^{173}Yb(n,γ) E=2 keV 1981Gr01

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	E. Browne, Huo Junde	NDS 87, 15 (1999)	1-Nov-1998

Target: 92.6% enriched ^{173}Yb(J^π=5/2$^-$); detector:Ge(Li).

^{174}Yb Levels

Level energies below 2336.5 keV are from secondary γ rays measured in thermal-neutron capture. Energies of levels populated by primary γ rays only were deduced by the evaluator.

ΔE: Uncertainties of levels populated by primary transitions only given by 1981Gr01 are too low. Values given here have been recalculated by the evaluator.

J^π: spin of levels populated by primary γ rays are 1, 2, 3, or 4, based on the assumption that primary γ rays carry one unit of angular momentum, and that the spin and parities of capture resonance states are J^π=2$^-$, 3$^-$. Level parities are based on probable γ-ray multipolarities determined from the energy dependence of the intensities. States with spins J=2 and 3 are differentiated from those with spins J=1 and 4 through the intensity of primary transitions feeding these states. This is because the former states may be populated by dipole transitions from resonance states with either J=2 or 3, whereas dipole transitions from resonance states with only one spin value may populate states with spins J=1 or 4. For low-energy neutron capture, this leads to primary transitions to final levels with spins J=2 or 3 which are a factor of≈2 more intense than those to final levels with spins J=1 or 4. See neutron thermal capture for band assignments.

E(level)	J^π	E(level)	J^π	E(level)	J^π
0.0	0^+	2016.126 *20*	(3^+)‡	2540.5 *8*	
76.471 *1*	2^+‡	2049.967 *9*	3^-‡	2583.1 *7*	$(2^+,3^+)$#
253.117 *2*	4^+‡	2068.984 *60*	(4^+)‡	2588.8 *7*	$(2^+,3^+)$#
526.034 *9*	6^+‡	2088.746 *18*	$(4)^-$‡	2601.8 *7*	
1318.361 *6*	2^-‡	2101.6& *1*	(4^+)‡	2623.0 *7*	$(2^+,3^+)$#
1382.013 *6*	3^-‡	2111.876 *14*	$(2^-,3^-)$	2641.8 *9*	
1468.195 *6*	4^-‡	2123.04 *10*	4^+‡	2647.0 *7*	
1518.148 *13*	6^+‡	2163.144 *11*	$1^+,2^+$‡	2656.6 *6*	
1561.021 *20*	2^+‡	2171.982 *26*	(2^+)‡	2662.6 *6*	
1606.358 *6*	3^+‡	2191.6 *10*		2680.6 *6*	
1624.40 *3*	1^+‡	2198.6 *3*		2704.4 *10*	
1633.973 *7*	2^+‡	2237.715 *19*	(4^+)‡	2713.0 *7*	
1674.82 *3*	2^+‡	2246.825 *15*	(2^+)‡	2728.1 *10*	
1701.568 *10*	4^+‡	2256.416 *8*	$(2^+,3^+,4^+)$‡	2749.8 *7*	
1709.42 *6*	3^+‡	2295.773 *30*	$(2^+,3^+)$‡	2784.1 *10*	
1715.449 *27*	4^+‡	2336.876 *7*	(4^+)‡	2799.1 *13*	
1733.64 *1*	3^+‡	2360.2 *6*		2813.8 *15*	
1753.7?		2384.1 *7*		2823.3 *11*	
1785.90 *4*	3^-‡	2404.5 *10*	$(2^-,3^-)$#	2843.8 *8*	
1805.40 *15*	4^+‡	2437.2 *7*		2883.2 *7*	
1851.408 *10*	3^-‡	2451.2 *8*	$(2^-,3^-)$#	2895.6 *7*	
1859.232 *25*	4^+‡	2464.8 *6*	$(2^+,3^+)$#	2909.7 *6*	
1935.5@ *7*	$(2^-,3^-)$#	2501.7 *8*	$(2^-,3^-)$#	2943.6 *7*	
1949.696 *6*	(4^-)‡	2513.0 *7*		2964.8 *7*	
1958.52 *3*	2^+‡	2519.0 *6*	$(2^+,3^+)$#	3001.7 *6*	
1971.1 *10*	$(1^-,4^-)$#	2527.0 *7*	$(1^+,4^+)$#	3014.8 *8*	

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^{173}Yb(n,γ) E=2 keV 1981Gr01 (continued)

^{174}Yb Levels (continued)

E(level)	E(level)	E(level)	E(level)	J^π
3153.9 *9*	3283.8 *9*	3477.6 *8*	3733.0 *7*	
3161.9 *7*	3294.2 *8*	3523.6 *12*	3772.2 *11*	
3209.3 *6*	3300.0 *8*	3534.6 *9*	S(n)+x[a]	$2^-,3^-$
3236.7 *7*	3314.9 *7*	3553.2 *9*		
3250.8 *8*	3352.7 *10*	3598.9 *9*		
3267.6 *7*	3462.1 *7*	3624.0 *12*		

[†] Uncertainties of levels populated by primary transitions only given by 1981Gr01 are too low. Values given here have been recalculated by the evaluator.
[‡] From thermal neutron-capture data.
[#] From primary γ-ray population.
[@] Possibly same as 1934.4-keV level from thermal-neutron capture.
[&] A 2101 level, observed in ^{173}Yb(n,γ) E=thermal, decays to the g.s. $J^\pi=2^+$ band member by a possible E1 γ ray.
[a] S(n)=7464.58 keV *35*; x=2 keV. Resonance capture state.

γ(^{174}Yb)

E_γ	I_γ[†]	E_i(level)	J^π_i	E_f	J^π_f
992	77.4	1518.148	6^+	526.034	6^+
1128	100.4	1382.013	3^-	253.117	4^+
1215	152.7	1468.195	4^-	253.117	4^+
1241	906	1318.361	2^-	76.471	2^+
1305	<630[#]	1382.013	3^-	76.471	2^+
1307	<630[#]	1561.021	2^+	253.117	4^+
1318	88.1	1318.361	2^-	0.0	0^+
1529[@]	<211	1606.358	3^+	76.471	2^+
1532[@]	<211	1785.90	3^-	253.117	4^+
[x]1543	<252				
1548[@]	<252	1624.40	1^+	76.471	2^+
1552[@]	<252	1805.40	4^+	253.117	4^+
1557	198	1633.973	2^+	76.471	2^+
1598[b]	<69.9[b]	1674.82	2^+	76.471	2^+
1598[b]	<69.9[b]	2123.04	4^+	526.034	6^+
1633[b]	<432[b]	1633.973	2^+	0.0	0^+
1633[b]	<432[b]	1709.42	3^+	76.471	2^+
1657	144	1733.64	3^+	76.471	2^+
1674	112	1674.82	2^+	0.0	0^+
1709	<136[&]	1785.90	3^-	76.471	2^+
1710	<136[&]	2237.715	(4^+)	526.034	6^+
2025	97.9	2101.6	(4^+)	76.471	2^+
2043	31.1	2295.773	$(2^+,3^+)$	253.117	4^+
2198	61.6	2198.6		0.0	0^+
[x]2284	<84.4[a]				
[x]2287	<84.4[a]				
3694.3 *11*	15.2 *46*	S(n)+x	$2^-,3^-$	3772.2	
3733.5 *7*	18.0 *36*	S(n)+x	$2^-,3^-$	3733.0	
3842.5 *12*	12.2 *30*	S(n)+x	$2^-,3^-$	3624.0	
3867.6 *9*	8.4 *25*	S(n)+x	$2^-,3^-$	3598.9	

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^{173}Yb(n,γ) E=2 keV 1981Gr01 (continued)

γ(^{174}Yb) (continued)

E_γ	I_γ[†]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]
3913.3 *9*	15.3 *38*	S(n)+x	$2^-,3^-$	3553.2		
3931.9 *9*	11.4 *29*	S(n)+x	$2^-,3^-$	3534.6		
3942.9 *12*	17.7 *53*	S(n)+x	$2^-,3^-$	3523.6		
3988.9 *8*	10.7 *21*	S(n)+x	$2^-,3^-$	3477.6		
4004.4 *7*	15.8 *24*	S(n)+x	$2^-,3^-$	3462.1		
4113.8 *10*	8.6 *22*	S(n)+x	$2^-,3^-$	3352.7		
4151.6 *7*	14.3 *21*	S(n)+x	$2^-,3^-$	3314.9		
4166.5 *8*	11.4 *28*	S(n)+x	$2^-,3^-$	3300.0		
4172.3 *8*	11.2 *28*	S(n)+x	$2^-,3^-$	3294.2		
4182.7 *9*	11.2 *25*	S(n)+x	$2^-,3^-$	3283.8		
4198.9 *7*	12.7 *19*	S(n)+x	$2^-,3^-$	3267.6		
4215.7 *8*	9.4 *24*	S(n)+x	$2^-,3^-$	3250.8		
4229.8 *7*	19.4 *39*	S(n)+x	$2^-,3^-$	3236.7		
4257.2 *6*	12.1 *18*	S(n)+x	$2^-,3^-$	3209.3		
4304.6 *7*	11.8 *24*	S(n)+x	$2^-,3^-$	3161.9		
4312.6 *9*	9.9 *25*	S(n)+x	$2^-,3^-$	3153.9		
4451.7 *8*	6.6 *20*	S(n)+x	$2^-,3^-$	3014.8		
4464.8 *6*	13.9 *22*	S(n)+x	$2^-,3^-$	3001.7		
4501.7 *7*	14.5 *22*	S(n)+x	$2^-,3^-$	2964.8		
4522.9 *7*	10.0 *15*	S(n)+x	$2^-,3^-$	2943.6		
4556.8 *6*	13.9 *21*	S(n)+x	$2^-,3^-$	2909.7		
4570.9 *7*	13.4 *20*	S(n)+x	$2^-,3^-$	2895.6		
4583.3 *7*	9.4 *19*	S(n)+x	$2^-,3^-$	2883.2		
4622.7 *8*	7.2 *14*	S(n)+x	$2^-,3^-$	2843.8		
4643.2 *11*	6.9 *21*	S(n)+x	$2^-,3^-$	2823.3		
4652.7 *15*	4.8 *19*	S(n)+x	$2^-,3^-$	2813.8		
4667.4 *13*	4.1 *16*	S(n)+x	$2^-,3^-$	2799.1		
4682.4 *10*	4.9 *12*	S(n)+x	$2^-,3^-$	2784.1		
4716.7 *7*	14.5 *22*	S(n)+x	$2^-,3^-$	2749.8		
4738.4 *10*	7.5 *19*	S(n)+x	$2^-,3^-$	2728.1		
4753.5 *7*	10.4 *21*	S(n)+x	$2^-,3^-$	2713.0		
4762.1 *10*	4.8 *10*	S(n)+x	$2^-,3^-$	2704.4		
4785.9 *6*	12.8 *26*	S(n)+x	$2^-,3^-$	2680.6		
4803.9 *6*	13.1 *20*	S(n)+x	$2^-,3^-$	2662.6		
4809.9 *6*	15.6 *23*	S(n)+x	$2^-,3^-$	2656.6		
4819.5 *7*	10.8 *22*	S(n)+x	$2^-,3^-$	2647.0		
4824.7 *9*	7.1 *18*	S(n)+x	$2^-,3^-$	2641.8		
4843.5 *7*	14.5 *22*	S(n)+x	$2^-,3^-$	2623.0	$(2^+,3^+)$	
4864.7 *7*	16.8 *34*	S(n)+x	$2^-,3^-$	2601.8		
4877.7 *7*	16.3 *24*	S(n)+x	$2^-,3^-$	2588.8	$(2^+,3^+)$	
4883.4 *7*	22.3 *33*	S(n)+x	$2^-,3^-$	2583.1	$(2^+,3^+)$	
4926.0 *8*	6.0 *12*	S(n)+x	$2^-,3^-$	2540.5		
4939.5 *7*	8.7 *13*	S(n)+x	$2^-,3^-$	2527.0	$(1^+,4^+)$	
4947.5 *6*	14.5 *22*	S(n)+x	$2^-,3^-$	2519.0	$(2^+,3^+)$	
4953.5 *7*	9.8 *20*	S(n)+x	$2^-,3^-$	2513.0		
4964.8 *8*	4.1 *12*	S(n)+x	$2^-,3^-$	2501.7	$(2^-,3^-)$	
5001.7 *6*	20.3 *20*	S(n)+x	$2^-,3^-$	2464.8	$(2^+,3^+)$	
5015.3 *8*	4.5 *11*	S(n)+x	$2^-,3^-$	2451.2	$(2^-,3^-)$	
5029.3 *7*	7.1 *14*	S(n)+x	$2^-,3^-$	2437.2		
5062.0 *10*	5.2 *13*	S(n)+x	$2^-,3^-$	2404.5	$(2^-,3^-)$	
5082.4 *7*	6.4 *13*	S(n)+x	$2^-,3^-$	2384.1		
5106.3 *6*	11.0 *17*	S(n)+x	$2^-,3^-$	2360.2		
5129.8 *7*	7.9 *12*	S(n)+x	$2^-,3^-$	2336.876	(4^+)	(E1)
5170.8 *7*	24.2 *36*	S(n)+x	$2^-,3^-$	2295.773	$(2^+,3^+)$	(E1)
5210.1 *6*	16.6 *17*	S(n)+x	$2^-,3^-$	2256.416	$(2^+,3^+,4^+)$	(E1)
5220.0 *6*	20.1 *20*	S(n)+x	$2^-,3^-$	2246.825	(2^+)	

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^{173}Yb(n,γ) E=2 keV 1981Gr01 (continued)

γ(^{174}Yb) (continued)

Eγ	Iγ[†]	Ei(level)	J^{π}_{i}	Ef	J^{π}_{f}	Mult.[‡]
5229.1 6	15.0 22	S(n)+x	2⁻,3⁻	2237.715	(4⁺)	(E1)
5268.2 12	4.1 12	S(n)+x	2⁻,3⁻	2198.6		
5277.0 7	4.8 10	S(n)+x	2⁻,3⁻	2191.6		
5294.6 6	25.7 26	S(n)+x	2⁻,3⁻	2171.982	(2⁺)	
5303.5 6	28.9 29	S(n)+x	2⁻,3⁻	2163.144	1⁺,2⁺	
5343.0 6	17.6 18	S(n)+x	2⁻,3⁻	2123.04	4⁺	(E1)
5355.3 7	5.6 11	S(n)+x	2⁻,3⁻	2111.876	(2⁻,3⁻)	(M1)
5365.3 6	12.5 13	S(n)+x	2⁻,3⁻	2101.6	(4⁺)	
5377.3 6	5.3 11	S(n)+x	2⁻,3⁻	2088.746	(4)⁻	(M1)
5398.0 6	10.8 16	S(n)+x	2⁻,3⁻	2068.984	(4⁺)	(E1)
5416.9 8	5.2 13	S(n)+x	2⁻,3⁻	2049.967	3⁻	(M1)
5450.2 6	27.4 27	S(n)+x	2⁻,3⁻	2016.126	(3⁺)	(E1)
5495.3[c] 10	3.6 9	S(n)+x	2⁻,3⁻	1971.1	(1⁻,4⁻)	(M1)
5508.2 6	22.9 23	S(n)+x	2⁻,3⁻	1958.52	2⁺	(E1)
5517.1 8	4.5 9	S(n)+x	2⁻,3⁻	1949.696	(4⁻)	(M1)
5530.9 7	6.3 12	S(n)+x	2⁻,3⁻	1935.5	(2⁻,3⁻)	(M1)
5607.6 6	15.7 16	S(n)+x	2⁻,3⁻	1859.232	4⁺	(E1)
5616.1 7	5.8 12	S(n)+x	2⁻,3⁻	1851.408	3⁻	(M1)
5661.2 6	21.3 15	S(n)+x	2⁻,3⁻	1805.40	4⁺	(E1)
5680.4 7	6.7 13	S(n)+x	2⁻,3⁻	1785.90	3⁻	(M1)
5712.9[c] 15	2.4 10	S(n)+x	2⁻,3⁻	1753.7?		(E1)
5732.8 6	41.9 29	S(n)+x	2⁻,3⁻	1733.64	3⁺	(E1)
5751.1 6	22.0 22	S(n)+x	2⁻,3⁻	1715.449	4⁺	(E1)
5757.0 6	38.3 38	S(n)+x	2⁻,3⁻	1709.42	3⁺	(E1)
5764.6 6	21.4 21	S(n)+x	2⁻,3⁻	1701.568	4⁺	(E1)
5791.7 6	41.5 29	S(n)+x	2⁻,3⁻	1674.82	2⁺	(E1)
5832.5 6	42.9 30	S(n)+x	2⁻,3⁻	1633.973	2⁺	(E1)
5842.5 6	15.1 10	S(n)+x	2⁻,3⁻	1624.40	1⁺	(E1)
5860.1 6	38.0 27	S(n)+x	2⁻,3⁻	1606.358	3⁺	(E1)
5905.5 6	34.1 24	S(n)+x	2⁻,3⁻	1561.021	2⁺	(E1)
5997.2 8	4.7 9	S(n)+x	2⁻,3⁻	1468.195	4⁻	(M1)
6084.8 6	9.7 10	S(n)+x	2⁻,3⁻	1382.013	3⁻	(M1)
6148.4 6	9.6 10	S(n)+x	2⁻,3⁻	1318.361	2⁻	(M1)
7213.0 6	62.8 31	S(n)+x	2⁻,3⁻	253.117	4⁺	(E1)
7389.6 6	100	S(n)+x	2⁻,3⁻	76.471	2⁺	(E1)

[†] Intensities of primary γ rays are relative to 100 for 7389.6γ. For absolute intensity per 100 neutrons captured multiply by 0.0159. Intensities of secondary γ rays are relative to 177.0 for 7389γ + 7213γ.
[‡] From the energy dependence of Iγ.
[#] 1305γ+1307γ.
[@] Complex peak.
[&] 1709γ+1710γ.
[a] 2284γ+2287γ.
[b] Multiply placed with undivided intensity.
[c] Placement of transition in the level scheme is uncertain.
[x] γ ray not placed in level scheme.

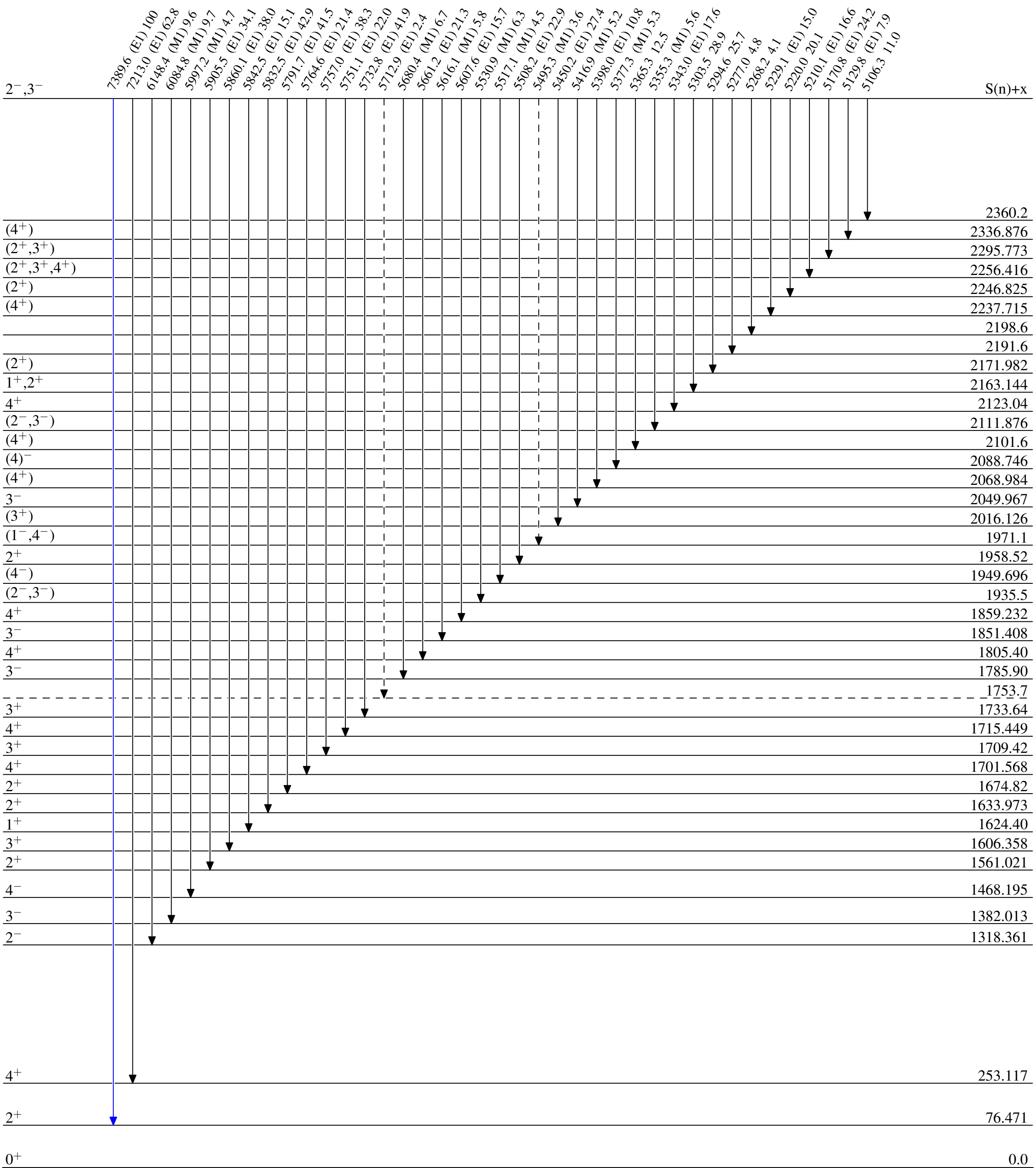
^{173}Yb(n,γ) E=2 keV 1981Gr01

Legend

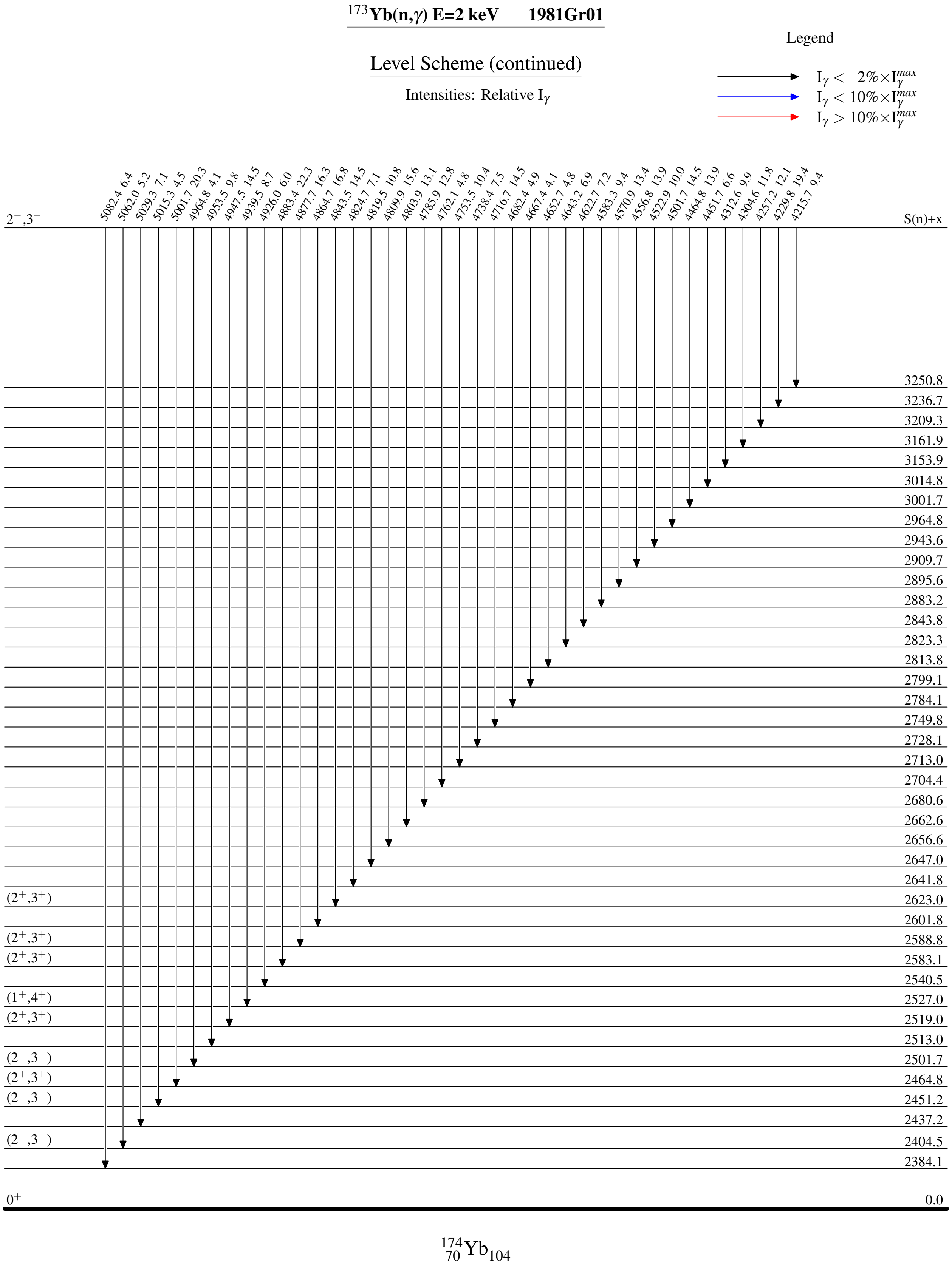
Level Scheme

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)



$^{174}_{70}Yb_{104}$


^{173}Yb(n,γ) E=2 keV 1981Gr01
Level Scheme (continued)
Intensities: Relative Iγ
Legend
Iγ < 2%×Iγ^max
Iγ < 10%×Iγ^max
Iγ > 10%×Iγ^max
2⁻,3⁻ S(n)+x
5082.4 6.4
5062.0 5.2
5029.3 7.1
5015.3 4.5
5001.7 20.3
4964.8 4.1
4953.5 9.8
4947.5 14.5
4939.5 8.7
4926.0 6.0
4883.4 22.3
4877.7 16.3
4864.7 16.8
4843.5 14.5
4824.7 7.1
4819.5 10.8
4809.9 15.6
4803.9 13.1
4785.9 12.8
4762.1 4.8
4753.5 10.4
4738.4 7.5
4716.7 14.5
4682.4 4.9
4667.4 4.1
4652.7 4.8
4643.2 6.9
4622.7 7.2
4583.3 9.4
4570.9 13.4
4556.8 13.9
4522.9 10.0
4501.7 14.5
4464.8 13.9
4451.7 6.6
4312.6 9.9
4304.6 11.8
4257.2 12.1
4229.8 19.4
4215.7 9.4
3250.8
3236.7
3209.3
3161.9
3153.9
3014.8
3001.7
2964.8
2943.6
2909.7
2895.6
2883.2
2843.8
2823.3
2813.8
2799.1
2784.1
2749.8
2728.1
2713.0
2704.4
2680.6
2662.6
2656.6
2647.0
2641.8
(2⁺,3⁺) 2623.0
2601.8
(2⁺,3⁺) 2588.8
(2⁺,3⁺) 2583.1
2540.5
(1⁺,4⁺) 2527.0
(2⁺,3⁺) 2519.0
2513.0
(2⁻,3⁻) 2501.7
(2⁺,3⁺) 2464.8
(2⁻,3⁻) 2451.2
2437.2
(2⁻,3⁻) 2404.5
2384.1
0⁺ 0.0
$^{174}_{70}Yb_{104}$

^{173}Yb(n,γ) E=2 keV 1981Gr01

Level Scheme (continued)

Intensities: Relative I_γ

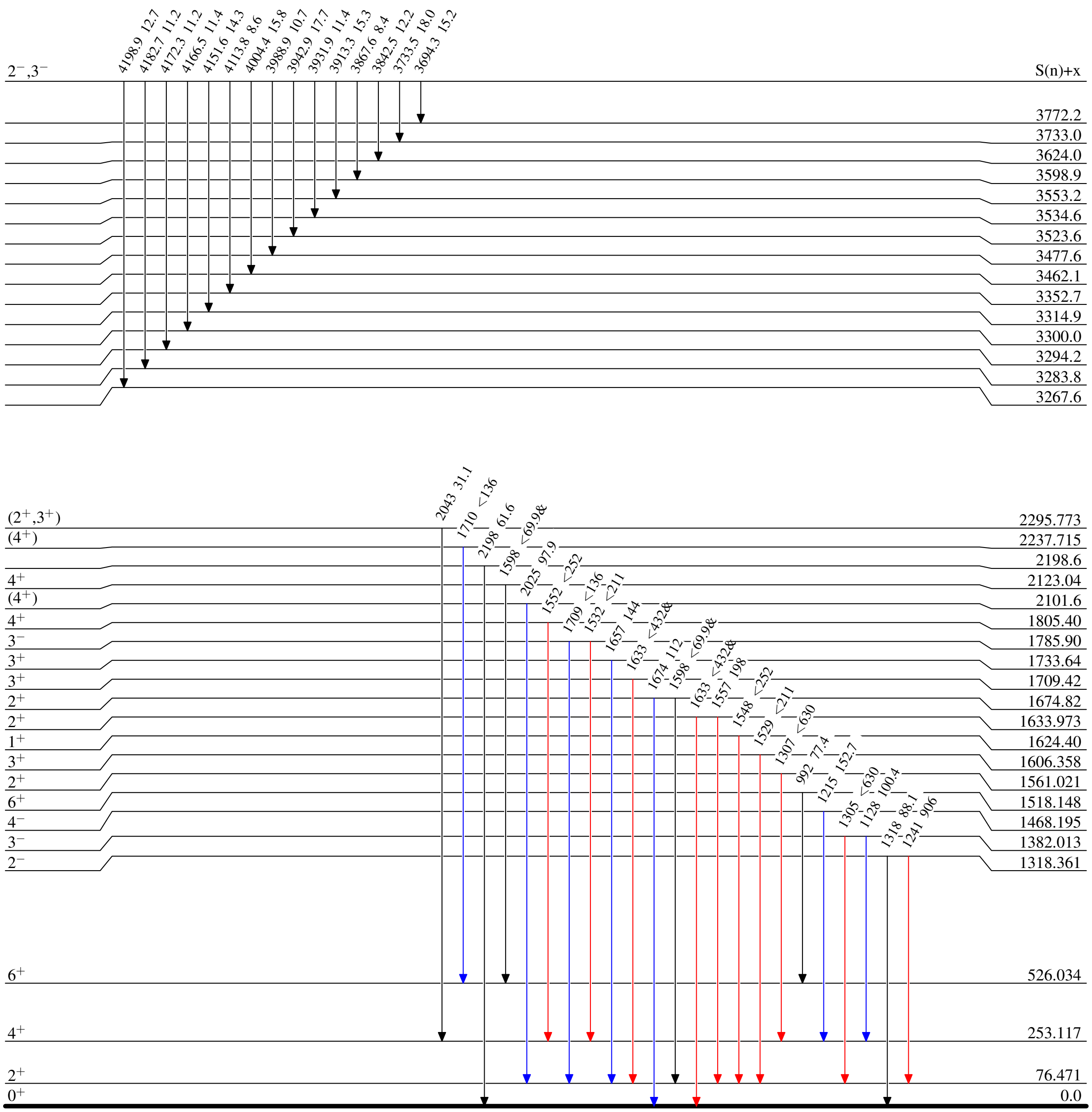
& Multiply placed: undivided intensity given

Legend

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

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

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



$^{174}_{70}Yb_{104}$