

$^{14}\text{C}(^{48}\text{Ca},2n\gamma)$ **2007De56**

Type	Author	History	Literature Cutoff Date
Full Evaluation	E. Browne, J. K. Tuli	Citation NDS 114, 1849 (2013)	31-Dec-2012

Additional information 1.

E=2.75 MeV/nucleon beam in 11^+ charge state provided by ATLAS facility at Argonne. Measured E_γ , I_γ , $\gamma\gamma$ coin, $\gamma(\theta)$ using GAMMASPHERE array of 91 Compton-suppressed HPGe detectors. Enriched ^{14}C target.

 ^{60}Fe Levels

Additional information 2.

E(level) [†]	J ^π	E(level) [†]	J ^π	E(level) [†]	J ^π	E(level) [†]	J ^π
0.0 [‡]	0 ⁺	5005.7 [@] 3	8 ⁽⁻⁾	7242.8 4		10670.0 18	
823.6 [‡] 1	2 ⁺	5333.0 [‡] 3	8 ⁽⁺⁾	7249.8 [#] 3	11 ⁽⁻⁾	10720.4 [@] 10	(14 ⁻)
2114.3 [‡] 2	4 ⁺	5528.4 [#] 3	9 ⁽⁻⁾	7631.4 5	11 ⁽⁻⁾	11810.0 ^{&} 8	15
3515.9 [#] 2	5 ⁽⁻⁾	5549.2 6	8 ⁺	7664.6 4		12115.8 [#] 15	(15 ⁻)
3519.7 2	(6 ⁺)	5754.2 3	9 ⁽⁻⁾	7890.0 ^{&} 3	11	12318.5 [‡] 21	(16 ⁺)
3581.8 [‡] 2	6 ⁺	6314.3 6	9	8059.1 [‡] 3	12 ⁺	12832.6 [@] 23	(16 ⁻)
3904.2 4	(6 ⁺)	6474.9 [‡] 3	10 ⁺	8536.1 [@] 4	12 ⁽⁻⁾	14583.0 [#] 20	(17 ⁻)
3931.5 2	6 ⁺	6549.7 [@] 3	10 ⁽⁻⁾	8919.9 7		14984.1 [‡] 23	(18 ⁺)
3957.8 [@] 2	6 ⁽⁻⁾	6578.3 3		8974.0 9		17955 [‡] 5	(20 ⁺)
4296.1 2	7 ⁽⁻⁾	6739.7 ^{&} 5	(9,10)	9502.9 [#] 5	(13 ⁻)		
4358.0 [#] 2	7 ⁽⁻⁾	6944.0 6	10	9559.0 ^{&} 3	13		
4451.1 3	6 ⁺	7003.0 7	10	9995.4 [‡] 4	14 ⁺		

[†] Deduced by evaluators from least-squares fit to γ -ray energies.

[‡] Band(A): γ -ray cascade based on g.s. ($J^\pi=0^+$).

[#] Band(B): Band based on $J^\pi=5^{(-)}$.

[@] Band(b): Band based on $J^\pi=6^{(-)}$.

[&] Band(C): Band based on $J=(9,10)$.

 $\gamma(^{60}\text{Fe})$

E_γ	I_γ	$E_i(\text{level})$	J_i^π	E_f	J_f^π	Comments
338.2 1	8.6 3	4296.1	7 ⁽⁻⁾	3957.8	6 ⁽⁻⁾	$A_2=-0.34$ 2
349.5 1	1.0 1	3931.5	6 ⁺	3581.8	6 ⁺	$A_2=+0.37$ 8
364.5 1	3.2 1	4296.1	7 ⁽⁻⁾	3931.5	6 ⁺	$A_2=-0.23$ 4
375.9 1	4.1 1	3957.8	6 ⁽⁻⁾	3581.8	6 ⁺	$A_2=+0.28$ 3
399.9 1	1.0 1	4358.0	7 ⁽⁻⁾	3957.8	6 ⁽⁻⁾	$A_2=+0.26$ 8
421.8 1	1.2 1	7664.6		7242.8		
426.4 4	0.2 1	4358.0	7 ⁽⁻⁾	3931.5	6 ⁺	$A_2=-0.22$ 8
437.9 1	15.1 5	3957.8	6 ⁽⁻⁾	3519.7 (6 ⁺)		$A_2=+0.23$ 3; $A_4=-0.08$ 4
441.9 1	7.1 2	3957.8	6 ⁽⁻⁾	3515.9 5 ⁽⁻⁾		$A_2=+0.39$ 4; $A_4=+0.17$ 6
453.7 2	0.5 1	4358.0	7 ⁽⁻⁾	3904.2 (6 ⁺)		
522.8 2	0.7 1	5528.4	9 ⁽⁻⁾	5005.7 8 ⁽⁻⁾		
647.7 2	0.8 1	5005.7	8 ⁽⁻⁾	4358.0 7 ⁽⁻⁾		
664.5 1	1.2 1	7242.8		6578.3		
688.7 3	0.4 1	7003.0	10	6314.3 9		$A_2=-0.44$ 14
714.4 1	4.6 2	4296.1	7 ⁽⁻⁾	3581.8 6 ⁺		$A_2=-0.22$ 3

Continued on next page (footnotes at end of table)

$^{14}\text{C}(^{48}\text{Ca},2n\gamma)$ 2007De56 (continued) $\gamma(^{60}\text{Fe})$ (continued)

E_γ	I_γ	$E_i(\text{level})$	J_i^π	E_f	J_f^π	Comments
720.3 3	2.3 1	6474.9	10 ⁺	5754.2	9 ⁽⁻⁾	A ₂ =-1.40 13
748.5 1	1.8 1	5754.2	9 ⁽⁻⁾	5005.7	8 ⁽⁻⁾	A ₂ =-0.23 7
765.1 2	0.9 1	6314.3	9	5549.2	8 ⁺	A ₂ =-0.34 10
780.6 10	8.5 3	4296.1	7 ⁽⁻⁾	3515.9	5 ⁽⁻⁾	A ₂ =+0.27 3; A ₄ =-0.15 4
823.6 1	100 5	823.6	2 ⁺	0.0	0 ⁺	A ₂ =+0.11 1; A ₄ =-0.08 4
824.0 1	4.6 2	6578.3		5754.2	9 ⁽⁻⁾	
842.3 1	17.4 6	4358.0	7 ⁽⁻⁾	3515.9	5 ⁽⁻⁾	A ₂ =+0.34 2; A ₄ =-0.09 3
882.0 2	2.0 1	5333.0	8 ⁽⁺⁾	4451.1	6 ⁺	A ₂ =+0.54 10
1021.2 15	0.2 1	6549.7	10 ⁽⁻⁾	5528.4	9 ⁽⁻⁾	
1036.8 1	9.2 3	5333.0	8 ⁽⁺⁾	4296.1	7 ⁽⁻⁾	A ₂ =-0.38 3
1047.9 1	17.1 5	5005.7	8 ⁽⁻⁾	3957.8	6 ⁽⁻⁾	A ₂ =+0.31 2
1141.9 1	18.0 6	6474.9	10 ⁺	5333.0	8 ⁽⁺⁾	A ₂ =+0.37 2
1150.3 3	0.9 1	7890.0	11	6739.7	(9,10)	
1170.4 1	15.1 5	5528.4	9 ⁽⁻⁾	4358.0	7 ⁽⁻⁾	A ₂ =+0.43 3; A ₄ =-0.13 4
1232.3 6	0.7 1	5528.4	9 ⁽⁻⁾	4296.1	7 ⁽⁻⁾	
1255.3 4	0.4 1	8919.9		7664.6		
1290.7 1	92 3	2114.3	4 ⁺	823.6	2 ⁺	A ₂ =+0.23 1; A ₄ =-0.08 2
1340.3 1	2.0 1	7890.0	11	6549.7	10 ⁽⁻⁾	A ₂ =-0.37 8
1401.7 [†] 1	44.0 15	3515.9	5 ⁽⁻⁾	2114.3	4 ⁺	A ₂ =-0.10 15; A ₄ =-0.05 2
1405.1 [†] 1	16.1 8	3519.7	(6 ⁺)	2114.3	4 ⁺	A ₂ =-0.10 15; A ₄ =-0.05 2
1415.1 [†] 10	1.5 1	7890.0	11	6474.9	10 ⁺	A ₂ =-0.45 6
1415.6 [†] 4	1.3 1	6944.0	10	5528.4	9 ⁽⁻⁾	A ₂ =-0.45 6
1458.1 1	10.1 3	5754.2	9 ⁽⁻⁾	4296.1	7 ⁽⁻⁾	A ₂ =+0.73 5; A ₄ =-0.12 7
1467.4 1	23.1 8	3581.8	6 ⁺	2114.3	4 ⁺	A ₂ =+0.13 6; A ₄ =-0.10 9
1499.9 2	1.8 1	9559.0	13	8059.1	12 ⁺	
1544.0 1	10.4 3	6549.7	10 ⁽⁻⁾	5005.7	8 ⁽⁻⁾	A ₂ =+0.39 4; A ₄ =-0.09 5
1584.2 1	15.8 5	8059.1	12 ⁺	6474.9	10 ⁺	A ₂ =+0.37 3; A ₄ =-0.17 3
1669.0 2	3.5 1	9559.0	13	7890.0	11	A ₂ =+0.46 6; A ₄ =-0.15 8
1696.0 11	0.4 1	10670.0		8974.0		
1721.3 1	10.3 3	7249.8	11 ⁽⁻⁾	5528.4	9 ⁽⁻⁾	A ₂ =+0.38 5; A ₄ =-0.09 5
1734.0 5	0.9 1	6739.7	(9,10)	5005.7	8 ⁽⁻⁾	
1751.6 2	5.3 2	5333.0	8 ⁽⁺⁾	3581.8	6 ⁺	A ₂ =+0.43 7
1789.1 7	0.7 2	3904.2	(6 ⁺)	2114.3	4 ⁺	
1813.4 4	1.9 1	5333.0	8 ⁽⁺⁾	3519.7	(6 ⁺)	
1817.4 2	6.4 3	3931.5	6 ⁺	2114.3	4 ⁺	A ₂ =+0.51 8
1843 5	0.2 1	3957.8	6 ⁽⁻⁾	2114.3	4 ⁺	
1877.2 3	2.6 1	7631.4	11 ⁽⁻⁾	5754.2	9 ⁽⁻⁾	A ₂ =+0.55 14; A ₄ =-0.37 19
1936.3 1	10.2 3	9995.4	14 ⁺	8059.1	12 ⁺	A ₂ =+0.36 3; A ₄ =-0.14 4
1967.4 4	2.2 2	5549.2	8 ⁺	3581.8	6 ⁺	A ₂ =+0.18 10
1986.4 2	3.2 1	8536.1	12 ⁽⁻⁾	6549.7	10 ⁽⁻⁾	A ₂ =+0.36 8
2030.0 5	1.1 1	8974.0		6944.0	10	
2112.1 15	0.4 1	12832.6	(16 ⁻)	10720.4	(14 ⁻)	
2184.4 7	0.9 1	10720.4	(14 ⁻)	8536.1	12 ⁽⁻⁾	
2251.0 [†] 5	1.9 1	11810.0	15	9559.0	13	A ₂ =+0.35 5; A ₄ =-0.17 7
2253.1 [†] 3	3.3 2	9502.9	(13 ⁻)	7249.8	11 ⁽⁻⁾	A ₂ =+0.35 5; A ₄ =-0.17 7
2323.1 15	3.8 2	12318.5	(16 ⁺)	9995.4	14 ⁺	A ₂ =+0.48 7; A ₄ =-0.10 9
2336.9 20	2.9 2	4451.1	6 ⁺	2114.3	4 ⁺	A ₂ =+0.40 10
2467.2 10	0.2 1	14583.0	(17 ⁻)	12115.8	(15 ⁻)	
2612.9 10	0.9 1	12115.8	(15 ⁻)	9502.9	(13 ⁻)	
2665.6 7	1.3 1	14984.1	(18 ⁺)	12318.5	(16 ⁺)	
2971 3	0.3 1	17955	(20 ⁺)	14984.1	(18 ⁺)	

Continued on next page (footnotes at end of table)

${}^{14}\text{C}({}^{48}\text{Ca}, 2n\gamma)$ **2007De56** (continued)

$\gamma({}^{60}\text{Fe})$ (continued)

† The following pairs of γ rays form unresolved doublets, the A_2 and A_4 values are for the composite lines: 1401.7 and 1405.1; 1415.1 and 1415.6; and 2251.0 and 2253.1.

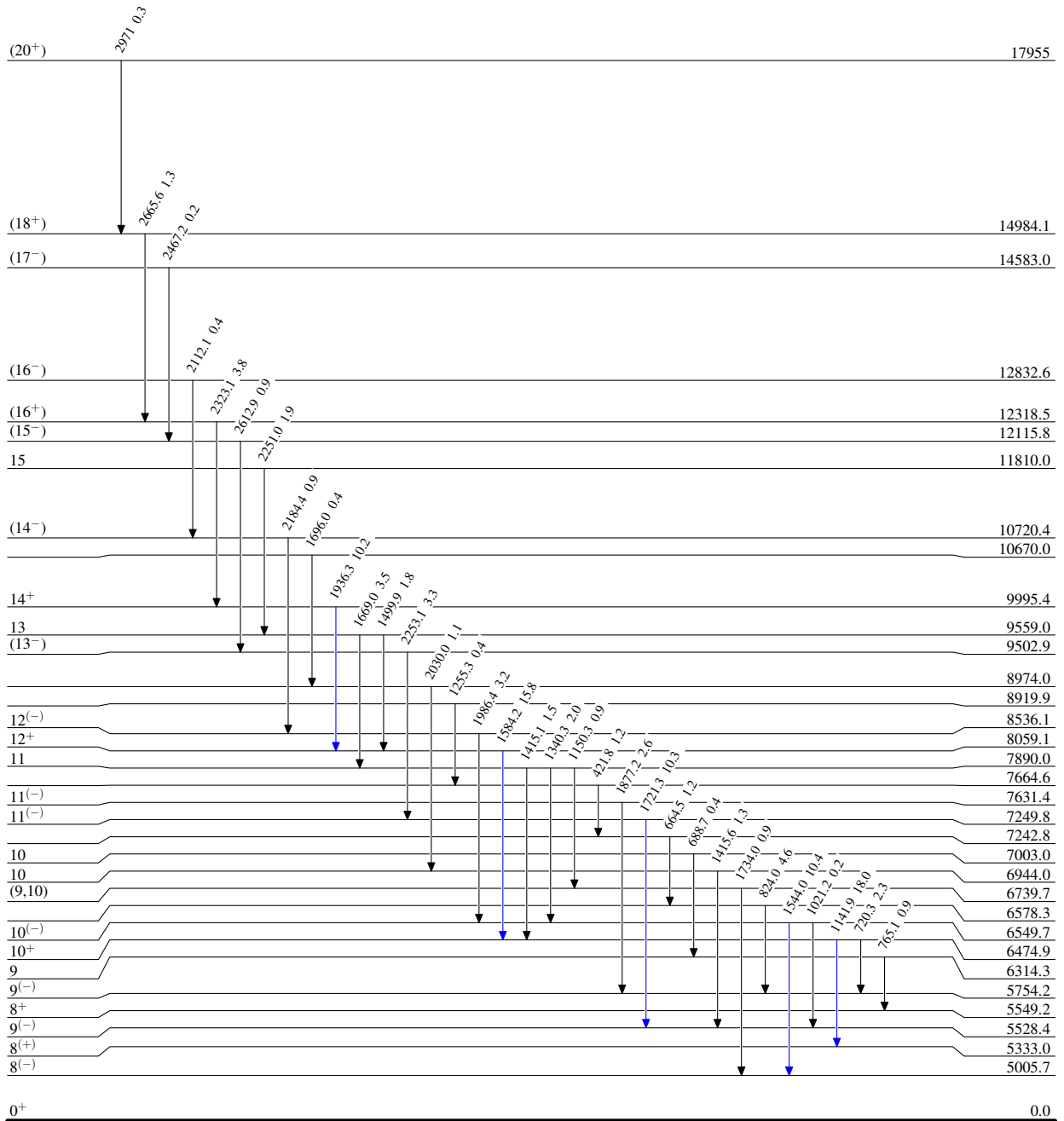
${}^{14}\text{C}({}^{48}\text{Ca}, 2n\gamma)$ 2007De56

Level Scheme

Intensities: Relative I_γ

Legend

- $I_\gamma < 2\% \times I_\gamma^{\text{max}}$
- $I_\gamma < 10\% \times I_\gamma^{\text{max}}$
- $I_\gamma > 10\% \times I_\gamma^{\text{max}}$




 ${}^{60}_{26}\text{Fe}_{34}$

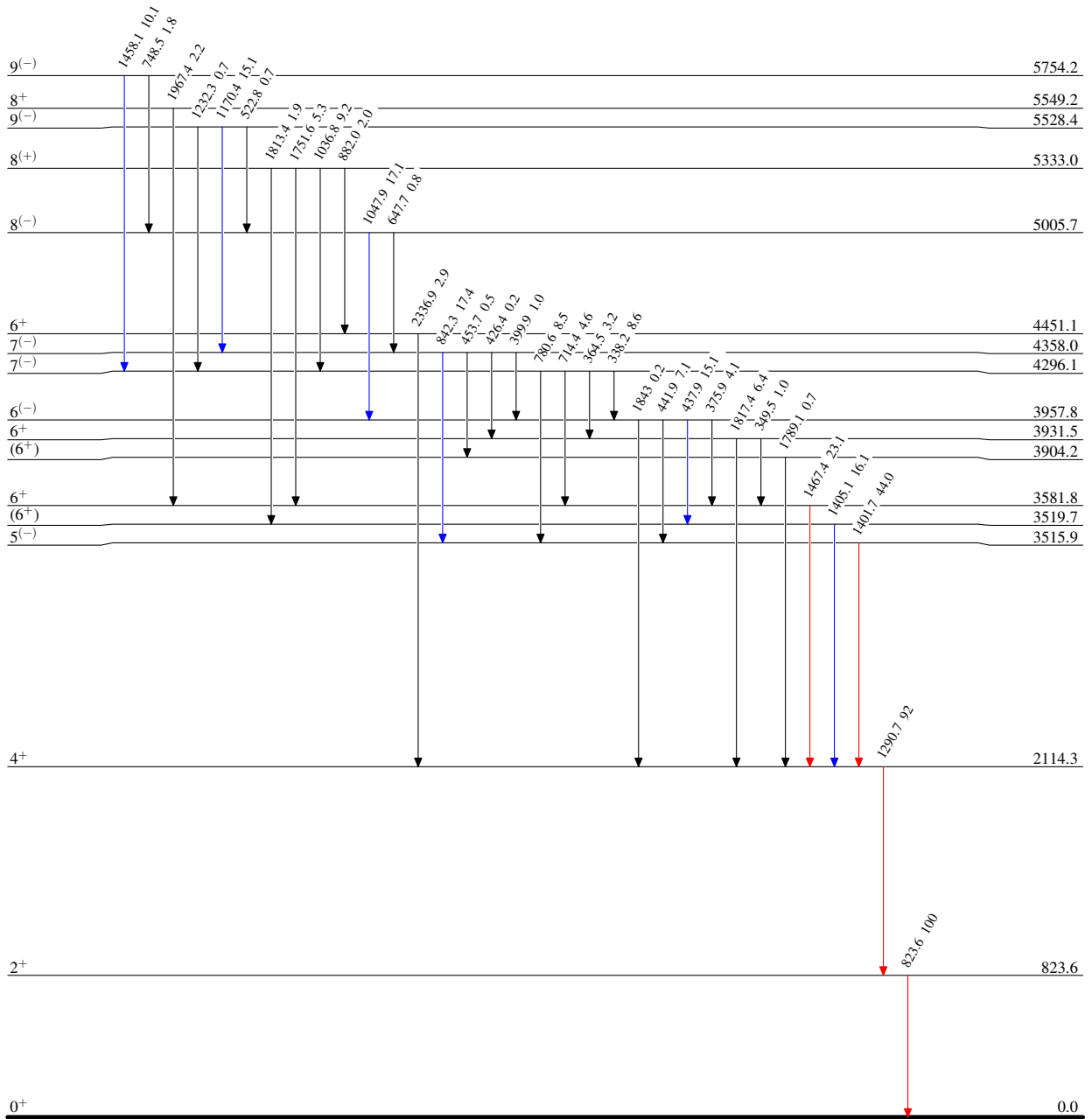
${}^{14}\text{C}({}^{48}\text{Ca}, 2n\gamma)$ 2007De56

Level Scheme (continued)

Intensities: Relative I_γ

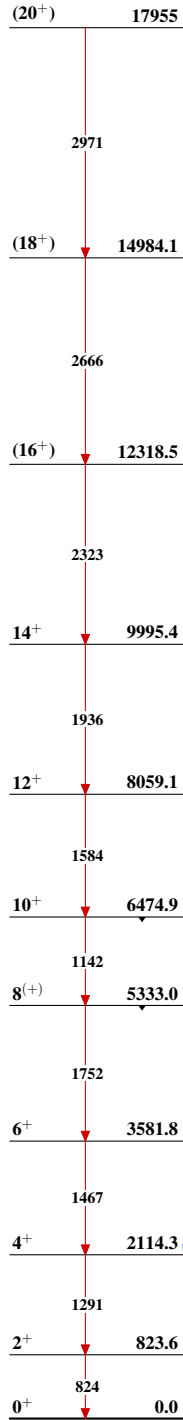
Legend

-  $I_\gamma < 2\% \times I_\gamma^{\max}$
 $I_\gamma < 10\% \times I_\gamma^{\max}$
 $I_\gamma > 10\% \times I_\gamma^{\max}$

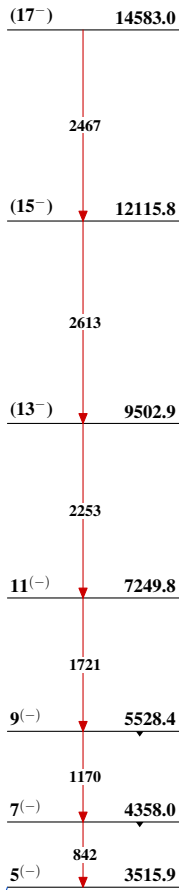
 ${}^{60}_{26}\text{Fe}_{34}$

${}^{14}\text{C}({}^{48}\text{Ca}, 2n\gamma)$ 2007De56

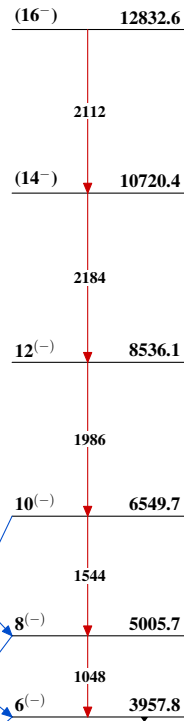
Band(A): γ -ray cascade
based on g.s. ($J^\pi=0^+$)



Band(B): Band based on
 $J^\pi=5^{(-)}$



Band(b): Band based on
 $J^\pi=6^{(-)}$



Band(C): Band based on
 $J=(9,10)$

