^{176}Yb(p,2nγ) 1974Wi06,1974Fo01

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	M. Shamsuzzoha Basunia	NDS 102, 719 (2004)	1-Jun-2004

1974Wi06: E(p)=6.8-10 MeV. Measured $\gamma\gamma$ coin and $\gamma\gamma$(t).
1974Fo01: E(p)=14-29 MeV. Measured $\gamma\gamma$ coin, pγ(t) and $\gamma(\theta)$. Deduced A_2 and A_4 coefficients.
Others: 1978Be38, 1965Bj01.

^{175}Lu Levels

E(level)[†]	J$^\pi$[e]	$T_{1/2}$	Comments
0.0	7/2$^+$		
113.79[‡] *13*	9/2$^+$		
251.35[‡] *24*	11/2$^+$		
343.44[#] *8*	5/2$^+$		
353.59[@] *9*	5/2$^-$	1.3 μs *1*	J$^\pi$: By analogy to the ^{173}Yb isomer, which also supported by the large partial cross section observed in ^{176}Yb(p,2n) reaction (1965Bj01). 343γ M1+E2 to 7/2$^+$. $T_{1/2}$: From ^{176}Yb(p,2nγ) in 1965Bj01.
370.89[@] *13*	(1/2$^-$)		
396.30[&] *10*	9/2$^-$		
412.32[‡] *16*	13/2$^+$		
415.08[@] *15*	(9/2)$^-$		
432.79[#] *12*	7/2$^+$		
514.76[@] *11*	3/2$^-$		
529.22[&] *14*	(11/2$^-$)		
546.4[#] *3*	(9/2$^+$)		
562.4[@] *4*	(13/2$^-$)		
595.3[‡] *6*	15/2$^+$		
626.63[a] *13*	(1/2$^+$)	10.6 ns *5*	$T_{1/2}$: $\gamma\gamma$(t). Weighted average of 10 ns *1* (1974Wi06) and 10.7 ns *5* (1974Fo01).
632.84[a] *10*	(3/2$^+$)		
672.94[@] *12*	(7/2$^-$)		
684.3[#] *3*	(11/2$^+$)		
685.28[&] *17*	(13/2$^-$)		
757.44[a] *12*	(5/2$^+$)		
773.54[a] *12*	(7/2$^+$)		
798.0[@] *11*	(17/2$^-$)		
799.5[‡] *8*	17/2$^+$		
845.1?[#] *11*	[13/2$^+$][f]		
863.3[&] *6*	(15/2$^-$)		
886.4[@] *3*	(11/2$^-$)		
990.25[a] *13*	(9/2$^+$)		
999.0[b] *3*	(3/2$^-$)		
1019.69[a] *16*	(11/2$^+$)		
1024.7[‡] *9*	19/2$^+$		
1063.4[b] *3*	(5/2)$^-$		
1064.1[&] *8*	(17/2$^-$)		
1121.7?[@] *15*	[21/2$^-$][f]		
1150.8[c] *3*	[3/2$^+$]		
1167.1[@] *15*	(15/2$^-$)		

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^{176}Yb(p,2nγ) 1974Wi06,1974Fo01 (continued)

^{175}Lu Levels (continued)

E(level)[†]	Jπ[e]
1219.1[c] 3	[5/2+]
1285.1[&] 9	(19/2−)
1315.5?[d] 3	(3/2)−
1332.6?[d] 3	[1/2−][f]
1363.4?[a] 10	[15/2+][f]

† Deduced by evaluator from a least-squares fit to γ-ray energies.
‡ 7/2(404) band.
# 5/2(402) band.
@ 1/2(541) band.
& 9/2(514) band.
a 1/2(411) band.
b 3/2(532)? band.
c 3/2(411)? band.
d 1/2(530)? band.
e From adopted level, except as noted.
f Tentative spin, assumed from expected level energy.

γ(^{175}Lu)

Eγ[†]	Iγ[‡]	Ei(level)	J_i^π	Ef	J_f^π	Comments
(61.5)		415.08	(9/2)−	353.59	5/2−	Transition not observed, but expected from decay of the 1/2[541] rotational band. Eγ is from E(level). Photons in the spectrum would be masked by the K x ray peak.
89.35 10	120	432.79	7/2+	343.44	5/2+	
111.9 4	13	626.63	(1/2+)	514.76	3/2−	
113.6[#] 4	<452[@]	546.4	(9/2+)	432.79	7/2+	
113.8 4	<452[@]	113.79	9/2+	0.0	7/2+	
117.0[e]	9	632.84	(3/2+)	514.76	3/2−	Tentative placement (1974Fo01).
124.57 10	37	757.44	(5/2+)	632.84	(3/2+)	
130.80 10	10	757.44	(5/2+)	626.63	(1/2+)	
132.92 10	137	529.22	(11/2−)	396.30	9/2−	
137.6 4	<221[&]	251.35	11/2+	113.79	9/2+	
137.9[#] 4	<221[&]	684.3	(11/2+)	546.4	(9/2+)	
140.73 10	52	773.54	(7/2+)	632.84	(3/2+)	
143.89 10	26	514.76	3/2−	370.89	(1/2−)	
144.9	14	396.30	9/2−	251.35	11/2+	
147.4 4	125	562.4	(13/2−)	415.08	(9/2)−	
156.07 10	77	685.28	(13/2−)	529.22	(11/2−)	
158.23 10		672.94	(7/2−)	514.76	3/2−	
160.8	<152[c]	845.1?	[13/2+]	684.3	(11/2+)	
161.2[#] 4	<152[c]	412.32	13/2+	251.35	11/2+	
161.20 10	<152[c]	514.76	3/2−	353.59	5/2−	
178.5	38	863.3	(15/2−)	685.28	(13/2−)	
[x]181.8	13					
182.9	33	595.3	15/2+	412.32	13/2+	
200.4	16	1064.1	(17/2−)	863.3	(15/2−)	

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^{176}Yb(p,2nγ) 1974Wi06,1974Fo01 (continued)

γ(^{175}Lu) (continued)

E_γ [†]	I_γ [‡]	E_i(level)	J_i^π	E_f	J_f^π
203.0[#] *4*		546.4	(9/2$^+$)	343.44	5/2$^+$
204.1	17	799.5	17/2$^+$	595.3	15/2$^+$
213.2	5	886.4	(11/2$^-$)	672.94	(7/2$^-$)
216.74 *10*	20	990.25	(9/2$^+$)	773.54	(7/2$^+$)
220.8	5	1285.1	(19/2$^-$)	1064.1	(17/2$^-$)
225.5	7	1024.7	19/2$^+$	799.5	17/2$^+$
232.78 *10*	10	990.25	(9/2$^+$)	757.44	(5/2$^+$)
235.6	34	798.0	(17/2$^-$)	562.4	(13/2$^-$)
246.15 *10*	28	1019.69	(11/2$^+$)	773.54	(7/2$^+$)
251.5[d] *4*	93[d]	251.35	11/2$^+$	0.0	7/2$^+$
251.5[d#] *4*	93[d]	684.3	(11/2$^+$)	432.79	7/2$^+$
255.72 *10*	122	626.63	(1/2$^+$)	370.89	(1/2$^-$)
257.86 *10*	45	672.94	(7/2$^-$)	415.08	(9/2)$^-$
261.9 *4*	11	632.84	(3/2$^+$)	370.89	(1/2$^-$)
279.25 *10*	25	632.84	(3/2$^+$)	353.59	5/2$^-$
282.52 *10*	117	396.30	9/2$^-$	113.79	9/2$^+$
[x]284.5	13				
289.43 *10*	75	632.84	(3/2$^+$)	343.44	5/2$^+$
298.52 *10*	94	412.32	13/2$^+$	113.79	9/2$^+$
[x]306.4	10				
319.29 *10*	45	672.94	(7/2$^-$)	353.59	5/2$^-$
323.7	<22[a]	1121.7?	[21/2$^-$]	798.0	(17/2$^-$)
324.0 *4*	<22[a]	886.4	(11/2$^-$)	562.4	(13/2$^-$)
333.3[#]		863.3	(15/2$^-$)	529.22	(11/2$^-$)
343.46 *10*	<548[b]	343.44	5/2$^+$	0.0	7/2$^+$
343.7	<548[b]	595.3	15/2$^+$	251.35	11/2$^+$
343.7	<548	1363.4?	[15/2$^+$]	1019.69	(11/2$^+$)
353.57 *10*	1000	353.59	5/2$^-$	0.0	7/2$^+$
369.1	10	1167.1	(15/2$^-$)	798.0	(17/2$^-$)
379[#]		1064.1	(17/2$^-$)	685.28	(13/2$^-$)
387.5	28	799.5	17/2$^+$	412.32	13/2$^+$
396.29 *10*	222	396.30	9/2$^-$	0.0	7/2$^+$
419.9 *4*		773.54	(7/2$^+$)	353.59	5/2$^-$
422[#]		1285.1	(19/2$^-$)	863.3	(15/2$^-$)
429.2	13	1024.7	19/2$^+$	595.3	15/2$^+$
432.8 *4*	63	432.79	7/2$^+$	0.0	7/2$^+$
461.6 *4*		1219.1	[5/2$^+$]	757.44	(5/2$^+$)
471.3 *4*	26	886.4	(11/2$^-$)	415.08	(9/2)$^-$
484.2 *4*		999.0	(3/2$^-$)	514.76	3/2$^-$
518.1 *4*		1150.8	[3/2$^+$]	632.84	(3/2$^+$)
524.0 *4*		1150.8	[3/2$^+$]	626.63	(1/2$^+$)
548.6 *4*		1063.4	(5/2)$^-$	514.76	3/2$^-$
586.4 *4*		1219.1	[5/2$^+$]	632.84	(3/2$^+$)
628.1 *4*		999.0	(3/2$^-$)	370.89	(1/2$^-$)
709.8 *4*		1063.4	(5/2)$^-$	353.59	5/2$^-$
800.7 *4*		1315.5?	(3/2)$^-$	514.76	3/2$^-$
817.7 *4*		1332.6?	[1/2$^-$]	514.76	3/2$^-$
961.9[d] *4*	[d]	1315.5?	(3/2)$^-$	353.59	5/2$^-$
961.9[d] *4*	[d]	1332.6?	[1/2$^-$]	370.89	(1/2$^-$)

[†] Values with uncertainties are from 1974Wi06. Other values are from 1974Fo01.

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^{176}Yb(p,2nγ) 1974Wi06,1974Fo01 (continued)

$\gamma(^{175}Lu)$ (continued)

‡ From 1974Fo01, at E(p)=16MeV. Measured at θ=125°. Authors quote uncertainties of≈10-50% depending on the line strength. Iγ at 90° also quoted by 1974Wi01, with uncertainties ranging from 10-30%.
# Observed only in coincidence spectra.
@ Iγ(113.6γ + 113.8γ)=452.
& Iγ(137.6γ + 137.9γ)=221.
a Iγ(323.7γ + 324.0γ)=22.
b Iγ(343.46γ + 343.7γ)=548.
c Iγ(160.8γ + 161.2γ)=152.
d Multiply placed with undivided intensity.
e Placement of transition in the level scheme is uncertain.
x γ ray not placed in level scheme.

^{176}Yb(p,2nγ) 1974Wi06,1974Fo01

Level Scheme

Intensities: Relative I_γ

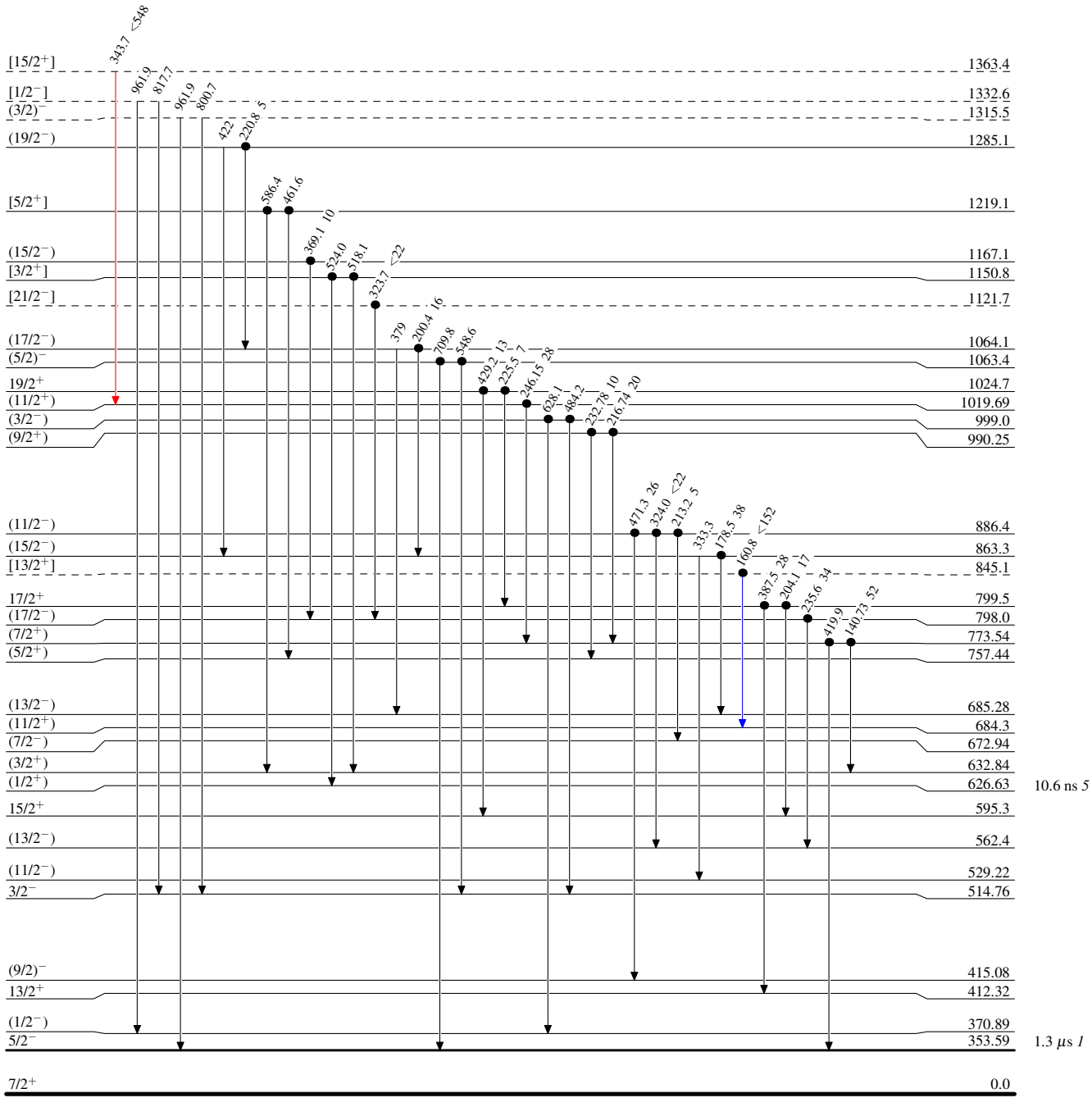
Legend

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

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

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

Coincidence



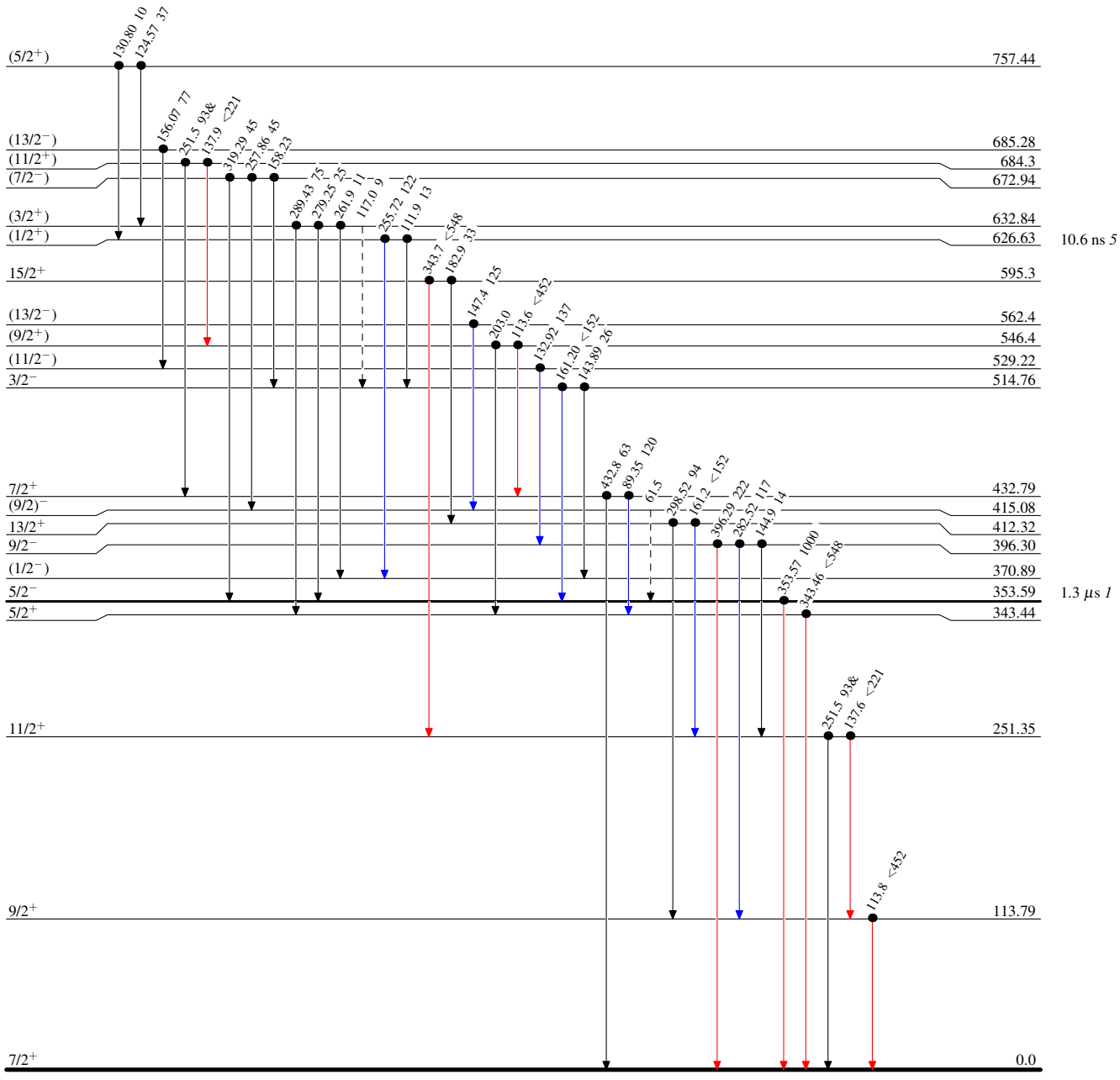
$^{175}_{71}Lu_{104}$

^{176}Yb(p,2nγ) 1974Wi06,1974Fo01

Level Scheme (continued)

Intensities: Relative I_γ
& Multiply placed: undivided intensity given

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



$^{175}_{71}Lu_{104}$