^{176}Yb(t,p)   1983Bu03,1982Zu02

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	E. Achterberg, O. A. Capurro, G. V. Marti	NDS 110, 1473 (2009)	31-May-2008

1982Zu02: ^{176}Yb(t,p) reaction, 96.2% enriched ^{176}Yb, E(t)=15 MeV. Proton angular distributions were measured at θ=3.75° to 86.25° in 7.5° steps, using a multiangle spectrograph. Proton spectra with FWHM=25-30 keV resolution. Results were compared with DWBA calculations to extract spin-parity assignments.

1983Bu03: ^{176}Yb(t,p), E(t)=15 MeV, target 96.4% enriched ^{176}Yb. FWHM≈15 keV for the proton peak spectra. Measured angular distributions of emitted protons at θ=7.5° to 67.5° in steps of 7.5°.

^{178}Yb Levels

E(level)‡	J$^{\pi\dagger}$	T$_{1/2}$	L$^{\&}$	C^{2}S^c	Comments
0.0^d	0$^+$	74 min 3	0	1.0	%β^-=100. T$_{1/2}$: from 1973Or03. 1973Or03 establish two β^- decays from this state to levels in ^{178}Lu: 1) E(β^-)=0.25 MeV, I$_\beta$≤10 %, log ft≥4.4; 2) E(β^-)=0.64 MeV, I$_\beta$≥90 %, log ft≈5.0.
84^d 4	2$^+$		2		
278^d 3	4$^+$		4		
342?^{b}					
576^{ad} 3	(6$^+$)				
1221^e 3	(2$^+$)		2		Proposed as the γ-vibrational bandhead (1983Bu03).
1315^f 3	0$^+$		0	0.56	C^{2}S: other value: ≈1 (1982Zu02). Proposed as the bandhead of the second K^π=0$^+$ band.
1335^a 3					
1387$^{\#a}$ 3	(2$^+$)				
1404$^{\#f}$ 3	2$^+$		2		Tentatively adopted as second member of the excited, K^π=0$^+$ band, but see footnote.
1436^a 3					
≈1447?^{b}					
1559^f 4	(4$^+$)				
≈1662?^{b}					
1705^a 5					
1813^a 5					
1869^a 5					
1969 4					
≈2111^a					
2131 4	(4$^+$,5$^-$)$^@$		(4,5)	0.25	L=(0) (1983Bu03).
2351^a 5					
2371^a 5					
2390 5	(4$^+$)		(4)		
2405^a 5					
2690 7	(4$^+$)		(4)		
2899 7	3$^-$		3		
2996^b 13	(4$^+$)		(4)		
3037^b 10	1$^-$		1		

† From comparison of experimental proton angular distributions with DWBA calculations. Also from systematics of g.s. and excited band levels in lighter even-Yb isotopes. These follow a very well defined and regular trend from α=150 to 176, for the levels in the g.s. rotational band, and from α=170 to 176 for the K^π=0$^+$ excited band based on the 0$^+_2$ state.

${}^{176}\text{Yb(t,p)}$ 1983Bu03,1982Zu02 (continued)

${}^{178}\text{Yb}$ Levels (continued)

‡ Energy values are either weighted averages derived by the evaluators based on values from 1982Zu02 and 1983Bu03 for levels
established by both sources, or the original values for levels seen only by one of them. Energy uncertainties are derived from a)
data in 1982Zu02, and, b) the estimate in 1983Bu03 of $\Delta E \approx 3$ keV for strongly populated levels with $E \leq 1500$ keV, and $\Delta E \approx 5$
keV for higher level energies.

\# 1983Bu03 propose the 1387 keV level as the 2^+ member of the $K^\pi = 0^+$ band based on the 1315 keV 0_2^+ excited level. Instead,
1982Zu02 suggest the 1404 keV level as candidate for second member in this band.

@ 1982Zu02 propose a tentative $J^\pi = (4^+, 5^-)$ character for this level, while 1983Bu03 suggest a 0^+ assignment. However, the fit of
the angular distributions to the DWBA calculation using L=0 shown in 1983Bu03 appears rather poor, specially when compared
to the other L=0 cases displayed in that work. The fits for L=(4,5) in 1982Zu02 suggest a slightly better agreement with the
experimental data.

& L-values are from 1982Zu02.

[a] Seen only by 1983Bu03.

[b] Seen only by 1982Zu02.

[c] L=0 strength relative to 1 for the ground state (1983Bu03).

[d] Band(A): $K^\pi = 0^+$ g.s. rotational band.

[e] Band(B): $K^\pi = 2^+$ γ-vibrational band.

[f] Band(C): $K^\pi = 0^+$ band.

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Band(C): $K^{\pi}=0^+$ band

(4$^+$)   1559

2$^+$ 1404

0$^+$ 1315

Band(B): $K^{\pi}=2^+$
γ-vibrational band

(2$^+$)   1221

Band(A): $K^{\pi}=0^+$ g.s.
rotational band

(6$^+$)   576

4$^+$ 278

2$^+$ 84

0$^+$ 0.0

$^{178}_{70}\text{Yb}_{108}$