^{96}Zr(^{13}C,3nγ) 1976Gr12,1976St03

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	D. De Frenne and A. Negret	NDS 109, 943 (2008)	1-May-2007

1976Gr12: E(^{13}C)=45-56 MeV. Measured: Iγ excit, $\gamma\gamma$, $\gamma(\theta)$, γ-ray linear pol, $\gamma\gamma(\theta)$ from aligned states. Deduced: ^{106}Pd levels, J^π, δ.
1976St03: E(^{13}C)=42 MeV. Measured: linear pol γ rays. Deduced: ^{106}Pd levels, δ.

^{106}Pd Levels

E(level)	J$^\pi$†	E(level)	J$^\pi$†	E(level)	J$^\pi$†	E(level)	J$^\pi$†
0.0	0^+	2306.03 *18*	4^-	3176.68 *20*	$8^{(-)}$	4259.7 *3*	(11^-)
511.78 *10*	2^+	2366.14 *25*	5^+	3289.60 *16*	(9^-)	4640.2 *4*	(12^-)
1127.99 *17*	2^+	2397.36 *15*	$(5)^-$	3461.78 *20*	$9^{(-)}$	4721.29 *23*	$12^{(+)}$
1229.10 *14*	4^+	2578.61 *25*	(4^-)	3532.96 *16*	10^+	4752.2 *4*	(12^-)
1557.73 *14*	3^+	2699.36 *16*	$(6)^-$	3654.11 *20*	$10^{(-)}$	4893.3 *3*	14^+
1932.3 *5*	4^+	2793.62 *15*	(7^-)	3874.72 *2*	(10^-)	4990.1 *4*	(13^-)
2076.53 *14*	6^+	2962.51 *15*	8^+	3948.6 *4*	(10^+)	5106.1 *5*	(12^+)
2084.65 *22*	3^-	2977.63 *21*	(7^-)	4021.68 *18*	$11^{(-)}$	5403.5 *3*	(14^+)
2229.1? *4*		2998.72 *16*	(8^-)	4088.18 *23*	12^+	5894.5 *5*	(16^+)

† From Adopted Levels.

γ(^{106}Pd)

A_2,A_4 coef deduced from $\gamma(\theta)$ spectra at 9 angles by 1976Gr12.

E$_\gamma$†	I$_\gamma$‡	E$_i$(level)	J$_i^\pi$	E$_f$	J$_f^\pi$	Mult.#	δ@	αa	Comments
199.0 *3*	1.2 *2*	3176.68	$8^{(-)}$	2977.63	(7^-)	(D+Q)			δ=−0.44 *15* or −1.4 *3* $\gamma\gamma(\theta)$.
205.11 *5*	8.8 *3*	2998.72	(8^-)	2793.62	(7^-)	D+Q			δ=+0.21 *2* $\gamma(\theta)$, +0.14 *5* $\gamma\gamma(\theta)$.
221.4 *2*	0.9 *2*	2306.03	4^-	2084.65	3^-	[M1+E2]			Mult.: $\Delta\pi$=no from decay scheme. δ=+0.14 *20* or <−2.5 from $\gamma\gamma(\theta)$ or +0.03 *8* or −9 *5* 10.
285.0 *5*	0.6 *2*	3461.78	$9^{(-)}$	3176.68	$8^{(-)}$	D+Q	−0.9 *5*		δ: from $\gamma(\theta)$; −0.37 *25* or −1.8 *9* from $\gamma\gamma(\theta)$.
290.89 *10*	3.6 *1*	3289.60	(9^-)	2998.72	(8^-)	D+Q	+0.36 *4*		δ: from $\gamma(\theta)$, +0.21 *7* from $\gamma\gamma(\theta)$.
299.39 *10*	8.6 *3*	2998.72	(8^-)	2699.36	$(6)^-$	(E2)&		0.030	
301.99 *10*	10.3 *3*	2699.36	$(6)^-$	2397.36	$(5)^-$	D+Q	+0.64 *22*	0.0223	δ: from $\gamma(\theta)$ (1976Gr12). Other: δ=>0.5 or <2.7 (1976St03).
367.6 *2*	0.4 *1*	4021.68	$11^{(-)}$	3654.11	$10^{(-)}$				
383.11 *20*	2.6 *3*	3176.68	$8^{(-)}$	2793.62	(7^-)	D+Q			δ=−0.55 *25* $\gamma(\theta)$; −0.38 *11* or −1.5 *3* $\gamma\gamma(\theta)$.
384.9c *3*	0.4 *2*	4259.7	(11^-)	3874.72	(10^-)				
393.36 *20*	1.4 *2*	2699.36	$(6)^-$	2306.03	4^-	E2			
396.26 *5*	13.9 *3*	2793.62	(7^-)	2397.36	$(5)^-$	(E2)&		0.012	
412.8 *3*	0.8 *2*	3874.72	(10^-)	3461.78	$9^{(-)}$				δ=−0.17 *20* or −2.8 *15* $\gamma\gamma(\theta)$;
429.8 *3*	2.6 *2*	1557.73	3^+	1127.99	2^+	M1+E2			δ=+0.18 *17* or <−2.5 from $\gamma\gamma(\theta)$ or +0.20 *4* or <−12.
463.03 *20*	1.4 *2*	3461.78	$9^{(-)}$	2998.72	(8^-)	D+Q	−0.9 *5*		δ: from $\gamma(\theta)$; −0.24 *10* or −1.8 *4* from $\gamma\gamma(\theta)$.
477.0 *3*	1.6 *3*	3176.68	$8^{(-)}$	2699.36	$(6)^-$				
484.2 *3*	0.9 *2*	3461.78	$9^{(-)}$	2977.63	(7^-)				

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^{96}Zr(^{13}C,3nγ) 1976Gr12,1976St03 (continued)

$\gamma(^{106}Pd)$ (continued)

E_γ [†]	I_γ [‡]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[#]	α[a]	Comments
495.97 *5*	5.7 *3*	3289.60	(9^-)	2793.62	(7^-)	E2[&]	0.006	
511.78 *10*	100	511.78	2^+	0.0	0^+	E2[&]		I_γ: γ-singles Iγ(512γ+$\gamma^{\pm}$)=137; Iγ(512γ)=100 is derived from summed Iγ to 512 level + 2% unobserved feeding.
555.2 *2*	20.0 *5*	4088.18	12^+	3532.96	10^+	E2[&]		
570.47 *5*	27.1 *7*	3532.96	10^+	2962.51	8^+	E2[&]		
616.22 *15*	3.0 *3*	1127.99	2^+	511.78	2^+	M1+E2		δ=+0.8 *7* from $\gamma\gamma(\theta)$ or <−4 or >25 from $\gamma(\theta)$.
633.1 *3*	1.2 *3*	4721.29	$12^{(+)}$	4088.18	12^+			
655.40 *15*	5.9 *4*	3654.11	$10^{(-)}$	2998.72	(8^-)	(E2)[&]		
668.1 *3*	2.2 *3*	3461.78	$9^{(-)}$	2793.62	(7^-)			
682.2 *2*	1.7 *2*	5403.5	(14^+)	4721.29	$12^{(+)}$	(Q)		
697.96 *20*	2.7 *2*	3874.72	(10^-)	3176.68	$8^{(-)}$	(Q)		
717.1 *4*	11.2 *7*	2793.62	(7^-)	2076.53	6^+	(E1)		
717.31 *10*	88.5 *20*	1229.10	4^+	511.78	2^+	[E2]		Mult.: $\Delta\pi$=no from level scheme. I_γ: from $\gamma\gamma$, γ-singles Iγ(717γ doublet)=95.8 *21*.
732.07 *10*	5.2 *3*	4021.68	$11^{(-)}$	3289.60	(9^-)	(Q)		
748.3 *2*	3.0 *2*	2306.03	4^-	1557.73	3^+			δ=+0.24 *4* from $\gamma(\theta)$ but uncorrected for contamination.
797.9 *3*	2.7 *4*	4259.7	(11^-)	3461.78	$9^{(-)}$			Mult.: Q from $\gamma\gamma(\theta)$;
804.3 *4*	2.0 *4*	1932.3	4^+	1127.99	2^+	E2		
805.1 *2*	9.1 *3*	4893.3	14^+	4088.18	12^+	E2[&]		
808.4 *2*	3.0 *2*	2366.14	5^+	1557.73	3^+			
847.43 *2*	58.8 *16*	2076.53	6^+	1229.10	4^+	E2[&]		
876.3 *3*	1.2 *7*	3874.72	(10^-)	2998.72	(8^-)			I_γ: γ-singles Iγ(876γ+877γ)=3.7 *3*.
877.5 *3*	1.5 *7*	4752.2	(12^-)	3874.72	(10^-)			
885.97 *5*	36.0 *9*	2962.51	8^+	2076.53	6^+	E2[&]		
901.1 *2*	2.2 *4*	2977.63	(7^-)	2076.53	6^+	(E1)		δ=−0.06 *7* $\gamma(\theta)$, +0.09 *10* $\gamma\gamma(\theta)$ (1976Gr12) corrected for composite ^{102}Pd E2 γ ray.
968.4 *3*	2.5 *2*	4990.1	(13^-)	4021.68	$11^{(-)}$	(Q)		
986.1[b] *3*	2.0[b] *2*	3948.6	(10^+)	2962.51	8^+	(E2)		I_γ: γ-singles Iγ(986γ doublet)=5.7 *3*. Mult.: doublet $\gamma(\theta)$ favors E2.
986.1[b] *3*	2.0[b] *5*	4640.2	(12^-)	3654.11	$10^{(-)}$			Mult.: Q from $\gamma\gamma(\theta)$;
1000.0[c] *3*	2.2 *5*	2229.1?		1229.10	4^+			
1001.2 *3*	2.1 *2*	5894.5	(16^+)	4893.3	14^+	(Q)		I_γ: from $\gamma\gamma$; γ-singles Iγ(1000γ+1001γ)=5.4 *3*. Mult.: Q from $\gamma\gamma(\theta)$. Transition is possibly Doppler broadened.
1017.9 *4*	1.3 *2*	5106.1	(12^+)	4088.18	12^+	(D+Q)		δ=−0.36 *30* $\gamma(\theta)$, −0.8 *4* $\gamma\gamma(\theta)$.
1045.94 *10*	5.9 *3*	1557.73	3^+	511.78	2^+	M1+E2		δ=+0.01 *7* or −4.5 from $\gamma\gamma(\theta)$.
1168.25 *5*	26.0 *6*	2397.36	$(5)^-$	1229.10	4^+	E1+M2		δ=−0.04 *2* $\gamma(\theta)$, −0.05 *3* $\gamma\gamma(\theta)$; other: −0.2 (1976St03).
1188.3 *2*	1.2 *2*	4721.29	$12^{(+)}$	3532.96	10^+	Q		
1315.3 *3*	1.3 *2*	5403.5	(14^+)	4088.18	12^+	(Q)		
1349.5 *2*	1.7 *2*	2578.61	(4^-)	1229.10	4^+			
1572.9 *3*	1.0 *3*	2084.65	3^-	511.78	2^+			From (^{13}C,3nγ) M=D+Q and δ=−0.19 *18* (1976Gr12).
1932.5 *4*	<0.03	1932.3	4^+	0.0	0^+			I_γ: other: 0≈(1977Ti01).

[†] Taken from 1976Gr12.

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^{96}Zr(^{13}C,3nγ) 1976Gr12,1976St03 (continued)

$\gamma(^{106}Pd)$ (continued)

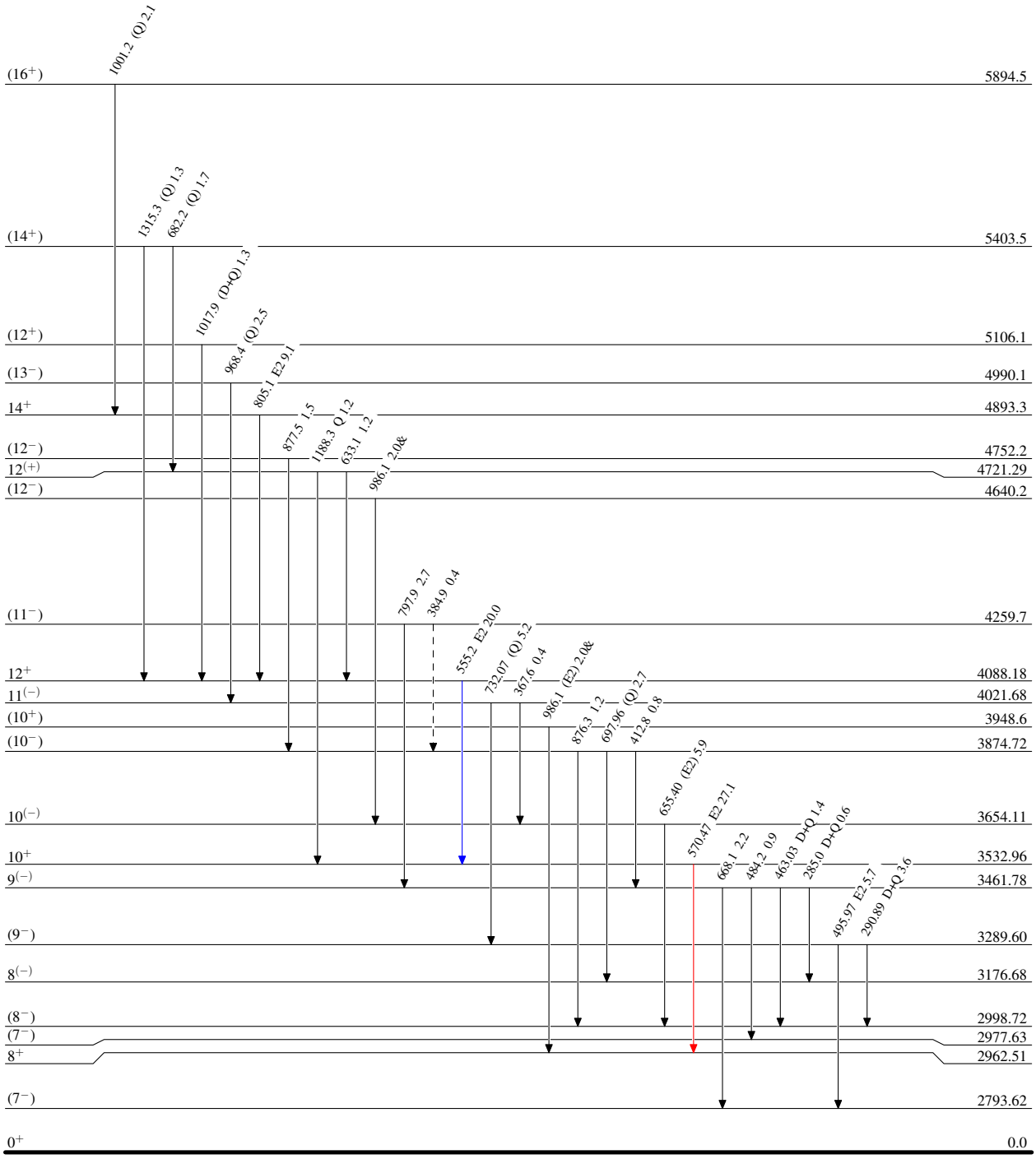
‡ From γ singles.
# Unless noted otherwise, from $\gamma(\theta)$ and $\gamma\gamma(\theta)$, linear pol of γ ray (1976St03). If no J^π of initial and final levels were known from other experiments, mixed transitions were given as D+Q. Only if J^π values were known from other experiments M1+E2 or E1+M2 were given.Also pure Q transitions given as E2 if J^π initial and final level were known.
@ Unless noted otherwise, taken from $\gamma(\theta)$ of 1976Gr12.
& Exp γ-ray linear pol is positive, 0.3 to 0.6 (1976St03).
a 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.
b Multiply placed with undivided intensity.
c Placement of transition in the level scheme is uncertain.

^{96}Zr(^{13}C,3nγ) 1976Gr12,1976St03

Level Scheme

Intensities: Type not specified
& 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)



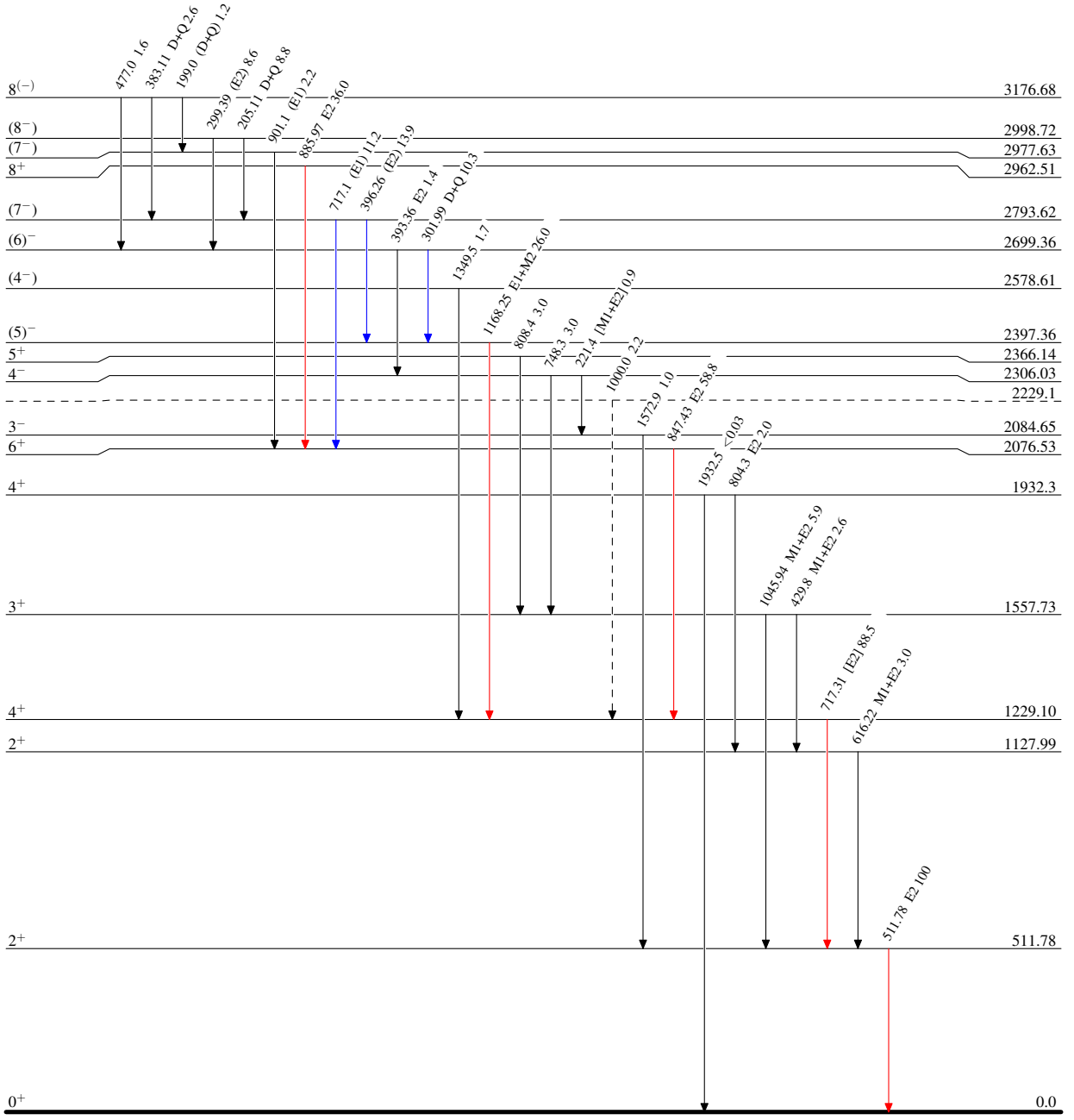
$^{106}_{46}Pd_{60}$

^{96}Zr(^{13}C,3nγ) 1976Gr12,1976St03

Level Scheme (continued)

Intensities: Type not specified
& 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)



$^{106}_{46}Pd_{60}$