$^{14}C(^{18}O,2n\gamma)$ 2010St13

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	M. S. Basunia, A. Chakraborty	NDS 197,1 (2024)	31-May-2024

90% enriched ^{14}C target bombarded with a 37 MeV ^{18}O beam at ANL Tandem Linear Accelerator System; Fragment Mass Analyzer, parallel-plate gridded avalanche counter (PGAC); Gammasphere array, consists of 101 Compton-suppressed HPGe detectors, Measured: Eγ, Iγ, $\gamma(\theta)$, DCO, γ-γ coin, time-of-flight parameter, deduced level scheme. Shell model calculations were performed.

^{30}Si Levels

E(level)[†]	J^{π}[‡]	Comments
0	0^+	E(level): from Adopted Level.
2234.01 *10*	2^+	
3496.84 *18*	2^+	
4828.39 *16*	3^+	
5228.62 *18*	3^+	
5277.43 *13*	4^+	
5484.92 *15*	3^-	
5949.00 *17*	4^+	
6500.87 *16*	4^-	
6996.98 *15*	5^+	
7041.24 *15*	5^-	
7220.7 *4*	4^+	
8191.5 *4*	5^-	
8956.9 *8*	(5^-)	
9104.78 *17*	6^-	
9365.3 *4*	6^+	
9771.3 *5*	6^-	
10552.5 *3*	6^-	
10672.9 *12*	(6)	
10717.35 *20*	7^-	
11081.5 *22*	$(6,7)^-$	J^{π}: 2010St13 propose J^{π} to be 6^- or 7^- based on γ-ray feeding. 4040γ to 5^-.
11537.0 *9*	7^-	
12391.8 *24*		
12508 *3*		
12712.9 *15*		
12830.04 *25*	(8^-)[#]	
13200.9 *5*	(8^-)[#]	
15189.4 *5*	(9^-)[#]	
15526.9 *14*	(9^-)[#]	

† From a least squares fit to the γ-ray energies. In least squares fit, the uncertainty for the 1261.8γ, 539.5γ and 3676.7γ, depopulating the levels 3496, 7041 and 10717 keV, respectively, increased for each by 0.2 keV, i.e. from 0.3, 0.3 and 0.2 to 0.5, 0.5 and 0.4, respectively, to bring the Chi-square value below the critical limit.

‡ As given in 2010St13, except otherwise noted. 2010St13 note that the $\gamma(\theta)$ and R_{DCO} measurements support the adopted J^{π}.

\# Assigned by 2010St13, based on γ-feeding sequence to the lower levels.

$^{14}C(^{18}O,2n\gamma)$ 2010St13 (continued)

$\gamma(^{30}Si)$

E_γ	I_γ [†]	E_i(level)	J^π_i	E_f	J^π_f	R_{DCO}	Comments
400.0 *2*	0.42 *3*	5228.62	3^+	4828.39	3^+		A_2=0.30 *10*
539.5 *3*	13.9 *4*	7041.24	5^-	6500.87	4^-	0.7 *1*	A_2=−0.21 *2*; DCO=0.7 *1*
551.9 *11*	0.12 *2*	6500.87	4^-	5949.00	4^+		
914.0 *13*	0.15 *6*	9104.78	6^-	8191.5	5^-		
970.3 *7*	0.21 *5*	8191.5	5^-	7220.7	4^+		
1016.0 *1*	1.4 *1*	6500.87	4^-	5484.92	3^-		
1048.2 *2*	1.7 *1*	6996.98	5^+	5949.00	4^+	0.5 *2*	DCO=0.5 *2*
1092.1 *2*	14.3 *5*	7041.24	5^-	5949.00	4^+	0.5 *1*	A_2=−0.20 *2*; DCO=0.5 *1*
1261.8 *3*	13.8 *5*	3496.84	2^+	2234.01	2^+	1.2 *2*	A_2=0.36 *2*; A_4=−0.10 *3*; DCO=1.2 *2*
1271.9 *2*	10.8 *4*	6500.87	4^-	5228.62	3^+	0.7 *1*	A_2=−0.22 *2*; DCO=0.7 *1*
1330.2 *7*	0.47 *7*	4828.39	3^+	3496.84	2^+		A_2=0.53 *9*
1353.2 *13*	0.44 *4*	10717.35	7^-	9365.3	6^+		
1447.9 *5*	0.59 *5*	10552.5	6^-	9104.78	6^-		
1556.3 *1*	4.3 *2*	7041.24	5^-	5484.92	3^-		A_2=0.32 *3*; A_4=−0.14 *4*
1578.7 *6*	0.74 *5*	9771.3	6^-	8191.5	5^-		
1612.5 *1*	6.1 *2*	10717.35	7^-	9104.78	6^-	0.8 *2*	A_2=0.10 *3*; DCO=0.8 *2*
1672.4 *1*	6.6 *2*	6500.87	4^-	4828.39	3^+	0.7 *1*	A_2=−0.25 *3*; DCO=0.7 *1*
1690.2 *5*	0.96 *10*	8191.5	5^-	6500.87	4^-		
1719.4 *1*	7.5 *3*	6996.98	5^+	5277.43	4^+	1.1 *2*	A_2=0.33 *3*; DCO=1.1 *2*
1731.5 *2*	11.1 *4*	5228.62	3^+	3496.84	2^+	0.7 *2*	A_2=−0.19 *2*; DCO=0.7 *2*
1763.8 *1*	6.6 *3*	7041.24	5^-	5277.43	4^+	0.4 *1*	A_2=−0.11 *2*; DCO=0.4 *1*
1767.7 *10*	0.56 *11*	6996.98	5^+	5228.62	3^+		
1915.6 *7*	0.73 *6*	8956.9	(5^-)	7041.24	5^-		
1943.0 *11*	0.54 *14*	7220.7	4^+	5277.43	4^+		
1988.2 *2*	4.4 *2*	5484.92	3^-	3496.84	2^+		
1991.5 *4*	0.34 *8*	7220.7	4^+	5228.62	3^+		
2063.4 *1*	17.0 *6*	9104.78	6^-	7041.24	5^-	1.2 *2*	A_2=0.34 *2*; DCO=1.2 *2*
2112.7 *2*	2.7 *1*	12830.04	(8^-)	10717.35	7^-		
2168.9 *3*	3.0 *2*	6996.98	5^+	4828.39	3^+		A_2>0
2233.9 *1*	100 *4*	2234.01	2^+	0	0^+		A_2=0.23 *1*; A_4=−0.10 *2*
2242.7 *18*	0.58 *17*	8191.5	5^-	5949.00	4^+		
2358.9 *6*	1.0 *1*	15189.4	(9^-)	12830.04	(8^-)		
2368.0 *4*	2.9 *2*	9365.3	6^+	6996.98	5^+		
2431.8 *11*	0.53 *9*	11537.0	7^-	9104.78	6^-		
2452.6 *13*	0.61 *9*	5949.00	4^+	3496.84	2^+		
2483.4 *4*	1.5 *1*	13200.9	(8^-)	10717.35	7^-		
2594.2 *2*	14.5 *6*	4828.39	3^+	2234.01	2^+	1.0 *2*	A_2=0.38 *3*; DCO=1.0 *2*
2696.7 *13*	0.55 *10*	15526.9	(9^-)	12830.04	(8^-)		
2707.5 *16*	0.86 *18*	8191.5	5^-	5484.92	3^-		
2730.5 *8*	1.1 *1*	9771.3	6^-	7041.24	5^-		
2776.1 *16*	0.82 *16*	9771.3	6^-	6996.98	5^+		A_2<0
2994.5 *6*	1.4 *1*	5228.62	3^+	2234.01	2^+		A_2<0
3043.2 *1*	29.5 *11*	5277.43	4^+	2234.01	2^+	1.2 *2*	A_2=0.34 *2*; A_4=−0.13 *2*; DCO=1.2 *2*
3251.4 *4*	4.9 *3*	5484.92	3^-	2234.01	2^+	0.7 *2*	A_2=−0.21 *5*; DCO=0.7 *2*
3271.6 *10*	1.6 *2*	9771.3	6^-	6500.87	4^-		
3286.8 *24*	0.47 *12*	12391.8		9104.78	6^-		
3345.7 *13*	1.5 *2*	11537.0	7^-	8191.5	5^-		
3403 *3*	0.38 *12*	12508		9104.78	6^-		
3418.8 *14*	1.7 *3*	9365.3	6^+	5949.00	4^+		A_2>0
3497.0 *4*	10.0 *5*	3496.84	2^+	0	0^+		A_2=0.36 *4*; A_4=−0.12 *5*
3511.0 *3*	0.51 *16*	10552.5	6^-	7041.24	5^-		
3607.9 *15*	0.84 *13*	12712.9		9104.78	6^-		A_2>0
3631.4 *12*	1.2 *2*	10672.9	(6)	7041.24	5^-		
3676.7 *2*	6.4 *3*	10717.35	7^-	7041.24	5^-	1.7 *6*	A_2=0.23 *3*; A_4=−0.18 *4*; DCO=1.7 *6*
3714.9 *2*	20.3 *9*	5949.00	4^+	2234.01	2^+	1.5 *3*	A_2=0.35 *2*; A_4=−0.15 *3*; DCO=1.5 *3*

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$^{14}C(^{18}O,2n\gamma)$ 2010St13 (continued)

$\gamma(^{30}Si)$ (continued)

E_γ	I_γ †	E_i(level)	J_i^π	E_f	J_f^π	Comments
3724.7 *3*	1.0 *2*	12830.04	(8^-)	9104.78	6^-	
3725.5 *10*	0.48 *12*	7220.7	4^+	3496.84	2^+	
4040.0 *22*	0.68 *17*	11081.5	$(6,7)^-$	7041.24	5^-	
4088.7 *20*	2.1 *3*	9365.3	6^+	5277.43	4^+	A_2=0.51 *8*; A_4=−0.16 *10*
4472.1 *6*	1.5 *1*	15189.4	(9^-)	10717.35	7^-	A_2>0

† Relative to Iγ(2233.9)=100.

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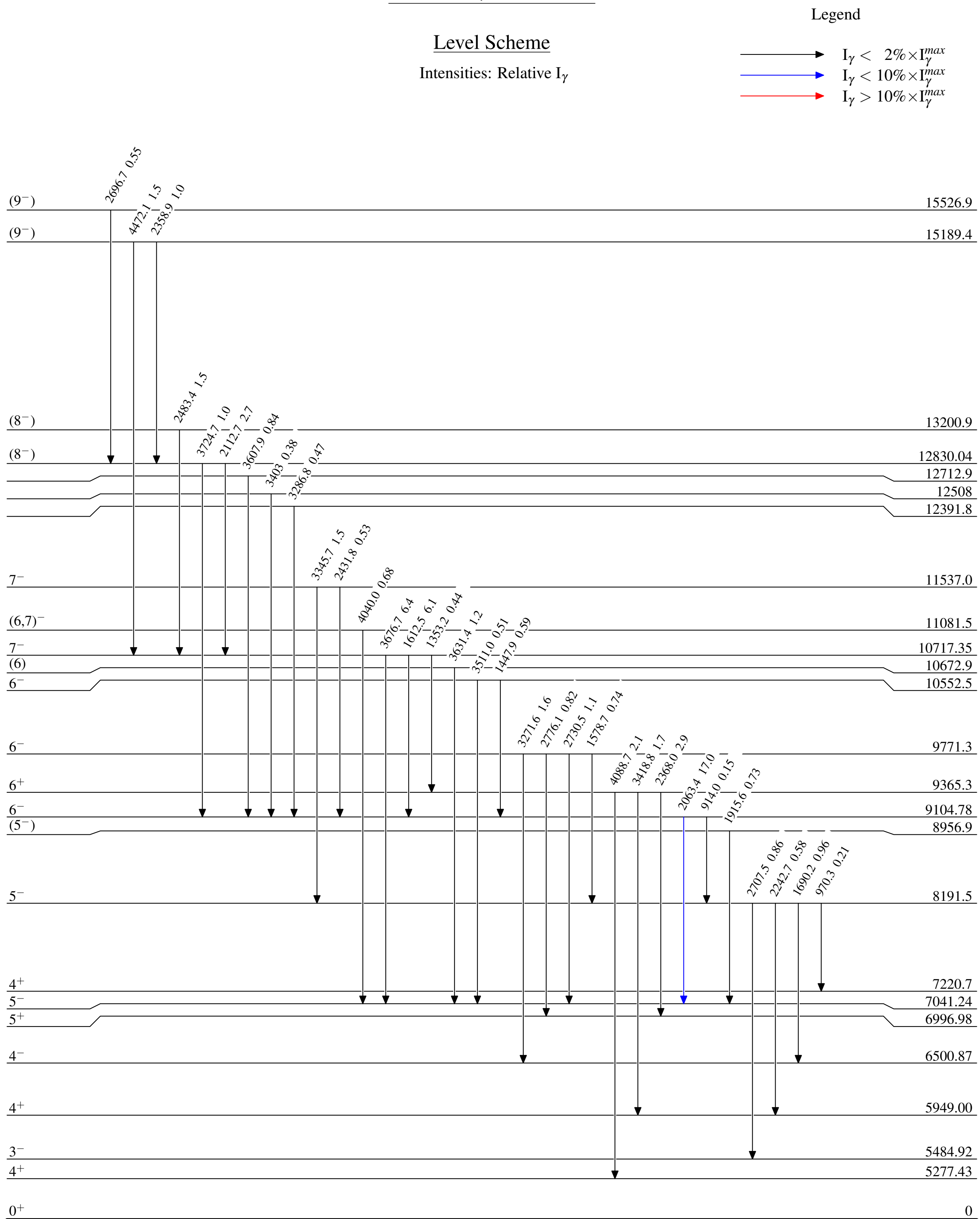
Level Scheme

Intensities: Relative I_γ



$^{30}_{14}Si_{16}$

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Level Scheme (continued)

Intensities: Relative I_γ