^{173}Yb(n,γ) E=4.53 eV 1973Ca22

History

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

Target: 87.54% enriched ^{173}Yb(J^π=5/2$^-$).
Detector:Ge(Li).
Measured primary and secondary γ rays, $\gamma\gamma$ coin.
1982Sh04 measured primary γ rays from 49 individual neutron resonances in the 10-530 eV range. The ratio of populating final states at 253, 526, 1318, and 1606 keV from J=3 to J=2 resonances, confirmed spins of 4, 6, 2, and 3, respectively, for these levels.

^{174}Yb Levels

$K^\pi=0^+$ bands are interpreted as rotational bands built upon pairing-vibrational excitations.

E(level)[c]	J^π[b]	Comments
0.0†	0^+	
76.471† *1*	2^+	
253.117† *2*	4^+	
526.034† *9*	6^+	
1318.2[a] *2*	2^-	
1382.0[a] *2*	3^-	
1468.0[a] *2*	4^-	
1518 *1*	6^+	
1560.6‡ *2*	2^+	
1572[a] *1*	5^-	
1633.7# *2*	2^+	
1709.3# *2*	3^+	
1714.9‡ *2*	4^+	
1805.1# *2*	4^+	
≈1888?@	0^+	
1958.2@ *2*	2^+	
2101.5 *2*		J^π: 1973Ca22 assigned $J^\pi=0^+$ to this level. This assignment is not consistent with primary (dipole) transition population from $J^\pi=3^-$ neutron-capture state. A level at 2101 keV has been reported by 1987Ge01 and 1978La14, but it's decay to the g.s. $J^\pi=2^+$ band member by a possible E1 transition rules out a $J^\pi=0^+$ assignment.
2123.0@ *2*	4^+	
2172.1& *2*	2^+	
2336.8& *2*	4^+	
7464.6 *4*	3^-	E(level): 4.53-eV resonance capture state. J^π: for resonance parameters see 1973Mu14.

† Band(A): $K^\pi=0^+$ g.s. rotational band.
‡ Band(B): $K^\pi=0^+$ band.
# Band(C): $K^\pi=2^+$ band.
@ Band(D): $K^\pi=0^+$ band.
& Band(E): $K^\pi=0^+$ band.
[a] Band(F): $K^\pi=2^-$ octupole-vibrational band.
[b] Spin assignments are based on rotational band structure and comparison of reduced γ-transition probability ratios with theory (Alaga rules).
[c] Level energies of g.s.-rotational band are from thermal-neutron-capture data.

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γ(^{174}Yb)

E_γ [†]	I_γ [‡]	E_i(level)	J_i^π	E_f	J_f^π
177		253.117	4^+	76.471	2^+
611.8[a] *8*	11.2 *30*	2172.1	2^+	1560.6	2^+
991.8[@]		1518	6^+	526.034	6^+
1128.9[@] *2*	155 *16*	1382.0	3^-	253.117	4^+
1188.8 *2*	53.6 *38*	1714.9	4^+	526.034	6^+
1214.9[@] *2*	253 *14*	1468.0	4^-	253.117	4^+
1241.7 *2*	1121 *56*	1318.2	2^-	76.471	2^+
1279[#] *CA*	<6.3	1805.1	4^+	526.034	6^+
1305.5 *5*	692 *52*	1382.0	3^-	76.471	2^+
1307.7[@] *8*	160 *23*	1560.6	2^+	253.117	4^+
1318.9		1572	5^-	253.117	4^+
1380.6 *3*	16.1 *64*	1633.7	2^+	253.117	4^+
1391.8 *5*	40 *10*	1468.0	4^-	76.471	2^+
[x]1410[#] *CA*	<9.5				
1456.0 *2*	82.9 *83*	1709.3	3^+	253.117	4^+
1461.9 *5*	100	1714.9	4^+	253.117	4^+
1484.1 *2*	89 *8*	1560.6	2^+	76.471	2^+
1552.0[@] *2*	118 *12*	1805.1	4^+	253.117	4^+
1557.4 *2*	176 *11*	1633.7	2^+	76.471	2^+
1561.5[a] *15*	<13.5	1560.6	2^+	0.0	0^+
1598.2[a] *2*	<75	2123.0	4^+	526.034	6^+
1633.3[&] *4*	453[&] *23*	1633.7	2^+	0.0	0^+
1633.3[&] *4*	453[&] *23*	1709.3	3^+	76.471	2^+
1639.6 *10*	22.7 *82*	1714.9	4^+	76.471	2^+
[x]1705[#] *CA*	<8.5				
1728.6 *2*	41.9 *42*	1805.1	4^+	76.471	2^+
1811.2[&a] *8*	<15.6[&]	≈1888?	0^+	76.471	2^+
1811.2[&a] *8*	<15.6[&]	2336.8	4^+	526.034	6^+
1869.9 *2*	91.0 *65*	2123.0	4^+	253.117	4^+
1881.7 *2*	50.9 *60*	1958.2	2^+	76.471	2^+
1918.7 *2*	65.8 *79*	2172.1	2^+	253.117	4^+
1958[#] *CA*	<18.5	1958.2	2^+	0.0	0^+
2025.0 *2*	87.7 *62*	2101.5		76.471	2^+
2046.1 *7*	20.5 *85*	2123.0	4^+	76.471	2^+
2083.7 *2*	80.0 *96*	2336.8	4^+	253.117	4^+
2095.3 *2*	83 *10*	2172.1	2^+	76.471	2^+
2170.0[a] *2*	<56.5	2172.1	2^+	0.0	0^+
2260 *2*	21 *11*	2336.8	4^+	76.471	2^+
5128 *CA*	32.6 *65*	7464.6	3^-	2336.8	4^+
5293 *CA*	11 *2*	7464.6	3^-	2172.1	2^+
5342 *CA*	44.6 *90*	7464.6	3^-	2123.0	4^+
5363 *CA*	40.5 *50*	7464.6	3^-	2101.5	
5750 *CA*	68.1 *70*	7464.6	3^-	1714.9	4^+
5831 *CA*	35.5 *40*	7464.6	3^-	1633.7	2^+
5904 *CA*	100	7464.6	3^-	1560.6	2^+

[†] Energies of primary γ rays were not reported by authors. Values given here have been deduced using a capture-state energy of 7464.6 keV. Authors report only a partial γ-ray list.

[‡] Intensities correspond to transitions following 4.53 eV neutron-capture resonance. Primary γ-ray intensities are relative to 100 for 5904γ. Secondary γ-ray intensities are relative to 100 for 1462γ.

Continued on next page (footnotes at end of table)

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$\gamma(^{174}Yb)$ (continued)

Not observed.
@ Observed in coincidence with 177γ.
& Multiply placed with undivided intensity.
a Placement of transition in the level scheme is uncertain.
x γ ray not placed in level scheme.

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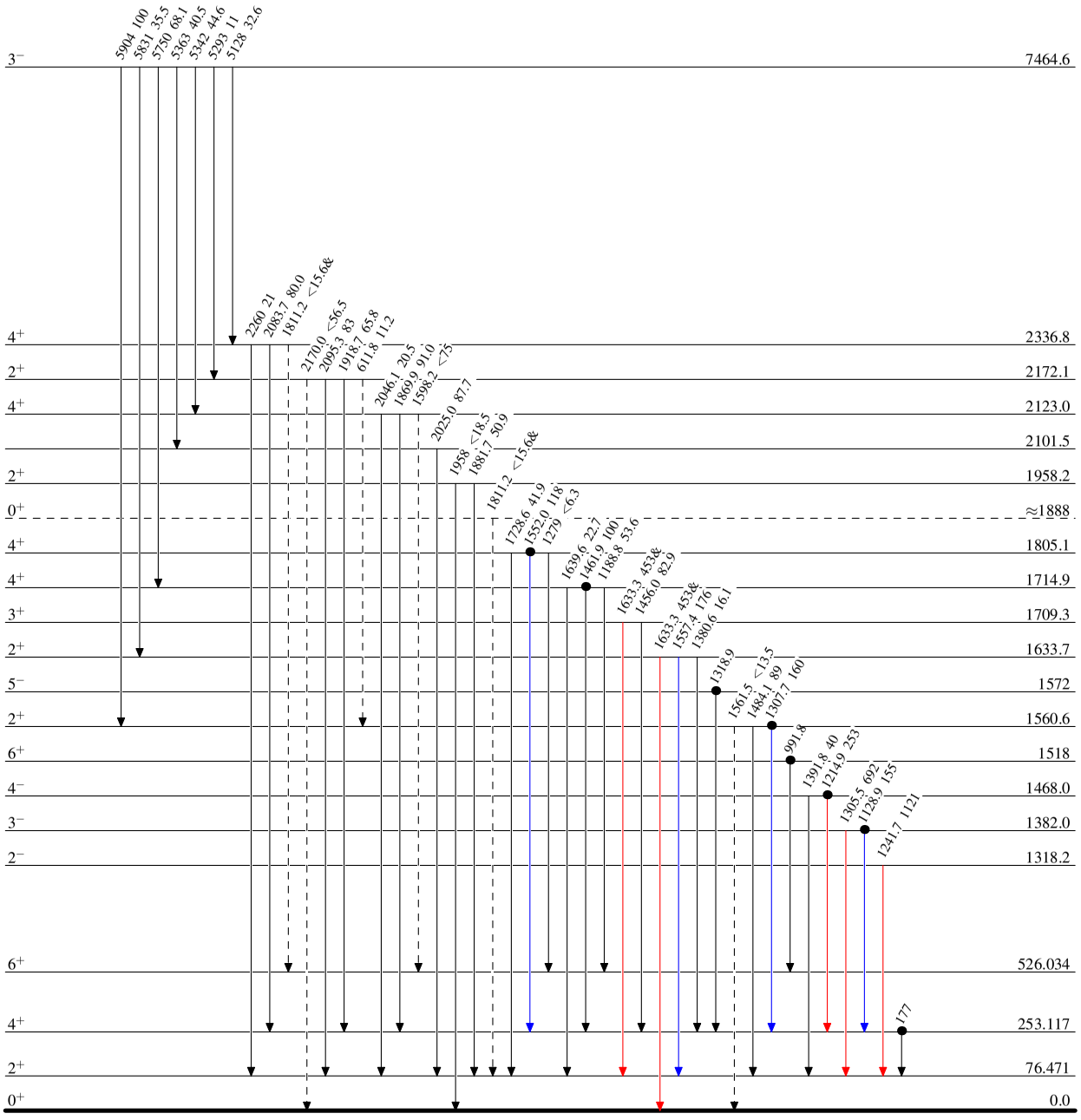
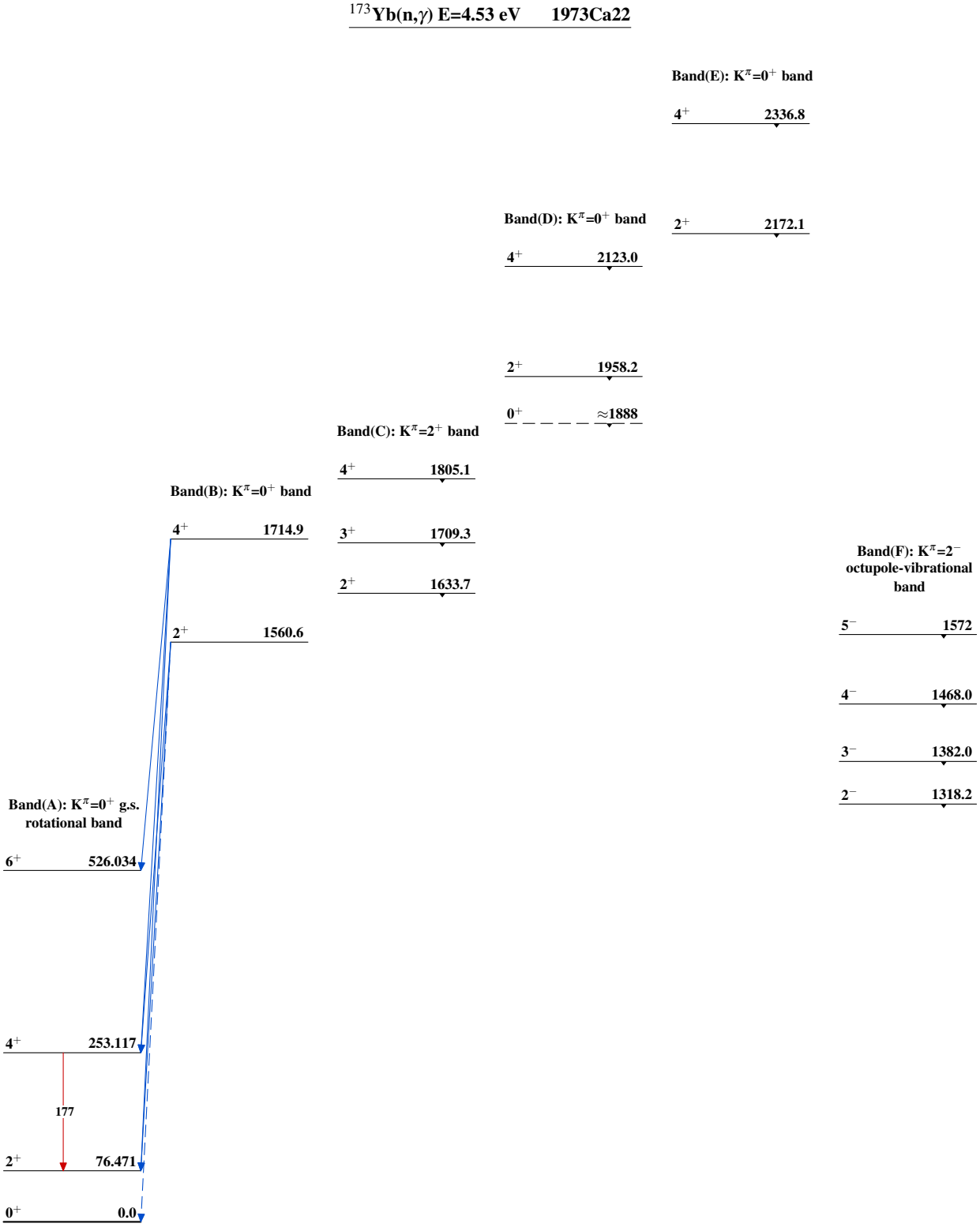
Level Scheme

Intensities: Relative I_γ
& Multiply placed: undivided intensity given

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



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


^{173}Yb(n,γ) E=4.53 eV 1973Ca22
Band(E): K$^{\pi}$=0^{+} band
4^{+} 2336.8
Band(D): K$^{\pi}$=0^{+} band
2^{+} 2172.1
4^{+} 2123.0
2^{+} 1958.2
0^{+} ≈1888
Band(C): K$^{\pi}$=2^{+} band
4^{+} 1805.1
3^{+} 1709.3
2^{+} 1633.7
Band(B): K$^{\pi}$=0^{+} band
4^{+} 1714.9
2^{+} 1560.6
Band(F): K$^{\pi}$=2^{-} octupole-vibrational band
5^{-} 1572
4^{-} 1468.0
3^{-} 1382.0
2^{-} 1318.2
Band(A): K$^{\pi}$=0^{+} g.s. rotational band
6^{+} 526.034
4^{+} 253.117
177
2^{+} 76.471
0^{+} 0.0

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