

$^{171}\text{Yb}(^3\text{He,d}),(\alpha,t)$ 1976El11

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

$E(^3\text{He})=27$ MeV, $E(\alpha)=28.5$ MeV.

$J^\pi(^{171}\text{Yb g.s.})=1/2^-$.

$E(^3\text{He})=27$ MeV, $E(\alpha)=28.5$ MeV. Measured $\sigma(\theta)$ at $\theta=30^\circ$ and 60° , enriched targets. FWHM=13 keV, uncertainty on absolute cross sections=25%. DWBA and Coriolis-mixing calculations.

1975Bu02: (α,t) $E=27$ MeV. Measured Q value=-791.9 20.

 ^{172}Lu Levels

Cross sections at $\theta=60^\circ$ ($\mu\text{b/sr}$)

Level energy	$(^3\text{He,d})$	(α,t)
0	5.7 4	18.3 7
68	21.0 8	27.2 9
132	9.9 5	9.1 5
148	2.9 3	19.3 7
191	5.5 4	2.8 3
210	6.2 4	12.6 6
237	5.0 4	2.9 3
296	8.3 5	3.8 3
314	3.8 3	3.4 3
355	3.1 3	4.0 3
406	25.6 9	19.6 7
437	4.4 4	2.8 3
466	25.6 9	15.7 7
513	15.0 7	11.1 6
581	4.4 4	9.1 5
614	2.0 2	3.3 3
640	5.0 4	11.7 6
663	2.4 3	1.4 2
685	5.2 4	9.8 5
720	4.8 4	10.4 5

Cross sections at 30° are also given by 1976El11

E(level) [†]	J^π [‡]	Comments
0	4^-	J^π : $K^\pi=4^-$ bandhead. Configuration= $((\nu 1/2(521))(\pi 7/2(404)))$. Higher spin members of this band are not reported which is consistent with the predicted weak population in this reaction.
68 & 3	$(3^-)&(1^+)&(3^+)$	J^π : $K^\pi=3^-$ bandhead. Probable Configuration= $((\nu 1/2(521))(\pi 7/2(404)))$. E(level): experimental cross section is larger (by a factor of ≈ 4 in $(^3\text{He,d})$ and a factor of ≈ 2 in (α,t)) than expected for $K^\pi=3^-$. The broad group observed at 68 keV most likely contains contribution from expected 1^+ and 3^+ members (both at ≈ 70 keV) of Configuration= $((\pi 1/2(541))(\nu 1/2(521)))$.
132 @ 3	(2^+)	E(level): this group is obscured by the 148 group in (α,t) spectrum, but it is better resolved in $(^3\text{He,d})$.
148 @ 3	(5^+)	
191 & 3	(1^+)	
210 @ 3	(4^+)	
237 & 5 296 3	(0^+)	J^π : $K^\pi=0^+$ bandhead. Probable Configuration= $((\nu 1/2(521))(\pi 1/2(541)))$.

Continued on next page (footnotes at end of table)

$^{171}\text{Yb}(^3\text{He,d}),(\alpha,t)$ **1976El11 (continued)** ^{172}Lu Levels (continued)

E(level) [†]	J ^π [‡]	L [#]	Comments
314 & 5	(2 ⁺)		
355 & 5	(3 ⁺)		
406 ^a 3	(2 ⁻)	(2)	J ^π : K ^π =2 ⁻ bandhead. Configuration=((ν 1/2(521))(π 5/2(402))).
437 5			
466 ^a 3	(3 ⁻)	(2)	
513 3	(3 ⁻)	(2)	J ^π : K ^π =3 ⁻ bandhead. Configuration=((ν 1/2(521))(π 5/2(402))).
581 ^b 3	(5 ⁺)		
614 & 5	(5 ⁺)		
640 ^c 3	(5 ⁺)		J ^π : K ^π =5 ⁺ bandhead. Probable Configuration=((ν 1/2(521))(π 9/2(514))).
663 5			
685 ^b 3	(6 ⁺)		
720 ^c 3	(6 ⁺)		

[†] General uncertainty=3 keV, as stated by 1976El11. For weaker peaks ΔE=5 keV (evaluator).

[‡] From a comparison between the experimental and calculated cross sections, assuming the existence of rotational bands. The following proton orbitals were considered significant for the coupling of the 1/2[521] neutron orbital (the only orbital available in the target ground state) in forming the 2-quasiparticle states by parallel and antiparallel coupling (of projection of intrinsic spin): 7/2[404], 1/2[541], 1/2[411], 5/2[402], 9/2[514] and 7/2[523].

[#] From σ(α,t)/σ(³He,d).

@ Band(A): K^π=1⁺ band. probable Configuration=((ν 1/2(521))(π 1/2(541))).

& Band(B): K^π=0⁺ band. probable Configuration=((ν 1/2(521))(π 1/2(541))).

^a Band(C): K^π=2⁻ band. probable Configuration=((ν 1/2(521))(π 5/2(402))).

^b Band(D): K^π=4⁺ band. probable Configuration=((ν 1/2(521))(π 9/2(514))). The 4⁺ bandhead is not reported, as expected from its weak population in this reaction.

^c Band(E): K^π=5⁺ band. probable Configuration=((ν 1/2(521))(π 9/2(514))).

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		Band(E): $K^\pi=5^+$ band	
		(6 ⁺)	720
		Band(D): $K^\pi=4^+$ band	
		(6 ⁺)	685
		Band(B): $K^\pi=0^+$ band	
		(5 ⁺)	614
		(5 ⁺)	581
		Band(C): $K^\pi=2^-$ band	
		(3 ⁻)	466
		(2 ⁻)	406
		(3 ⁺)	355
		(2 ⁺)	314
		(0) ⁺	237
Band(A): $K^\pi=1^+$ band			
(4 ⁺)	210	(1) ⁺	191
(5 ⁺)	148		
(2 ⁺)	132		
(3 ⁻)&(1 ⁺)&(3 ⁺)	68	(3 ⁻)&(1 ⁺)&(3 ⁺)	68