929.00 *14*		6567.35 *20*	8565.62 *19*	
3393.16 *3*	2$^+$	4953.37 *7*		6647.18 *9*	8638.6 *3*	
3587.75 *3*	0$^+$	5065.03 *6*	(1$^-$)	6756.3 *3*	8666.23 *22*	
3619.47 *4*	(3)$^+$	5127.18 *17*		6834.94 *19*	9045.22 *24*	
3734.42 *4*	2$^+$	5288.57 *14*		6911.95 *9*	9076.68 *17*	
3871.078 *24*	2$^+$‡	5446.99 *10*		6996.86 *20*	9346.84 *18*	
3887.38 *7*		5476.06 *21*		7056.29 *14*	9953.7 *3*	
3925.21 *9*	2$^+$,3$^+$	5612.43 *4*		7207.7 *3*	10029.04 *17*	
4006.46 *3*	1$^+$,2$^+$	5672.39 *7*		7222.82 *11*	(11387.720# *20*)	(1$^-$,2$^-$)
4019.91 *3*	1$^+$,2$^+$	5710.82 *4*		7316.15 *16*		
4039.91 *6*	3$^-$	5860.0 *5*		7339.70 *25*		
4078.01 *5*	1$^+$,2$^+$	5878.07 *9*		7414.17 *23*		

† From least-squares fit to γ-ray energies.
‡ J$^\pi$=1$^+$,2$^+$ in (n,γ); adopted 2$^+$ as γ to 4$^+$.
# S(n)=11387.73 *5* (2012Wa38).

γ(^{60}Ni)

Iγ normalization: σ=73.7 b *12* (2004Ra23). Since not all primary γ rays have been detected in 2004Ra23, the recommended cross-section value corresponds to ΣI_γ (to ground state).

E$_\gamma$	I$_\gamma$†‡	E$_i$(level)	J$_i^\pi$	E$_f$	J$_f^\pi$	E$_\gamma$	I$_\gamma$†‡	E$_i$(level)	J$_i^\pi$	E$_f$	J$_f^\pi$
119.9 *3*	0.033 *4*	2625.98	3$^+$	2505.79	4$^+$	x355.67 *11*	0.026 *4*				
x123.65 *20*	0.011 *2*					393.76 *6*	0.162 *4*	3587.75	0$^+$	3193.890	1$^+$
x139.11 *17*	0.013 *3*					431.9 *4*	0.009 *3*	4019.91	1$^+$,2$^+$	3587.75	0$^+$
x158.34 *12*	0.016 *2*					467.28 *3*	0.71 *3*	2625.98	3$^+$	2158.671	2$^+$
x215.16 *18*	0.015 *3*					493.3 *4*	0.008 *3*	3119.44	4$^+$	2625.98	3$^+$
x216.95 *25*	0.014 *3*					497.76 *4*	0.115 *4*	3123.744	2$^+$	2625.98	3$^+$
x229.62 *10*	0.027 *3*					x521.24 *8*	0.118 *8*				
x277.38 *14*	0.024 *3*					x541.0 *3*	0.014 *3*				
305.7 *3*	0.016 *3*	3925.21	2$^+$,3$^+$	3619.47	(3)$^+$	x555.81 *19*	0.020 *3*				

Continued on next page (footnotes at end of table)

^{59}Ni(n,γ) E=thermal 2004Ra23 (continued)

γ(^{60}Ni) (continued)

E_γ	I_γ[†‡]	E_i(level)	J_i^π	E_f	J_f^π
569.5 *4*	0.009 *3*	3887.38		3317.85	0^+
[x]604.62 *23*	0.014 *3*				
642.96 *5*	0.088 *3*	3268.96	2^+	2625.98	3^+
[x]660.27 *16*	0.019 *3*				
667.4 *5*	0.007 *3*	4779.16		4111.96	
[x]672.90 *6*	0.073 *3*				
677.17 *5*	0.137 *3*	3871.078	2^+	3193.890	1^+
680.42 *4*	0.144 *3*	3186.23	3^+	2505.79	4^+
693.57 *11*	0.037 *3*	3887.38		3193.890	1^+
702.11 *14*	0.025 *3*	4019.91	$1^+,2^+$	3317.85	0^+
[x]727.07 *18*	0.020 *3*				
739.2 *3*	0.030 *5*	3925.21	$2^+,3^+$	3186.23	3^+
747.33 *3*	0.818 *15*	3871.078	2^+	3123.744	2^+
749.7 *3*	0.050 *6*	6362.06		5612.43	
751.9 *4*	0.026 *5*	3871.078	2^+	3119.44	4^+
758.5 *4*	0.020 *6*	4493.17	2^+	3734.42	2^+
[x]770.3 *3*	0.011 *3*				
805.6 *4*	0.011 *3*	3925.21	$2^+,3^+$	3119.44	4^+
813.48 *7*	0.068 *3*	4547.99	$1^+,2^+$	3734.42	2^+
826.11 *3*	6.30 *12*	2158.671	2^+	1332.535	2^+
839.08 *19*	0.023 *3*	3123.744	2^+	2284.822	0^+
841.2 *3*	0.016 *3*	4953.37		4111.96	
851.9 *3*	0.020 *3*	5612.43		4760.24	
853.8 *4*	0.015 *3*	4039.91	3^-	3186.23	3^+
[x]868.06 *20*	0.022 *3*				
883.1 *3*	0.016 *3*	4006.46	$1^+,2^+$	3123.744	2^+
896.23 *6*	0.119 *5*	4019.91	$1^+,2^+$	3123.744	2^+
909.05 *4*	0.601 *14*	3193.890	1^+	2284.822	0^+
913.63 *14*	0.047 *4*	4953.37		4039.91	3^-
952.26 *3*	11.2 *3*	2284.822	0^+	1332.535	2^+
964.8 *3*	0.022 *3*	3123.744	2^+	2158.671	2^+
983.9 *4*	0.011 *3*	3268.96	2^+	2284.822	0^+
993.48 *3*	0.161 *5*	3619.47	$(3)^+$	2625.98	3^+
[x]1005.83 *10*	0.054 *4*				
1027.56 *4*	0.228 *5*	3186.23	3^+	2158.671	2^+
1035.23 *3*	1.03 *3*	3193.890	1^+	2158.671	2^+
1064.2 *4*	0.021 *4*	5612.43		4547.99	$1^+,2^+$
1091.42 *9*	0.067 *3*	5446.99		4355.57	
1110.31 *9*	0.081 *6*	3268.96	2^+	2158.671	2^+
1113.9 *3*	0.053 *6*	3619.47	$(3)^+$	2505.79	4^+
1154.82 *12*	0.046 *4*	4547.99	$1^+,2^+$	3393.16	2^+
1159.09 *13*	0.043 *4*	3317.85	0^+	2158.671	2^+
1173.24 *3*	0.47 *4*	2505.79	4^+	1332.535	2^+
1194.4 *5*	0.015 *5*	4929.00		3734.42	2^+
1234.51 *7*	0.072 *4*	3393.16	2^+	2158.671	2^+
1244.93 *22*	0.021 *4*	3871.078	2^+	2625.98	3^+
1248.86 *15*	0.036 *4*	5288.57		4039.91	3^-
1293.2 *9*	0.37 *5*	2625.98	3^+	1332.535	2^+
[x]1296.3 *4*	0.028 *5*				
1306.5 *5*	0.019 *5*	4493.17	2^+	3186.23	3^+
1308.16 *25*	0.044 *5*	4577.45	2^+	3268.96	2^+
1332.54 *5*	44.6 *9*	1332.535	2^+	0.0	0^+
1354.08 *9*	0.065 *5*	4547.99	$1^+,2^+$	3193.890	1^+
1358.67 *18*	0.027 *4*	(11387.720)	$(1^-,2^-)$	10029.04	
1380.4 *3*	0.045 *6*	4006.46	$1^+,2^+$	2625.98	3^+
1381.8 *3*	0.035 *6*	3887.38		2505.79	4^+

Continued on next page (footnotes at end of table)

^{59}Ni(n,γ) E=thermal 2004Ra23 (continued)

γ(^{60}Ni) (continued)

E_γ	I_γ †‡	E_i(level)	J_i^π	E_f	J_f^π
1385.97 *14*	0.035 *5*	4779.16		3393.16	2^+
1392.3 *5*	0.009 *3*	5127.18		3734.42	2^+
1399.4 *4*	0.010 *3*	7761.7		6362.06	
x1404.4 *3*	0.017 *4*				
1419.40 *10*	0.053 *4*	3925.21	$2^+,3^+$	2505.79	4^+
1424.24 *4*	0.251 *7*	4547.99	$1^+,2^+$	3123.744	2^+
1429.07 *3*	0.496 *10*	3587.75	0^+	2158.671	2^+
1434.0 *3*	0.018 *4*	(11387.720)	$(1^-,2^-)$	9953.7	
1451.88 *16*	0.033 *4*	4078.01	$1^+,2^+$	2625.98	3^+
1472.6 *6*	0.021 *6*	7798.9		6327.23	
1474.6 *3*	0.049 *6*	5967.8		4493.17	2^+
1485.94 *19*	0.039 *4*	4111.96		2625.98	3^+
1491.5 *3*	0.030 *5*	4760.24		3268.96	2^+
x1497.91 *25*	0.033 *5*				
x1510.83 *21*	0.028 *4*				
1532.65 *12*	0.055 *5*	6066.70		4534.13	
1562.8 *3*	0.040 *4*	5918.55		4355.57	
x1564.6 *7*	0.015 *5*				
1568.0 *5*	0.014 *3*	6327.23		4760.24	
1575.84 *13*	0.071 *5*	5446.99		3871.078	2^+
1585.33 *13*	0.067 *5*	4779.16		3193.890	1^+
1592.53 *4*	0.440 *11*	5612.43		4019.91	$1^+,2^+$
1606.10 *14*	0.059 *5*	4111.96		2505.79	4^+
1621.2 *5*	0.017 *5*	6465.26		4843.93	
1628.9 *4*	0.022 *4*	7339.70		5710.82	
1632.99 *18*	0.053 *5*	5710.82		4078.01	$1^+,2^+$
1636.42 *13*	0.082 *5*	4760.24		3123.744	2^+
1643.6 *4*	0.026 *5*	7316.15		5672.39	
1684.4 *3*	0.031 *5*	4953.37		3268.96	2^+
1692.45 *8*	0.119 *7*	4318.58	2^+	2625.98	3^+
1712.30 *9*	0.741 *15*	3871.078	2^+	2158.671	2^+
1734.98 *11*	0.157 *8*	4019.91	$1^+,2^+$	2284.822	0^+
1741.3 *5*	0.013 *4*	5612.43		3871.078	2^+
1766.5 *3*	0.029 *4*	3925.21	$2^+,3^+$	2158.671	2^+
1786.9 *3*	0.049 *8*	3119.44	4^+	1332.535	2^+
1791.19 *3*	3.07 *3*	3123.744	2^+	1332.535	2^+
1813.5 *5*	0.066 *7*	4318.58	2^+	2505.79	4^+
x1816.1 *5*	0.016 *4*				
1829.9 *4*	0.018 *5*	4335.55		2505.79	4^+
1853.67 *7*	0.173 *6*	3186.23	3^+	1332.535	2^+
1861.33 *3*	1.34 *3*	3193.890	1^+	1332.535	2^+
1878.0 *4*	0.022 *5*	5612.43		3734.42	2^+
1881.15 *12*	0.074 *5*	4039.91	3^-	2158.671	2^+
1888.4 *3*	0.031 *4*	5476.06		3587.75	0^+
1919.28 *7*	0.132 *6*	4078.01	$1^+,2^+$	2158.671	2^+
1936.41 *6*	0.186 *5*	3268.96	2^+	1332.535	2^+
1985.27 *3*	3.65 *7*	3317.85	0^+	1332.535	2^+
2028.5 *5*	0.019 *5*	4534.13		2505.79	4^+
2040.85 *19*	0.048 *5*	(11387.720)	$(1^-,2^-)$	9346.84	
2060.58 *3*	0.571 *13*	3393.16	2^+	1332.535	2^+
2152.6 *3*	0.035 *5*	6996.86		4843.93	
2158.63 *3*	0.98 *3*	2158.671	2^+	0.0	0^+
2176.84 *4*	0.285 *8*	4335.55		2158.671	2^+
2198.1 *4*	0.027 *5*	6516.73		4318.58	2^+
x2245.40 *15*	0.063 *5*				
2255.18 *5*	0.230 *7*	3587.75	0^+	1332.535	2^+

Continued on next page (footnotes at end of table)

^{59}Ni(n,γ) E=thermal 2004Ra23 (continued)

γ(^{60}Ni) (continued)

E_γ	I_γ †‡	E_i(level)	J_i^π	E_f	J_f^π
2263.17 *4*	0.348 *8*	4547.99	$1^+,2^+$	2284.822	0^+
2282.0 *3*	0.025 *4*	5476.06		3193.890	1^+
2311.00 *18*	0.048 *5*	(11387.720)	$(1^-,2^-)$	9076.68	
2317.65 *20*	0.048 *6*	5710.82		3393.16	2^+
2320.7 *4*	0.025 *4*	6327.23		4006.46	$1^+,2^+$
2334.4 *3*	0.031 *5*	4493.17	2^+	2158.671	2^+
2341.9 *4*	0.023 *4*	(11387.720)	$(1^-,2^-)$	9045.22	
2375.6 *3*	0.030 *4*	4534.13		2158.671	2^+
2389.25 *5*	0.300 *8*	4547.99	$1^+,2^+$	2158.671	2^+
2392.6 *3*	0.040 *5*	5710.82		3317.85	0^+
2401.83 *3*	0.778 *15*	3734.42	2^+	1332.535	2^+
2418.65 *20*	0.042 *5*	4577.45	2^+	2158.671	2^+
2478.42 *7*	0.129 *5*	5672.39		3193.890	1^+
2488.73 *10*	0.088 *4*	5612.43		3123.744	2^+
2493.8 *3*	0.032 *3*	4779.16		2284.822	0^+
2496.9 *3*	0.019 *3*	6516.73		4019.91	$1^+,2^+$
2517.00 *9*	0.246 *8*	5710.82		3193.890	1^+
2525.4 *3*	0.033 *6*	5918.55		3393.16	2^+
2538.53 *4*	0.451 *10*	3871.078	2^+	1332.535	2^+
2547.35 *21*	0.043 *5*	6567.35		4019.91	$1^+,2^+$
2554.69 *10*	0.124 *5*	3887.38		1332.535	2^+
2572.2 *4*	0.017 *4*	8638.6		6066.70	
2578.2 *5*	0.014 *4*	6465.26		3887.38	
2586.98 *12*	0.071 *5*	5710.82		3123.744	2^+
2593.3 *4*	0.015 *4*	6911.95		4318.58	2^+
2601.5 *4*	0.025 *5*	4760.24		2158.671	2^+
2607.10 *22*	0.041 *5*	6647.18		4039.91	3^-
2613.9 *3*	0.026 *4*	8286.3		5672.39	
2620.40 *8*	0.125 *5*	4779.16		2158.671	2^+
2627.4 *3*	0.029 *4*	6647.18		4019.91	$1^+,2^+$
2633.3 *3*	0.032 *5*	5902.44		3268.96	2^+
2673.86 *4*	1.60 *3*	4006.46	$1^+,2^+$	1332.535	2^+
2684.19 *12*	0.166 *8*	5878.07		3193.890	1^+
2687.33 *4*	0.712 *16*	4019.91	$1^+,2^+$	1332.535	2^+
2707.44 *8*	0.145 *5*	4039.91	3^-	1332.535	2^+
2721.59 *25*	0.038 *5*	(11387.720)	$(1^-,2^-)$	8666.23	
2745.47 *6*	0.240 *7*	4078.01	$1^+,2^+$	1332.535	2^+
2749.5 *4*	0.026 *5*	(11387.720)	$(1^-,2^-)$	8638.6	
2770.5 *3*	0.039 *5*	4929.00		2158.671	2^+
2779.42 *14*	0.084 *5*	4111.96		1332.535	2^+
[x]2785.73 *14*	0.085 *5*				
2797.7 *5*	0.021 *5*	6066.70		3268.96	2^+
2822.3 *3*	0.040 *5*	(11387.720)	$(1^-,2^-)$	8565.62	
2831.3 *6*	0.018 *5*	6756.3		3925.21	$2^+,3^+$
2846.9 *5*	0.026 *5*	7339.70		4493.17	2^+
[x]2874.42 *19*	0.068 *6*				
2883.0 *4*	0.037 *5*	(11387.720)	$(1^-,2^-)$	8504.7	
[x]2907.5 *3*	0.033 *5*				
2938.6 *4*	0.024 *5*	7473.50		4534.13	
2985.97 *7*	0.320 *9*	4318.58	2^+	1332.535	2^+
3002.5 *4*	0.025 *5*	4335.55		1332.535	2^+
3022.90 *20*	0.064 *5*	4355.57		1332.535	2^+
3027.86 *16*	0.075 *6*	6647.18		3619.47	$(3)^+$
3040.5 *4*	0.030 *5*	6911.95		3871.078	2^+
3046.7 *7*	0.017 *4*	5672.39		2625.98	3^+
3058.0 *7*	0.016 *4*	6327.23		3268.96	2^+

Continued on next page (footnotes at end of table)

^{59}Ni(n,γ) E=thermal 2004Ra23 (continued)

$\gamma(^{60}Ni)$ (continued)

E_γ	I_γ †‡	E_i(level)	J_i^π	E_f	J_f^π	Comments
x3062.5 *5*	0.023 *4*					
3101.2 *6*	0.015 *4*	(11387.720)	(1$^-$,2$^-$)	8286.3		
3123.70 *5*	0.34 *2*	3123.744	2$^+$	0.0	0$^+$	
3129.6 *3*	0.033 *4*	7207.7		4078.01	1$^+$,2$^+$	
3160.60 *6*	0.260 *8*	4493.17	2$^+$	1332.535	2$^+$	
3167.7 *4*	0.045 *5*	6362.06		3193.890	1$^+$	
3193.77 *4*	0.602 *11*	3193.890	1$^+$	0.0	0$^+$	
3215.27 *8*	0.122 *6*	4547.99	1$^+$,2$^+$	1332.535	2$^+$	
x3233.0 *3*	0.030 *5*					
3244.90 *9*	0.151 *5*	4577.45	2$^+$	1332.535	2$^+$	
x3264.0 *5*	0.019 *4*					
3268.78 *12*	0.074 *5*	3268.96	2$^+$	0.0	0$^+$	
3276.32 *20*	0.044 *5*	5902.44		2625.98	3$^+$	
3288.5 *3*	0.019 *5*	5446.99		2158.671	2$^+$	
3296.3 *3*	0.038 *5*	7316.15		4019.91	1$^+$,2$^+$	
3302.11 *24*	0.035 *4*	7414.17		4111.96		
x3352.8 *4*	0.025 *6*					
3354.5 *4*	0.048 *5*	7690.1		4335.55		
x3359.5 *4*	0.027 *5*					
3369.4 *4*	0.023 *4*	6489.17		3119.44	4$^+$	
3393.05 *20*	0.042 *4*	3393.16	2$^+$	0.0	0$^+$	
3426.3 *5*	0.094 *24*	5710.82		2284.822	0$^+$	
3428.0 *4*	0.096 *25*	4760.24		1332.535	2$^+$	
3436.9 *3*	0.076 *6*	(11387.720)	(1$^-$,2$^-$)	7950.95		
3440.37 *17*	0.092 *8*	6066.70		2625.98	3$^+$	
3446.77 *17*	0.081 *7*	4779.16		1332.535	2$^+$	
3453.67 *11*	0.131 *5*	5612.43		2158.671	2$^+$	
3487.1 *4*	0.023 *5*	6756.3		3268.96	2$^+$	E_γ: alternative placement: 9346−−>5860 transition.
x3495.12 *16*	0.108 *5*					
3511.07 *18*	0.174 *8*	4843.93		1332.535	2$^+$	E_γ: alternative placement: 8638−−>5127 transition.
3513.6 *3*	0.072 *7*	5672.39		2158.671	2$^+$	
3517.3 *3*	0.042 *5*	6834.94		3317.85	0$^+$	
3551.94 *14*	0.130 *6*	5710.82		2158.671	2$^+$	
3569.53 *13*	0.088 *5*	(11387.720)	(1$^-$,2$^-$)	7818.04		E_γ: alternative placement: 7495−−>3925 transition.
3589.0 *3*	0.051 *8*	(11387.720)	(1$^-$,2$^-$)	7798.9		
3596.4 *4*	0.040 *6*	4929.00		1332.535	2$^+$	
3603.4 *7*	0.020 *5*	7222.82		3619.47	(3)$^+$	E_γ: alternative placement: 6996−−>3393 transition.
3620.64 *14*	0.117 *8*	4953.37		1332.535	2$^+$	
3625.6 *4*	0.034 *6*	(11387.720)	(1$^-$,2$^-$)	7761.7		
3632.4 *6*	0.024 *6*	7950.95		4318.58	2$^+$	
3641.1 *4*	0.045 *6*	6834.94		3193.890	1$^+$	
x3658.9 *3*	0.050 *6*					
3697.7 *6*	0.032 *7*	(11387.720)	(1$^-$,2$^-$)	7690.1		
3700.9 *9*	0.031 *8*	5860.0		2158.671	2$^+$	
3703.4 *8*	0.039 *11*	(11387.720)	(1$^-$,2$^-$)	7684.1		
3732.23 *22*	0.151 *13*	5065.03	(1$^-$)	1332.535	2$^+$	
3743.71 *13*	0.180 *9*	5902.44		2158.671	2$^+$	
3794.8 *4*	0.049 *6*	5127.18		1332.535	2$^+$	
x3817.7 *5*	0.040 *7*					
3836.1 *5*	0.033 *6*	(11387.720)	(1$^-$,2$^-$)	7552.0		E_γ: alternative placement: 7761−−>3925 transition.
3870.94 *7*	0.356 *12*	3871.078	2$^+$	0.0	0$^+$	
3892.4 *5*	0.043 *7*	(11387.720)	(1$^-$,2$^-$)	7495.3		E_γ: alternative placement: 7818−−>3925 transition.
x3895.4 *5*	0.045 *7*					
3913.7 *3*	0.042 *6*	(11387.720)	(1$^-$,2$^-$)	7473.50		
x3939.5 *4*	0.042 *6*					
3955.2 *6*	0.025 *6*	5288.57		1332.535	2$^+$	E_γ: alternative placement: 7690−−>3734 transition.

Continued on next page (footnotes at end of table)

^{59}Ni(n,γ) E=thermal 2004Ra23 (continued)

$\gamma(^{60}Ni)$ (continued)

E_γ	I_γ †‡	E_i(level)	J_i^π	E_f	J_f^π	Comments
3973.4 *5*	0.042 *7*	(11387.720)	(1$^-$,2$^-$)	7414.17		
3983.6 *4*	0.050 *6*	6489.17		2505.79	4$^+$	
4006.30 *4*	1.20 *3*	4006.46	1$^+$,2$^+$	0.0	0$^+$	
4019.74 *5*	1.68 *4*	4019.91	1$^+$,2$^+$	0.0	0$^+$	
4021.4 *5*	0.075 *8*	6647.18		2625.98	3$^+$	
4048.2 *4*	0.048 *6*	(11387.720)	(1$^-$,2$^-$)	7339.70		
x4066.3 *3*	0.062 *8*					
4071.49 *22*	0.073 *8*	(11387.720)	(1$^-$,2$^-$)	7316.15		
4077.6 *9*	0.022 *5*	4078.01	1$^+$,2$^+$	0.0	0$^+$	
4080.0 *7*	0.027 *6*	7950.95		3871.078	2$^+$	
4111.6 *8*	0.041 *7*	4111.96		0.0	0$^+$	
4114.4 *6*	0.070 *8*	5446.99		1332.535	2$^+$	
4164.75 *11*	0.193 *8*	(11387.720)	(1$^-$,2$^-$)	7222.82		
4168.32 *19*	0.099 *8*	6327.23		2158.671	2$^+$	
4180.5 *7*	0.018 *4*	(11387.720)	(1$^-$,2$^-$)	7207.7		E_γ: alternative placement: 6465−−>2285 transition.
4204.0 *7*	0.021 *6*	6489.17		2284.822	0$^+$	E_γ: alternative placement: 7473−−>3269 transition.
x4255.6 *6*	0.026 *4*					
4279.8 *4*	0.034 *6*	5612.43		1332.535	2$^+$	E_γ: alternative placement: 8286−−>4006 transition.
x4305.2 *6*	0.019 *5*					
4318.52 *11*	0.130 *7*	4318.58	2$^+$	0.0	0$^+$	
4331.24 *15*	0.113 *6*	(11387.720)	(1$^-$,2$^-$)	7056.29		E_γ: alternative placement: 7950−−>3619 transition.
4335.37 *23*	0.087 *8*	4335.55		0.0	0$^+$	
x4338.3 *3*	0.064 *7*					
x4348.2 *4*	0.031 *5*					
x4356.6 *3*	0.046 *6*					
4370.7 *5*	0.025 *4*	6996.86		2625.98	3$^+$	E_γ: alternative placement: 7495−−>3123 transition.
x4377.65 *13*	0.120 *6*					
4390.4 *3*	0.042 *5*	(11387.720)	(1$^-$,2$^-$)	6996.86		
4430.3 *4*	0.040 *5*	7056.29		2625.98	3$^+$	
4475.58 *10*	0.150 *7*	(11387.720)	(1$^-$,2$^-$)	6911.95		
4487.56 *25*	0.055 *5*	8565.62		4078.01	1$^+$,2$^+$	
4492.3 *6*	0.022 *4*	7761.7		3268.96	2$^+$	
x4507.04 *18*	0.163 *10*					
4545.9 *5*	0.074 *15*	5878.07		1332.535	2$^+$	E_γ: alternative placement: 8565−−>4019 transition.
4548.2 *3*	0.163 *16*	4547.99	1$^+$,2$^+$	0.0	0$^+$	
4553.0 *3*	0.071 *6*	(11387.720)	(1$^-$,2$^-$)	6834.94		
4577.37 *14*	0.144 *8*	4577.45	2$^+$	0.0	0$^+$	
4617.2 *4*	0.048 *6*	8504.7		3887.38		
4631.2 *5*	0.036 *6*	(11387.720)	(1$^-$,2$^-$)	6756.3		
x4639.1 *6*	0.030 *6*					
4678.3 *5*	0.050 *5*	8565.62		3887.38		
x4683.0 *5*	0.043 *6*					
4693.6 *5*	0.042 *6*	7818.04		3123.744	2$^+$	
4740.48 *12*	0.227 *10*	(11387.720)	(1$^-$,2$^-$)	6647.18		
x4744.7 *5*	0.047 *7*					
4760.1 *4*	0.054 *6*	4760.24		0.0	0$^+$	
4819.9 *6*	0.032 *6*	(11387.720)	(1$^-$,2$^-$)	6567.35		
4843.76 *9*	0.389 *15*	4843.93		0.0	0$^+$	
4871.7 *8*	0.024 *6*	(11387.720)	(1$^-$,2$^-$)	6516.73		
4898.4 *4*	0.064 *6*	(11387.720)	(1$^-$,2$^-$)	6489.17		
4906.1 *5*	0.043 *6*	6239.2		1332.535	2$^+$	
4922.34 *25*	0.155 *11*	(11387.720)	(1$^-$,2$^-$)	6465.26		
x4950.1 *5*	0.101 *15*					
5005.5 *7*	0.031 *7*	(11387.720)	(1$^-$,2$^-$)	6382.4		E_γ: alternative placement: 9045−−>4039 transition.
5025.43 *25*	0.092 *8*	(11387.720)	(1$^-$,2$^-$)	6362.06		
5046.4 *7*	0.032 *6*	8666.23		3619.47	(3)$^+$	

Continued on next page (footnotes at end of table)

^{59}Ni(n,γ) E=thermal 2004Ra23 (continued)

$\gamma(^{60}Ni)$ (continued)

E_γ	I_γ †‡	E_i(level)	J_i^π	E_f	J_f^π	Comments
5059.8 *6*	0.040 *7*	(11387.720)	(1$^-$,2$^-$)	6327.23		
5064.79 *7*	0.509 *15*	5065.03	(1$^-$)	0.0	0$^+$	
x5097.8 *6*	0.031 *6*					
5132.6 *5*	0.028 *6*	6465.26		1332.535	2$^+$	
5148.1 *3*	0.062 *5*	(11387.720)	(1$^-$,2$^-$)	6239.2		
x5152.61 *25*	0.070 *5*					
x5157.9 *9*	0.015 *5*					
5173.6 *3*	0.049 *5*	9045.22		3871.078	2$^+$	
5184.9 *5*	0.029 *5*	10029.04		4843.93		
x5193.4 *3*	0.056 *5*					
x5234.82 *10*	0.230 *7*					
x5245.5 *5*	0.030 *5*					
x5254.46 *14*	0.146 *6*					
5287.8 *7*	0.022 *5*	5288.57		0.0	0$^+$	
x5299.1 *5*	0.074 *16*					
5306.7 *4*	0.040 *5*	9346.84		4039.91	3$^-$	
5320.69 *18*	0.094 *6*	(11387.720)	(1$^-$,2$^-$)	6066.70		E$_\gamma$: alternative placement: 8638−−>3317 transition.
5393.3 *3*	0.062 *5*	7552.0		2158.671	2$^+$	
x5407.76 *13*	0.155 *6*					
5419.5 *6*	0.025 *5*	(11387.720)	(1$^-$,2$^-$)	5967.8		E$_\gamma$: alternative placement: 9953−−>4534 transition.
5452.1 *5*	0.028 *5*	8638.6		3186.23	3$^+$	
5468.5 *6*	0.028 *5*	(11387.720)	(1$^-$,2$^-$)	5918.55		
5472.8 *5*	0.036 *5*	8666.23		3193.890	1$^+$	
5485.02 *8*	0.377 *9*	(11387.720)	(1$^-$,2$^-$)	5902.44		
5509.46 *11*	0.223 *8*	(11387.720)	(1$^-$,2$^-$)	5878.07		
5527.4 *5*	0.035 *5*	(11387.720)	(1$^-$,2$^-$)	5860.0		
5578.7 *6*	0.022 *5*	6911.95		1332.535	2$^+$	
5611.8 *4*	0.036 *5*	5612.43		0.0	0$^+$	E$_\gamma$: alternative placement: 9347−−>3734 transition.
5640.4 *7*	0.020 *5*	7798.9		2158.671	2$^+$	
5659.9 *8*	0.015 *4*	8286.3		2625.98	3$^+$	
5676.64 *4*	0.935 *18*	(11387.720)	(1$^-$,2$^-$)	5710.82		
5710.52 *10*	0.362 *12*	5710.82		0.0	0$^+$	
5714.96 *18*	0.159 *9*	(11387.720)	(1$^-$,2$^-$)	5672.39		
5723.0 *5*	0.035 *5*	7056.29		1332.535	2$^+$	
5759.1 *7*	0.024 *5*	9076.68		3317.85	0$^+$	E$_\gamma$: alternative placement: 9347−−>3588 transition.
5775.08 *6*	0.713 *15*	(11387.720)	(1$^-$,2$^-$)	5612.43		
5875.2 *7*	0.017 *4*	7207.7		1332.535	2$^+$	
x5886.3 *7*	0.023 *5*					
5889.9 *5*	0.033 *5*	7222.82		1332.535	2$^+$	
5911.3 *8*	0.016 *5*	(11387.720)	(1$^-$,2$^-$)	5476.06		
5933.3 *7*	0.018 *5*	9953.7		4019.91	1$^+$,2$^+$	
5940.5 *3*	0.074 *6*	(11387.720)	(1$^-$,2$^-$)	5446.99		
x5944.3 *5*	0.039 *5*					
5952.4 *5*	0.024 *5*	9076.68		3123.744	2$^+$	
5967.5 *8*	0.014 *5*	5967.8		0.0	0$^+$	
5983.4 *5*	0.024 *5*	7316.15		1332.535	2$^+$	
x6003.9 *7*	0.017 *5*					
6067.2 *8*	0.014 *5*	6066.70		0.0	0$^+$	
6099.4 *3*	0.062 *6*	(11387.720)	(1$^-$,2$^-$)	5288.57		
6162.5 *6*	0.032 *5*	7495.3		1332.535	2$^+$	
6260.19 *20*	0.070 *6*	(11387.720)	(1$^-$,2$^-$)	5127.18		
6322.29 *11*	0.557 *14*	(11387.720)	(1$^-$,2$^-$)	5065.03	(1$^-$)	
6351.2 *4*	0.032 *5*	7684.1		1332.535	2$^+$	
6382.3 *5*	0.033 *5*	6382.4		0.0	0$^+$	
6434.01 *10*	0.223 *7*	(11387.720)	(1$^-$,2$^-$)	4953.37		
6458.42 *18*	0.098 *6*	(11387.720)	(1$^-$,2$^-$)	4929.00		

Continued on next page (footnotes at end of table)

^{59}Ni(n,γ) E=thermal 2004Ra23 (continued)

γ(^{60}Ni) (continued)

E_γ	I_γ[†][‡]	E_i(level)	J_i^π	E_f	J_f^π
6464.9 *3*	0.090 *5*	6465.26		0.0	0^+
6543.44 *18*	0.586 *24*	(11387.720)	$(1^-,2^-)$	4843.93	
6608.29 *15*	0.293 *13*	(11387.720)	$(1^-,2^-)$	4779.16	
6627.12 *19*	0.128 *8*	(11387.720)	$(1^-,2^-)$	4760.24	
6809.91 *9*	0.333 *13*	(11387.720)	$(1^-,2^-)$	4577.45	2^+
6839.38 *12*	1.21 *7*	(11387.720)	$(1^-,2^-)$	4547.99	$1^+,2^+$
6894.23 *11*	0.275 *10*	(11387.720)	$(1^-,2^-)$	4493.17	2^+
6911.7 *3*	0.098 *6*	6911.95		0.0	0^+
[x]7032.9 *7*	0.026 *5*				
7051.67 *12*	0.220 *9*	(11387.720)	$(1^-,2^-)$	4335.55	
7068.67 *8*	0.415 *12*	(11387.720)	$(1^-,2^-)$	4318.58	2^+
7275.9 *9*	0.019 *5*	(11387.720)	$(1^-,2^-)$	4111.96	
7309.22 *14*	0.214 *10*	(11387.720)	$(1^-,2^-)$	4078.01	$1^+,2^+$
7367.31 *5*	1.95 *5*	(11387.720)	$(1^-,2^-)$	4019.91	$1^+,2^+$
7380.77 *4*	2.43 *7*	(11387.720)	$(1^-,2^-)$	4006.46	$1^+,2^+$
7473.0 *8*	0.030 *6*	7473.50		0.0	0^+
7499.4 *4*	0.076 *7*	(11387.720)	$(1^-,2^-)$	3887.38	
7516.17 *4*	2.04 *5*	(11387.720)	$(1^-,2^-)$	3871.078	2^+
7652.88 *8*	0.430 *10*	(11387.720)	$(1^-,2^-)$	3734.42	2^+
7689.5 *5*	0.043 *6*	7690.1		0.0	0^+
7761.6 *8*	0.027 *6*	7761.7		0.0	0^+
7799.40 *6*	0.689 *14*	(11387.720)	$(1^-,2^-)$	3587.75	0^+
[x]7915.1 *9*	0.022 *6*				
7951.4 *8*	0.025 *6*	7950.95		0.0	0^+
7993.95 *10*	0.310 *11*	(11387.720)	$(1^-,2^-)$	3393.16	2^+
8069.26 *4*	3.18 *6*	(11387.720)	$(1^-,2^-)$	3317.85	0^+
8117.6 *9*	0.044 *13*	(11387.720)	$(1^-,2^-)$	3268.96	2^+
8193.24 *4*	1.90 *5*	(11387.720)	$(1^-,2^-)$	3193.890	1^+
8200.88 *17*	0.207 *9*	(11387.720)	$(1^-,2^-)$	3186.23	3^+
8263.35 *5*	1.59 *5*	(11387.720)	$(1^-,2^-)$	3123.744	2^+
8504.2 *9*	0.020 *4*	8504.7		0.0	0^+
9102.10 *4*	8.83 *16*	(11387.720)	$(1^-,2^-)$	2284.822	0^+
9228.19 *9*	1.14 *4*	(11387.720)	$(1^-,2^-)$	2158.671	2^+
10054.14 *7*	8.22 *15*	(11387.720)	$(1^-,2^-)$	1332.535	2^+
11386.50 *9*	21.5 *8*	(11387.720)	$(1^-,2^-)$	0.0	0^+

[†] Intensities given in 2004Ra23 are in units of millibarns.
[‡] For intensity per 100 neutron captures, multiply by 1.357.
[x] γ ray not placed in level scheme.

^{59}Ni(n,γ) E=thermal 2004Ra23

Level Scheme

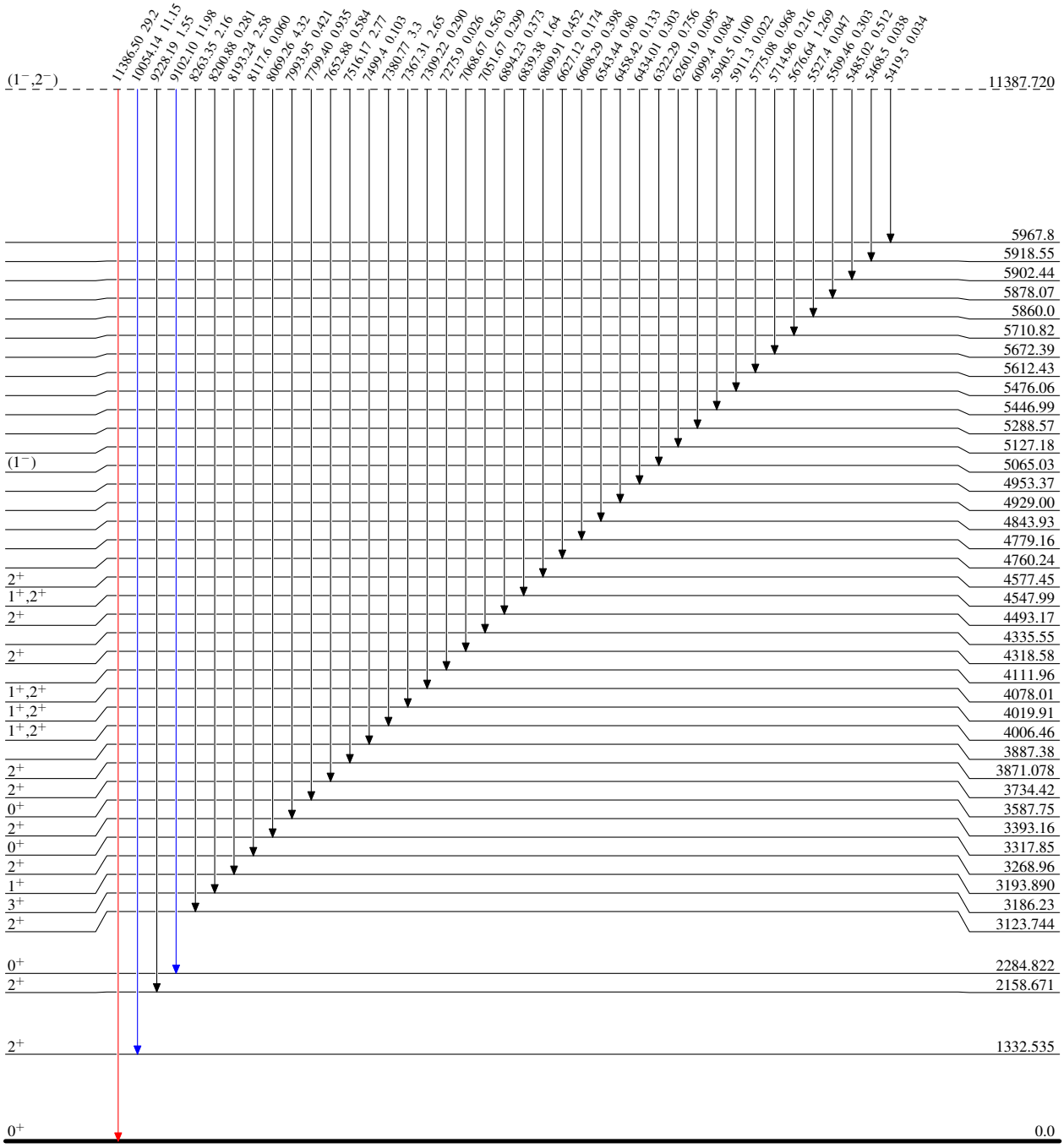
Intensities: $I_{(\gamma+ce)}$ per 100 neutron captures

Legend

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

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

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

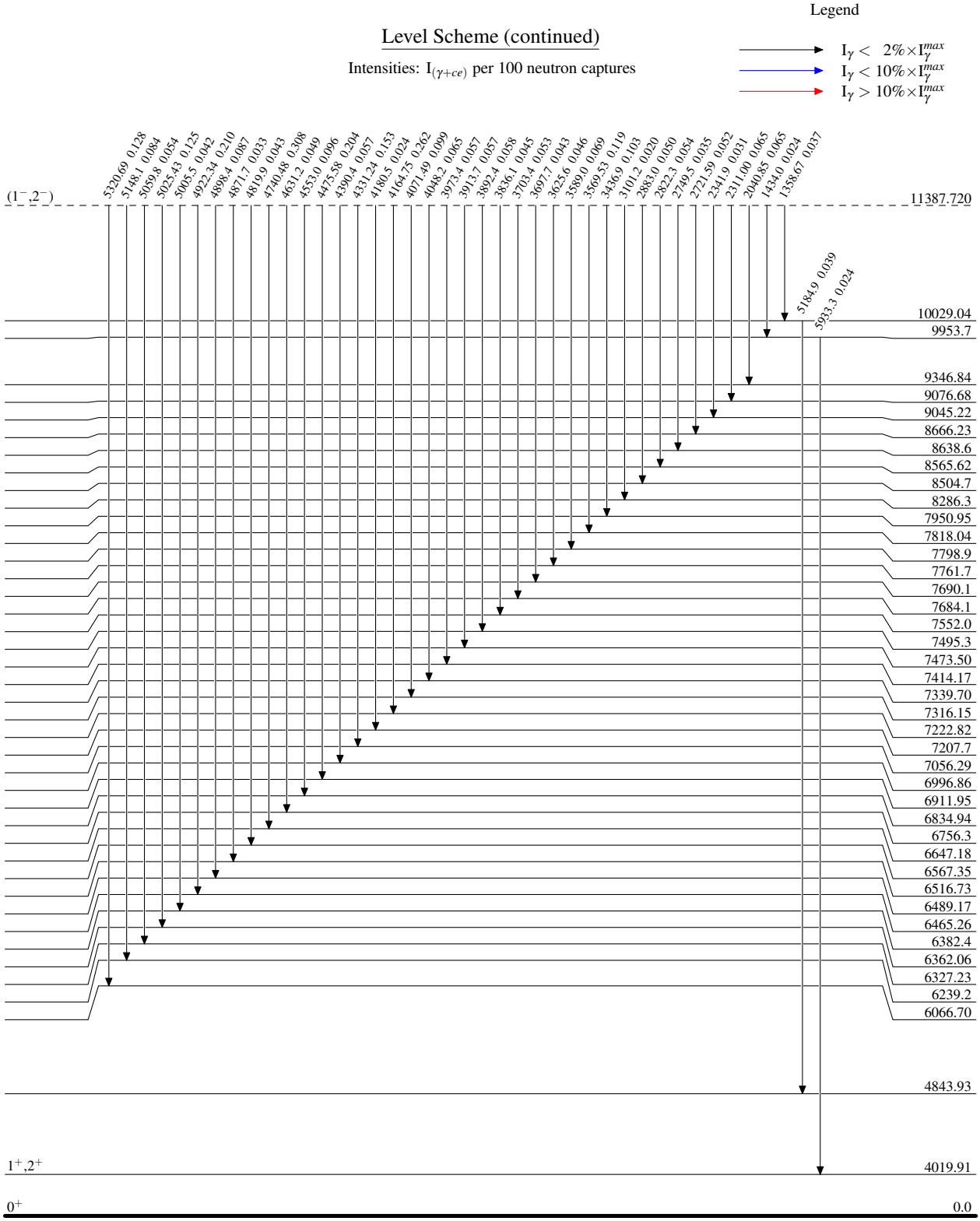


$^{60}_{28}Ni_{32}$

^{59}Ni(n,γ) E=thermal 2004Ra23

Level Scheme (continued)

Intensities: $I_{(\gamma+ce)}$ per 100 neutron captures



$^{60}_{28}Ni_{32}$

^{59}Ni(n,γ) E=thermal 2004Ra23

Level Scheme (continued)

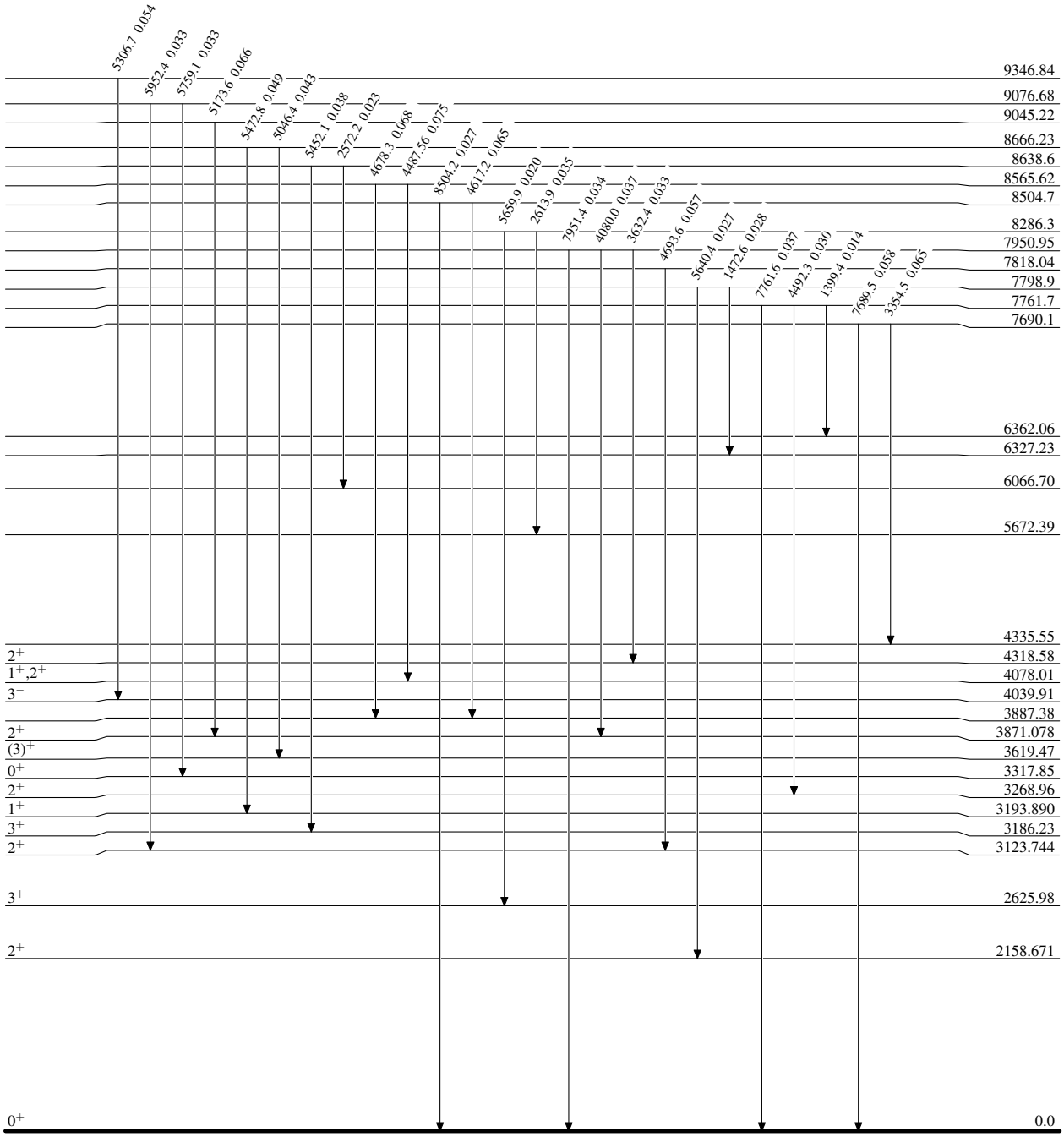
Intensities: $I_{(\gamma+ce)}$ per 100 neutron captures

Legend

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

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

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



$^{60}_{28}Ni_{32}$

^{59}Ni(n,γ) E=thermal 2004Ra23

Level Scheme (continued)

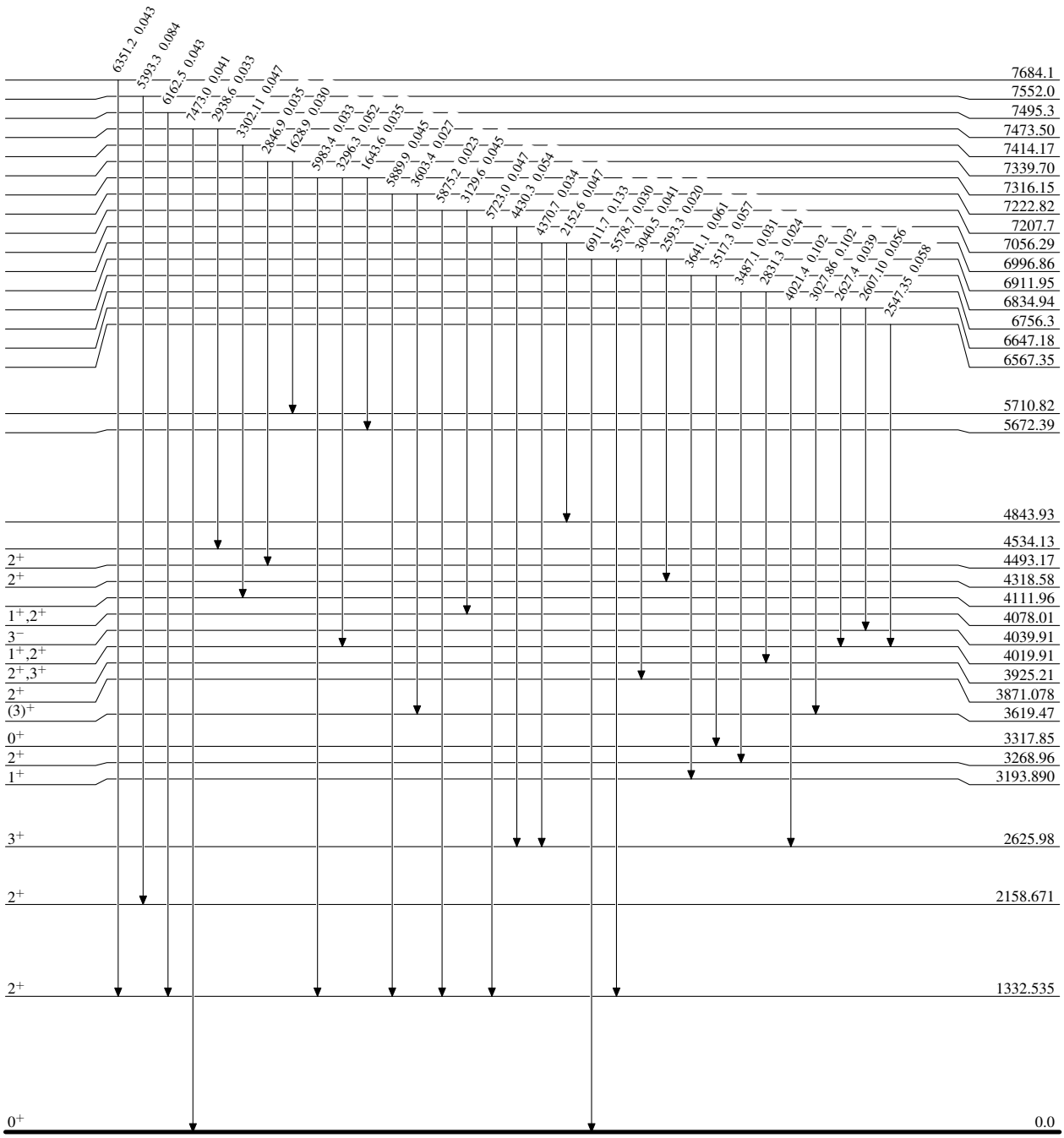
Intensities: $I_{(\gamma+ce)}$ per 100 neutron captures

Legend

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

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

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



$^{60}_{28}Ni_{32}$

^{59}Ni(n,γ) E=thermal 2004Ra23

Level Scheme (continued)

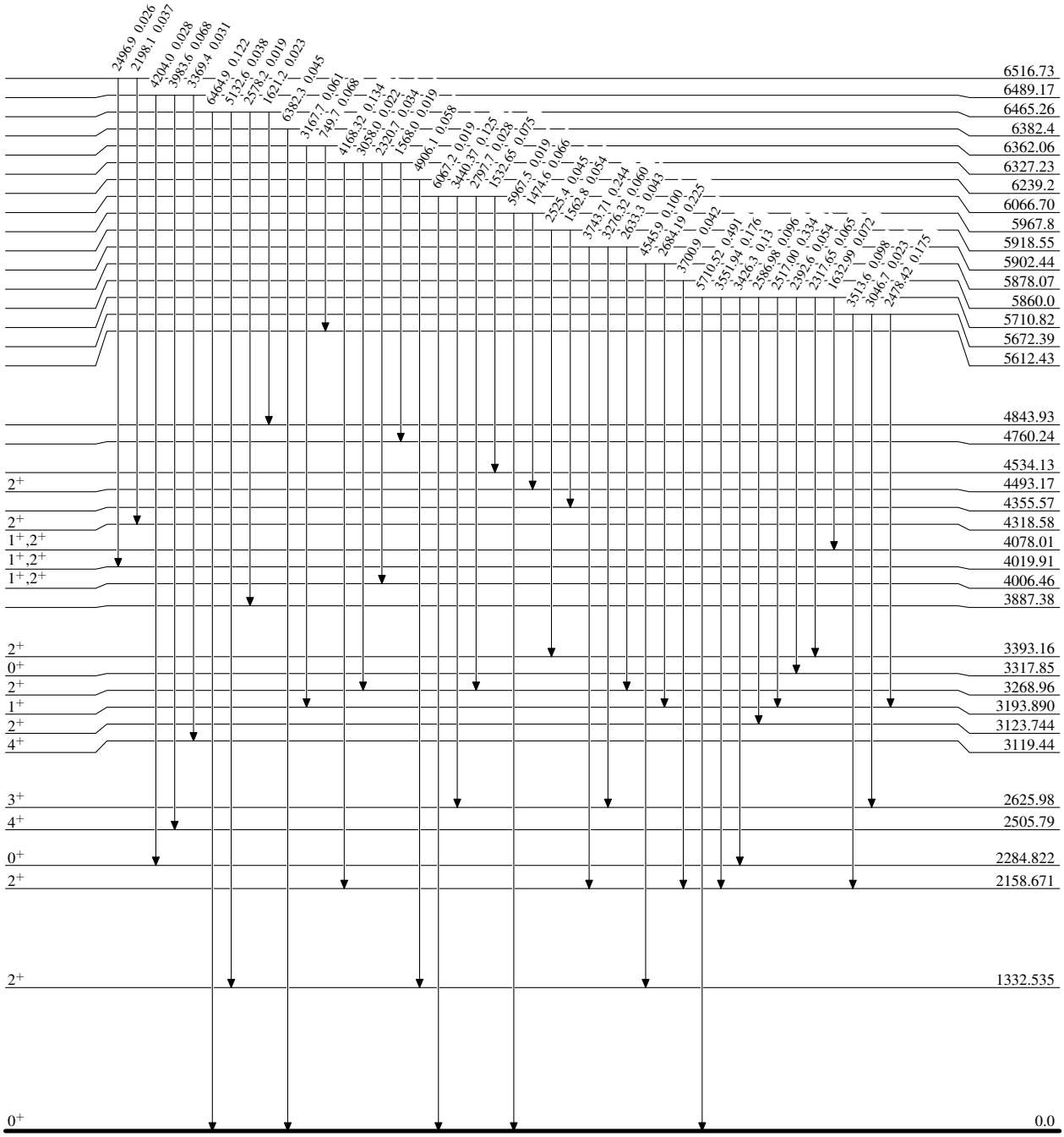
Intensities: $I_{(\gamma+ce)}$ per 100 neutron captures

Legend

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

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

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



$^{60}_{28}Ni_{32}$

^{59}Ni(n,γ) E=thermal 2004Ra23

Level Scheme (continued)

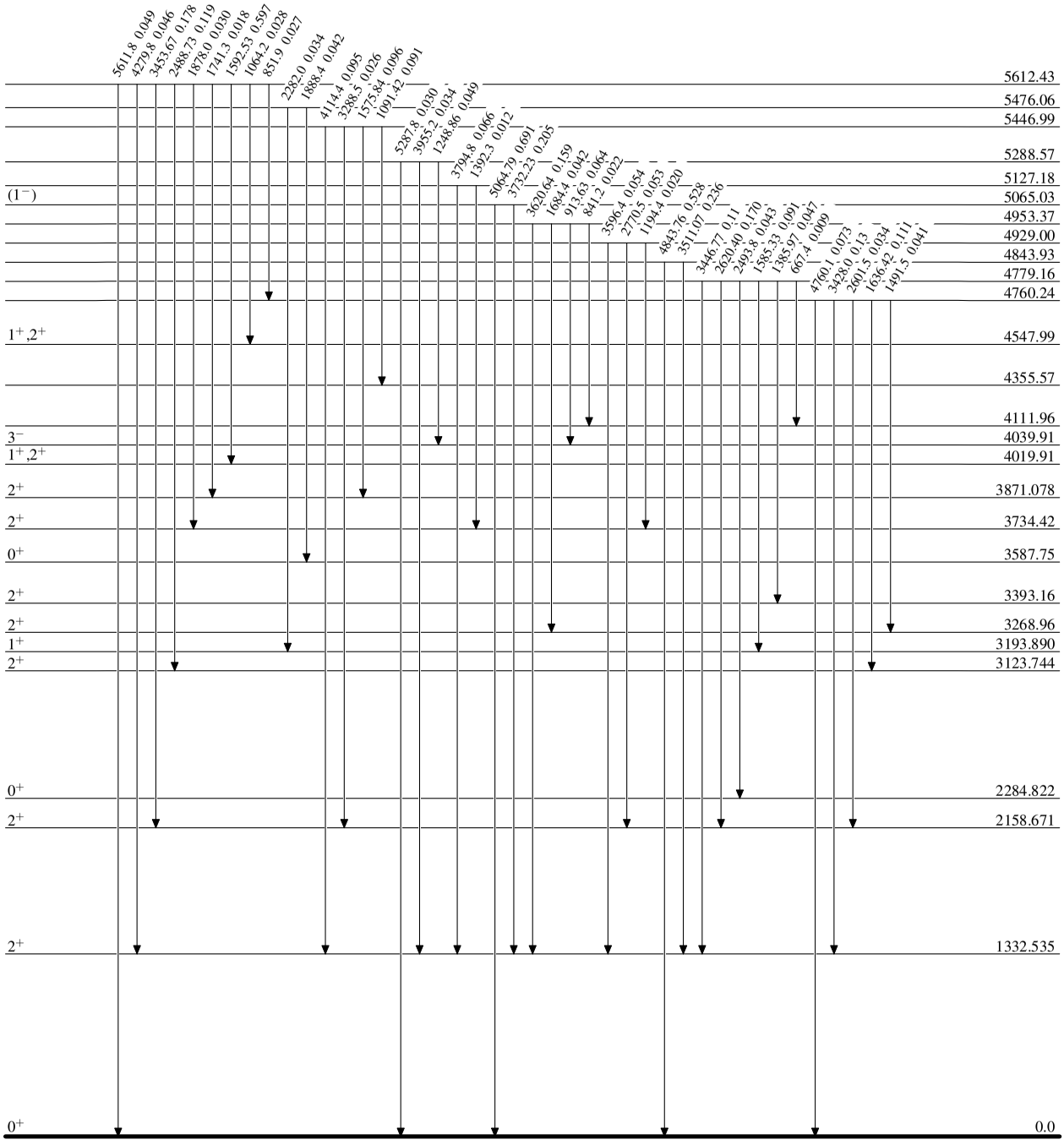
Intensities: $I_{(\gamma+ce)}$ per 100 neutron captures

Legend

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

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

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

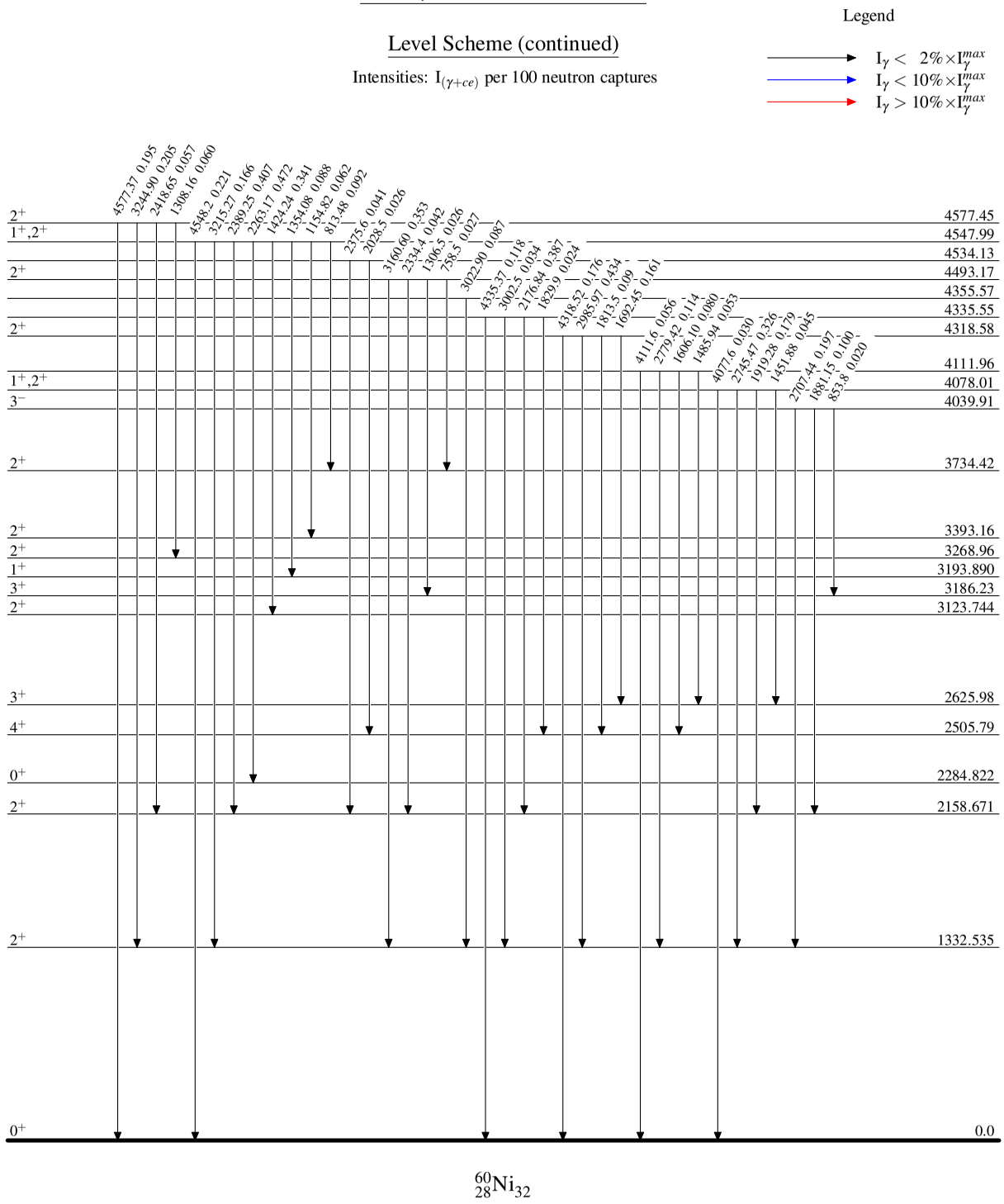


$^{60}_{28}Ni_{32}$

^{59}Ni(n,γ) E=thermal 2004Ra23

Level Scheme (continued)

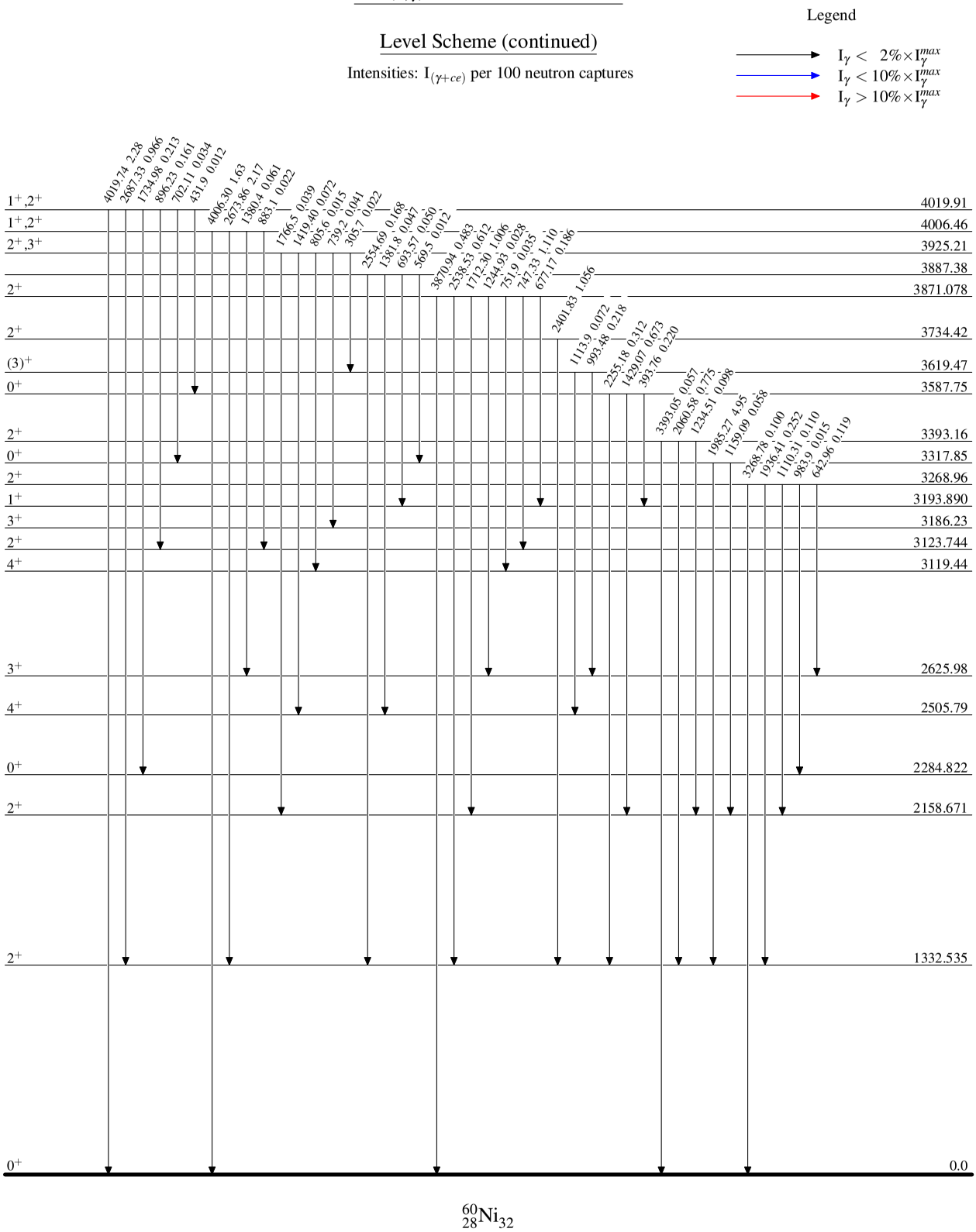
Intensities: $I_{(\gamma+ce)}$ per 100 neutron captures



^{59}Ni(n,γ) E=thermal 2004Ra23

Level Scheme (continued)

Intensities: $I_{(\gamma+ce)}$ per 100 neutron captures

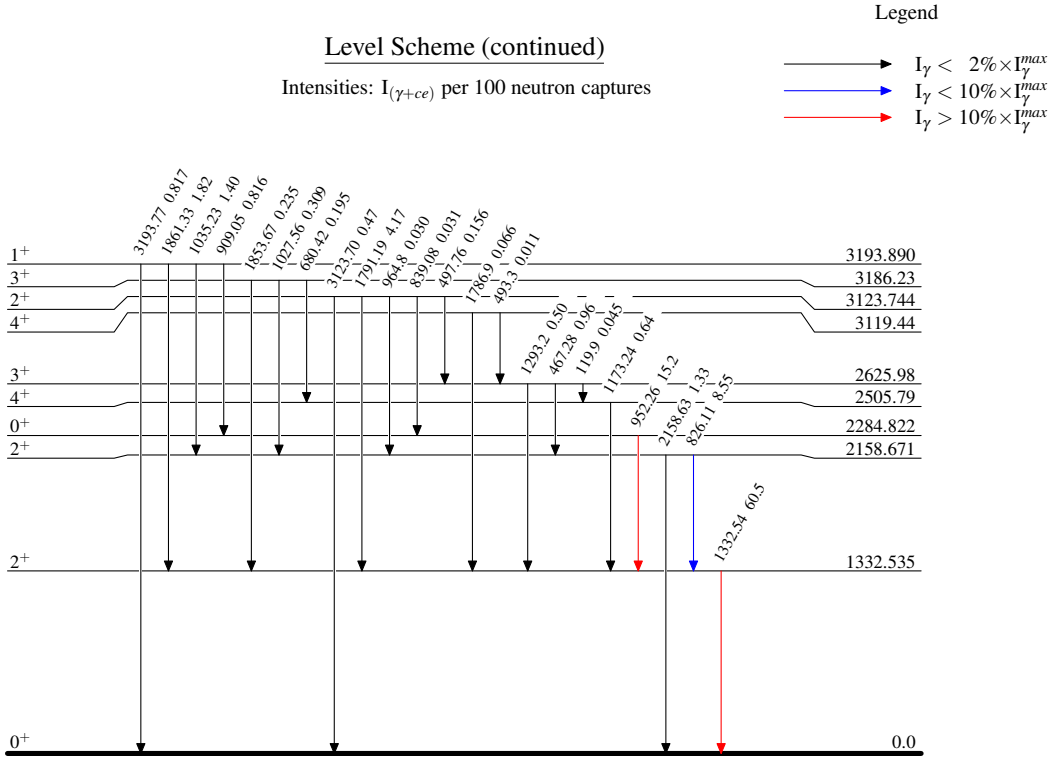


$^{60}_{28}Ni_{32}$

^{59}Ni(n,γ) E=thermal 2004Ra23

Level Scheme (continued)

Intensities: $I_{(\gamma+ce)}$ per 100 neutron captures



$^{60}_{28}Ni_{32}$