Coulomb excitation   2002Kl02,2000St06,1966Pa19

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Coral M. Baglin, E. A. Mccutchan	NDS 151, 334 (2018)	30-Jun-2018

1958Ch36: $E(p) \leq 3.7$ MeV.

1963El06: $E(p) \approx 4$ MeV, $E(d) \approx 4$ MeV.

1966Bo16: $E(^{16}O) \approx 45$ MeV.

1966Pa19: $E(^{16}O)$=30, 40, 50, 55 MeV; Yb metallic targets enriched to 91.5% in ^{171}Yb; measured $E\gamma$, $I\gamma$, (Ge(Li), NaI(Tl)), particle-γ coin.

1999Fu05: $E(^{90}Zr)$=390 MeV; measured $E\gamma$ (FWHM$\approx$4.8 keV at 700 keV), particle-γ coin; observed gammas from $J \leq 33/2$ members of g.s. band, but detailed results not reported.

2000St06: $E(^{58}Ni)$=170, 220 MeV; measured $\gamma(\theta,H,T)$ in thin polarized Gd, $E\gamma$, $I\gamma$, particle-γ coin, $\gamma\gamma$ coin, particle-$\gamma(\theta)$, relative cross sections; particle-rotor model calculations.

2002Kl02: $E(^{32}S)$=105 MeV; enriched ^{171}Yb target, $I\beta$ normalization foil stopper, Cologne plunger device (θ=155°−175°), 3 Ge detectors at backward angles and one EUROBALL cluster type detector at 0°; measured $E\gamma$, $T_{1/2}$ using RDM (for 6 g.s. band members).

Others: 1965Er08, 1966Bo16, 1967As03, 1970Ga19.

^{171}Yb Levels

E(level)	$J^{\pi\dagger}$	$T_{1/2}^{\ddagger}$	Comments
$0.0^{\#}$	$1/2^-$	stable	
$66.73^{\#}$ *1*	$3/2^-$	0.79 ns *5*	B(E2)↑=2.52 *15* (1963El06)
			$T_{1/2}$: from B(E2) and adopted γ-ray properties.
$75.87^{\#}$ *1*	$5/2^-$	1.64 ns *16*	B(E2)↑=3.75 *15* (1963El06)
			B(E2): this value may not be correct. 2000St06 report that they cannot reproduce their observed excitation probabilities if they base the g.s. band's $5/2^-$ to $1/2^-$ E2 matrix element on this B(E2) value.
			$T_{1/2}$: adopted value; $T_{1/2}$=1.16 ns *7* is value deduced from B(E2) and adopted γ-ray properties (however, see comment on B(E2)). Other value: 0.72 ns *10* (recoil distance (1967As03)).
$122.42^{@}$ *1*	$5/2^-$		
$207.4^{@}$	$7/2^-$		
$230.6^{\#}$ *5*	$7/2^-$	155 ps *8*	g=0.237 *15* (2000St06)
$246.7^{\#}$ *6*	$9/2^-$	149 ps *4*	g=0.340 *15* (2000St06)
$316.4^{@}$	$9/2^-$		
$487.0^{\#}$	$11/2^-$	21.39 ps *19*	g=0.280 *14* (2000St06)
$508.7^{\#}$ *9*	$13/2^-$	21.3 ps *4*	g=0.356 *18* (2000St06)
$832^{\#}$	$15/2^-$	4.27 ps *28*	g=0.280 *18* (2000St06)
$860^{\#}$	$17/2^-$	4.19 ps *18*	g=0.333 *18* (2000St06)
$1263^{\#}$	$19/2^-$		g=0.26 *3* (2000St06)
$1293^{\#}$	$(21/2^-)$		g=0.29 *3* (2000St06)
$1773^{\#}$	$(23/2^-)$		
$1806^{\#}$	$(25/2^-)$		
$2359^{\#}$	$(27/2^-)$		
$2392^{\#}$	$(29/2^-)$		
$3025^{\#}$	$(31/2^-)$		E(level): placements of 666γ and 656γ are interchanged in Adopted Levels; if correct, E would become 3015 here.
$3048^{\#}$	$(33/2^-)$		E(level): placements of 666γ and 656γ are interchanged in Adopted Levels; if correct, E would become 3058 here. E=3102 given in 1999Fu05 appears to be erroneous.

Coulomb excitation   2002Kl02,2000St06,1966Pa19 (continued)

^{171}Yb Levels (continued)

[†] From Adopted Levels.

[‡] From RDM measurement of 2002Kl02, except as noted. Authors checked for, but did not observe, any deorientation effects.

[#] Band(A): 1/2[521] band.

[@] Band(B): 5/2[512] band.

Coulomb excitation   2002Kl02,2000St06,1966Pa19 (continued)

$\gamma(^{171}Yb)$

E_i(level)	J_i^π	E_γ[‡]	I_γ[†]	E_f	J_f^π	Mult.[#]	δ[@]	α[d]	Comments
66.73	$3/2^-$	66.72[&] 1		0.0	$1/2^-$	M1+E2		14 3	$\gamma(\theta)$ is consistent with $\delta=+0.69$ (2000St06).
75.87	$5/2^-$	75.88[&] 1		0.0	$1/2^-$				
122.42	$5/2^-$	(46.543[a] 5)		75.87	$5/2^-$				
		(55.689[a] 2)		66.73	$3/2^-$				
207.4	$7/2^-$	85.0		122.42	$5/2^-$				
230.6	$7/2^-$	154.8 7	37.9 6	75.87	$5/2^-$	M1+E2	+0.521 16	0.904 18	$I\gamma(154.8\gamma)/I\gamma(164.0\gamma)=0.433$ 26 (1966Pa19).
		164.0 7	100	66.73	$3/2^-$	E2		0.528 11	
246.7	$9/2^-$	16[c]	0.152 3	230.6	$7/2^-$	[M1]		122.1	γ unobserved, but existence deduced from intensity balance in coincidence spectrum (2000St06).
		170.7 7	100	75.87	$5/2^-$	E2		0.460 10	
316.4	$9/2^-$	109.0		207.4	$7/2^-$				Weak.
		194.0		122.42	$5/2^-$				Weak.
487.0	$11/2^-$	240.0	15.8 5	246.7	$9/2^-$	M1+E2	+0.50 4	0.260 6	$I\gamma(240.0\gamma)/I\gamma(256.6\gamma)=0.16$ 4 (1966Pa19).
		256.6	100	230.6	$7/2^-$	E2		0.1197	
508.7	$13/2^-$	22[c]	0.059 5	487.0	$11/2^-$	[M1]		47.4	γ unobserved, but existence deduced from intensity balance in coincidence spectrum (2000St06).
		262.0 7	100	246.7	$9/2^-$	E2		0.1121 19	
832	$15/2^-$	323[c]	9.4 10	508.7	$13/2^-$	M1+E2	≈+0.5	≈0.1151	δ: $\gamma(\theta)$ consistent with rotational model prediction of +0.49 (2000St06).
		345[c]	100	487.0	$11/2^-$	E2		0.0489	
860	$17/2^-$	27[c]	<0.25	832	$15/2^-$	[M1]		25.8	γ unobserved, but existence deduced from intensity balance in coincidence spectrum (2000St06).
		350[c]	100	508.7	$13/2^-$	E2		0.0469	
1263	$19/2^-$	403[c]		860	$17/2^-$				
		430[c]		832	$15/2^-$	(E2)		0.0265	Mult.: $\gamma(\theta)$ not shown in 2000St06.
1293	$(21/2^-)$	(30[c])		1263	$19/2^-$				γ expected and included in fig. 1 of 2000St06, but not observed; not included in Adopted Gammas.
		434[c]		860	$17/2^-$	(E2)			Mult.: $\gamma(\theta)$ not shown in 2000St06.
1773	$(23/2^-)$	480[cf]		1293	$(21/2^-)$				
		510[c]		1263	$19/2^-$	[E2]			
1806	$(25/2^-)$	513[c]		1293	$(21/2^-)$	[E2]			
2359	$(27/2^-)$	586[eb] 2		1773	$(23/2^-)$	[E2]			
2392	$(29/2^-)$	586[eb] 2		1806	$(25/2^-)$	[E2]		0.01205 20	
3025	$(31/2^-)$	666[b] 2		2359	$(27/2^-)$	[E2]			
3048	$(33/2^-)$	656[b] 2		2392	$(29/2^-)$	[E2]			

[†] Relative photon branching from level (2000St06). Branching for expected, but unobserved, low-energy ΔJ=1 transitions was deduced from ΔJ=2 transition intensity from same level in coincidence with transitions above the level in question.

[‡] From 1966Pa19, except as noted.

Coulomb excitation   2002Kl02,2000St06,1966Pa19 (continued)

$\gamma(^{171}\text{Yb})$ (continued)

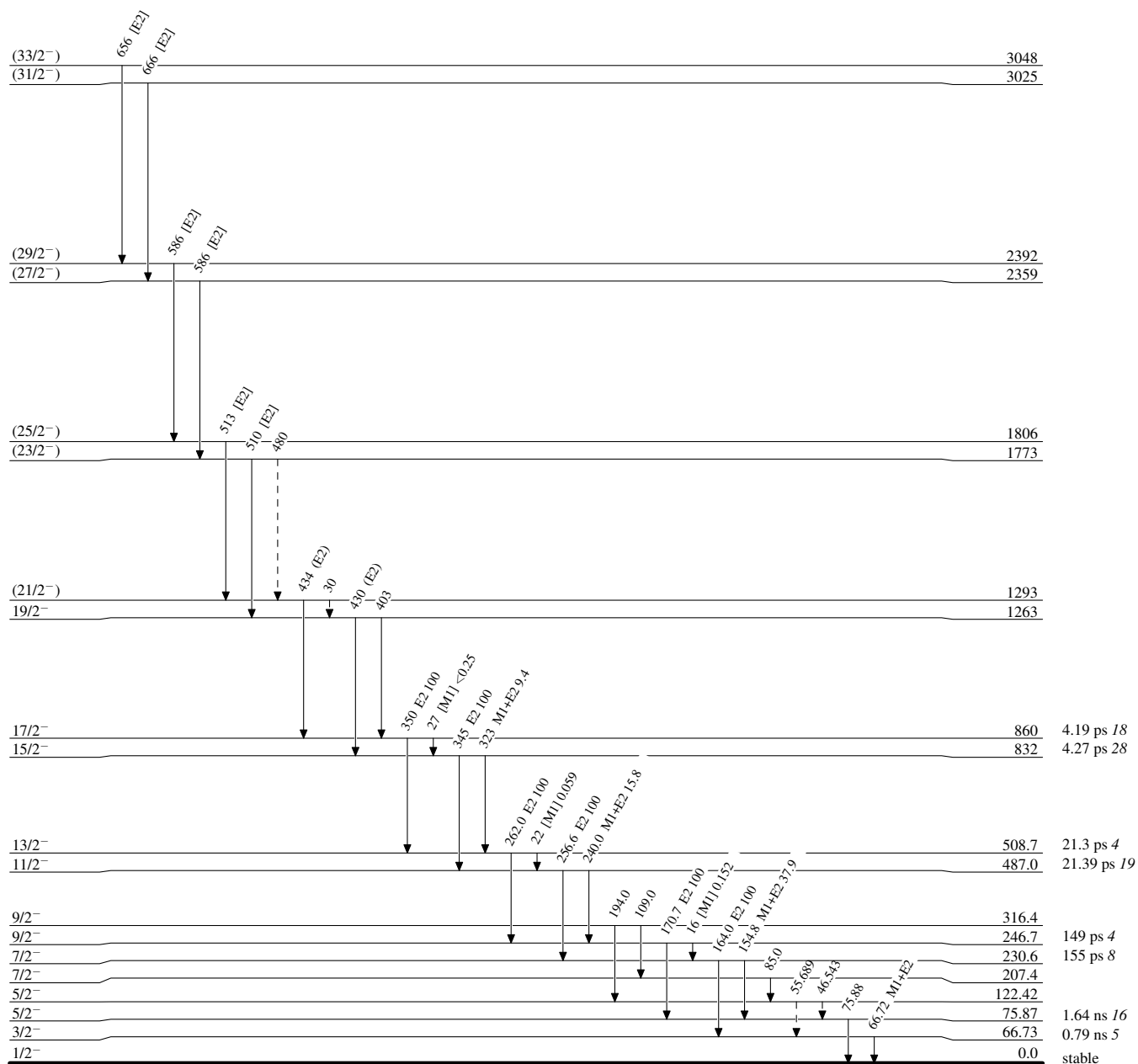[#] Based on particle-$\gamma(\theta)$ and agreement of relative cross sections with Coulomb excitation theory assuming a rotor model (2000St06).

[@] From particle-$\gamma(\theta)$ (2000St06, table 3 and fig. 5).

[&] From 1958Ch36 (bent-crystal spectrometer).

[a] From Adopted Gammas.

[b] Estimated by evaluator from spectrum of fig. 13 in 1999Fu05.

[c] From 2000St06; uncertainty unstated by authors.

[d] Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on γ-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.

[e] Multiply placed.

[f] Placement of transition in the level scheme is uncertain.

Coulomb excitation   2002Kl02,2000St06,1966Pa19   Legend

Level Scheme

Intensities: Relative photon branching from each level

- - - - - ▸ γ Decay (Uncertain)

$^{171}_{70}$Yb$_{101}$

Coulomb excitation   2002Kl02,2000St06,1966Pa19

Band(A): 1/2[521] band

(33/2$^-$)	3048
(31/2$^-$)	3025

666   656

(29/2$^-$)	2392
(27/2$^-$)	2359

586   586

(25/2$^-$)	1806
(23/2$^-$)	1773

480   513
510

(21/2$^-$)	1293
19/2$^-$	1263

30

403   434
430

17/2$^-$	860
15/2$^-$	832

27

323   350
345

13/2$^-$	508.7
11/2$^-$	487.0

22

Band(B): 5/2[512] band

240   262
257

9/2$^-$	316.4

9/2$^-$	246.7
7/2$^-$	230.6

16

109   194

7/2$^-$	207.4

155   171
164

5/2$^-$	75.87
3/2$^-$	66.73
1/2$^-$	0.0

5/2$^-$	122.42

85

$^{171}_{70}$Yb$_{101}$