^{173}Yb(^{3}He,α), (^{3}He,$\alpha\gamma$) 1972On01,1991Gu04

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh	NDS 75,199 (1995)	31-May-1995

$J^{\pi}(^{173}Yb$ g.s.)=5/2^{-}[512].

1972On01: (^{3}He,α) E=24 MeV. Enriched (95%) target. FWHM≈30 keV. Data at θ(lab)=30°, 38°, 50°.

1991Gu04 (also 1990Gu14,1989Ze01): (^{3}He,$\alpha\gamma$) E=45 MeV. Measured γ, $\alpha\gamma$, γ-ray multiplicity.

Peaks observed in (^{3}He,$\alpha\gamma$) (1991Gu04)

Excitation energy	Eγ	Transitions
200		g.s. band
1200	1000	$K^{\pi}=3^{+}$ band to g.s. band
1900	200	$K^{\pi}=6^{-}$ intraband
2600	2100	$K^{\pi}=5^{-}$ band to g.s. band
2800	1100	$K^{\pi}=8^{+}$ band to $K^{\pi}=6^{-}$ band
2800	400	$K^{\pi}=8^{+}$ band t0 $K^{\pi}=(5^{-})$ band
3300	3000	to g.s. band
4500		
5400		

Cross-section data (1972On01)

Level	dσ/dΩ (μb/sr) at 50 °	Level	dσ/dΩ (μb/sr) at 50 °
79	3.9 3	2105	2.8 4
259	3.1 3	2179	2.8 4
541	1.0 4	2249	1.3 4
1114	2.3 3	2283	2.9 5
1168	3.8 4	2346	8.3 8
1262	≈ 2.2	2454	3.3 11
1270	≈ 3.7	2542	15.5 9
1323	3.8 13	2581	11.7 12
1349	12.0 20	2645	8.5 36
1375	2.5 8	2665	24 5
1545	24.6 10	2693	16.2 16 a)
1665	15.5 12 a)	2739	20.6 10
1693	5.8 13	2787	57 3
1747	2.5 4	2832	13.2 17 a)
1808	28.6 14 a)	2875	9.1 13
1838?	4.1 13	2907	6.5 7
1879?	1.1 4 a)	2951	6.6 5
1916?	2.2 3	2993	2.8 4
1966	15.8 11	3062	2.8 6
2007	20 4	3098	5.5 8
2055	3.3 3	3143	4.8 7

a) unresolved doublet

$\sigma(^{3}He,\alpha)(50\ °)/\sigma(d,t)(120\ °)$ (1972On01)

Level	Experimental	Predicted
79	0.055 6	0.046
259	0.055 6	0.075
541	0.12 3	0.093
1168	0.049 7	0.016
1262 a)	0.095	0.095
1323	0.60 26	1.2
1349	1.2 4	1.8
1375	0.15 6	0.018
1541 a)	3.3 7 b)	2.3

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      1559 a)        3.0 7  b)      2.6
      1661 a)        0.30 7 b)      0.98
      1668 a)        0.85 25 b)     1.2
      1693           0.41 12        0.083
      1747           0.27 7         1.0
      1804 a)        1.3 7 b)       0.27
      1808           4.6 25         2.7
      1838           1.8 9          3.3
      1862 a)        0.29 14 b)     1.1
      1916           0.20 6         0.53
      1966           2.4 5          3.2
      2007           0.19 6         0.037
      2055           0.36 6         0.17
      2105           0.36 10        0.25
      2179           0.35 7         1.0
      2346           1.8 4          2.2
      2542           2.1 4          4.5
      2697 a)        0.75 11 b)     0.55
      2739           2.4 4          6.0
      2787           4.4 23         2.8
      2817 a)        1.3 4   b)     0.91
           a) unresolved peak.   Energy from (d,t)
           b) total intensity of the multiplet assigned to this level
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^{172}Yb Levels

The quasiparticle configurations given here are components deduced from a comparison of experimental and theoretical cross sections (1972On01). Other configurations may contribute which are not expected to be populated in this reaction.

E(level)‡	Jπ†	σ(experimental)/σ(predicted) (1972On01)#	Comments
79&	2^+	1.2	
259&	4^+	0.78	
541&	6^+	1.4	
1114a	2^+		
1168b	3^+	1.5	
1270@b	4^+	0.5	E(level): 1262+1286 doublet. σ(experimental)/σ(predicted) is for 1262 component.
1323c	4^-	0.62	
1349c	(5^-)	0.90	
1375b	5^+	0.47	
1545@c	6^- & 7^-	1.2, 3.1	E(level): 1541+1549+1559 unresolved group, but contribution from 1549, 3^+ is expected to be small.
1665@f	(7^-) & 3^+	8.1, 0.7	E(level): 1661+1668 unresolved doublet.
1693d	3^+	1.5	
1747e	4^+	0.22	
1808@f	(8^-) & (4^+)	1.4, 5.2	
1838?@c	(8^-)	1.7	
1879?@e	(5^+)	0.27	
1916?d	(5^+)	0.43	
1966f	(9^-)	0.95	

Continued on next page (footnotes at end of table)

^{173}Yb(^{3}He,α), (^{3}He,$\alpha\gamma$) 1972On01,1991Gu04 (continued)

^{172}Yb Levels (continued)

E(level)[‡]	J$^{\pi}$[†]	σ(experimental)/σ(predicted) (1972On01)[#]
2007[g]	1^+	3.3
2055[g]	(2^+)	1.1
2105[g]	(3^+)	0.36
2179[h]	(6^-)	0.42
2249		
2283		
2346[h]	(7^-)	0.51
2454		
2542[h]	(8^-)	0.71
2581		
2645		
2665		
2693[@ i]	(5^+)	1.1
2739[h]	(9^-)	1.7
2787[@ j]	(8^+)	1.2
2832[@ i]	(6^+)	0.91
2875		
2907		
2951		
2993		
3062		
3098		
3143		

[†] From Adopted Levels. Many values are deduced from σ(experimental)/σ(predicted) and σ(^{3}He,α)/σ(d,t) ratios.
[‡] From 1972On01. Uncertainty is not quoted by 1972On01. It is probably≈5 keV.
[#] Ratio deduced (evaluator) from cross sections given by 1972On01. Due to large uncertainties in σ(predicted), agreement between experimental and predicted cross sections is valid mainly for strongly populated levels.
[@] Unresolved multiplet.
[&] Band(A): $K^{\pi}=0^+$ g.s. band. the g.s. band is populated through Configuration=((ν 5/2(512))(ν 5/2(512))).
[a] Band(B): $K^{\pi}=0^+$ band. the following are some of the contributing configurations: Configuration=((ν 1/2(521))(ν 1/2(521))); Configuration=((ν 5/2(512))(ν 5/2(512))).
[b] Band(C): $K^{\pi}=3^+$ band. contributing Configuration=((ν 5/2(512))(ν 1/2(521))). See Adopted Levels for other configurations.
[c] Band(D): $K^{\pi}=1^-$ octupole band. dominant (almost pure) Configuration=((ν 7/2(633))(ν 5/2(512))) the J=1,2, and 3 members of this band are not seen in (^{3}He,α), consistent with the predicted low cross sections.
[d] Band(E): $K^{\pi}=2^+$ band. main Configuration=((ν 5/2(512))(ν 1/2(521))).
[e] Band(F): $K^{\pi}=3^+$ band. main Configuration=((ν 11/2(505))(ν 5/2(512))).
[f] Band(G): $K^{\pi}=6^-$ band. main Configuration=((ν 5/2(512))(ν 7/2(633))).
[g] Band(H): $K^{\pi}=(1^+)$ band. probable Configuration=((ν 5/2(512))(ν 3/2(521))).
[h] Band(I): $K^{\pi}=(5^-)$ band. probable Configuration=((ν 5/2(512))(ν 5/2(642))).
[i] Band(J): $K^{\pi}=(4^+)$ band. probable Configuration=((ν 5/2(512))(ν 3/2(521))).
[j] Band(K): $K^{\pi}=(8^+)$ band. probable Configuration=((ν 5/2(512))(ν 11/2(505))).

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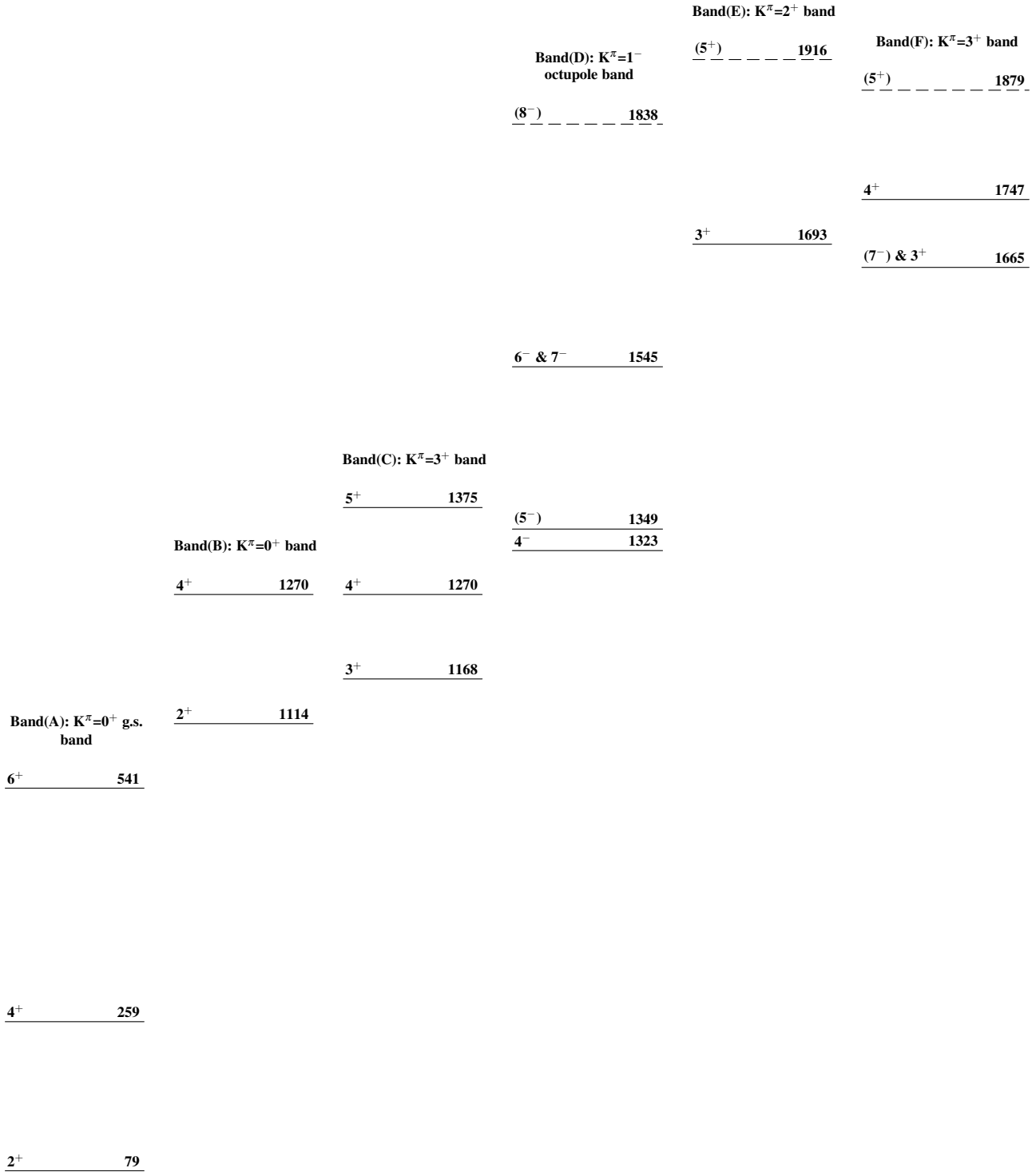

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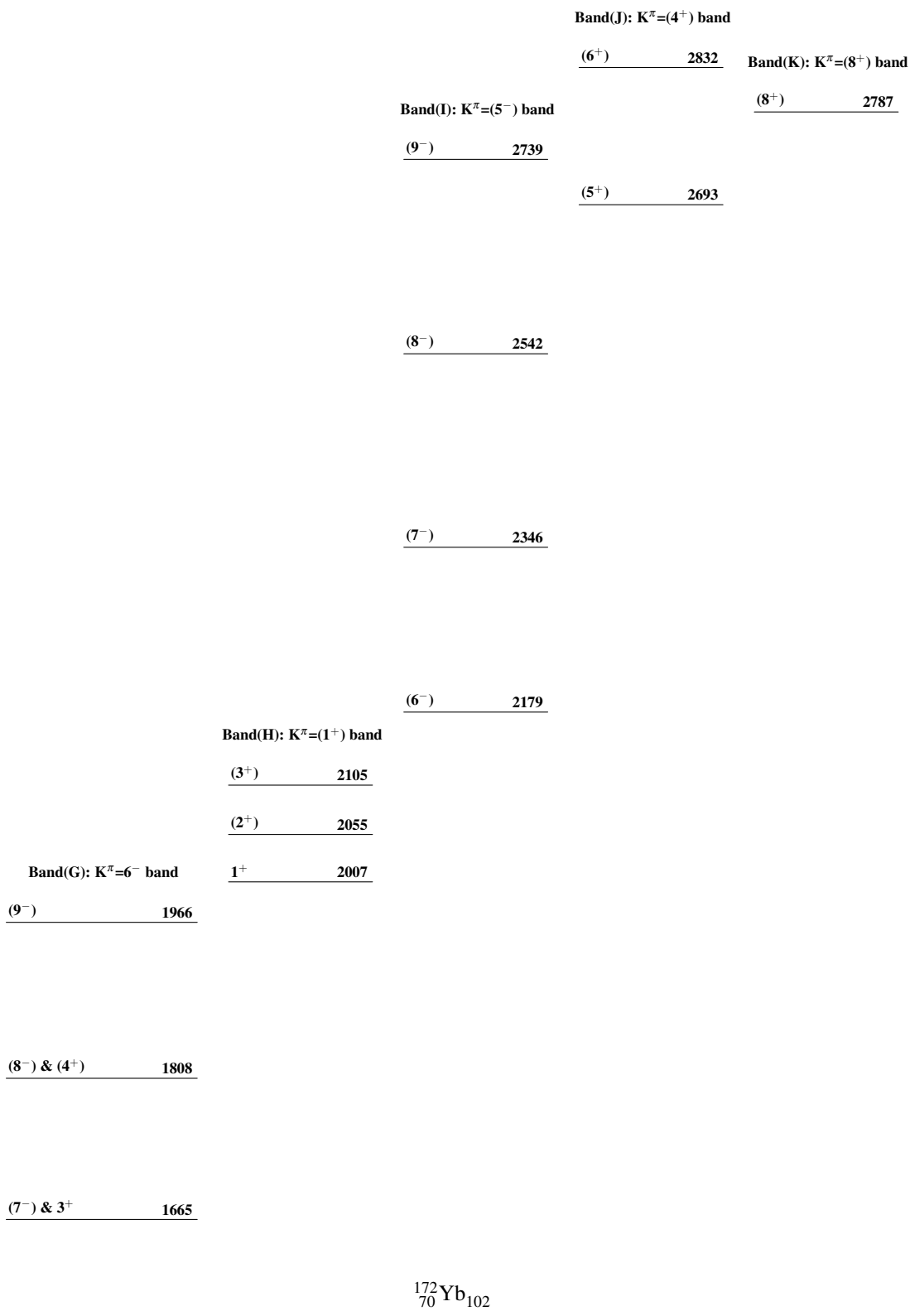
^{173}Yb(^{3}He,α), (^{3}He,$\alpha\gamma$) 1972On01,1991Gu04 (continued)



$^{172}_{70}Yb_{102}$