^{130}Te(^{12}C,3nγ):E=65 MeV 2009Ch26

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	P. K. Joshi, B. Singh, S. Singh, A. K. Jain	NDS 138, 1 (2016)	15-Oct-2016

2009Ch26: 2.2 mg/cm^2 ^{130}Te target ^{12}C beam provided at E=65 MeV by the 15UD Pelletron Accelerator of the Inter University Accelerator Centre in Delhi. The γ rays were measured using five Clover Ge detectors and identified using gates on strong known transitions. Measured Eγ, Iγ, $\gamma\gamma$, $\gamma\gamma(\theta)$(DCO), $\gamma\gamma$(lin pol). Deduced levels, J, π, multipolarities from measured DCO ratios, shell model configurations. Comparison with large basis shell model and cranked Nilsson-Strutinsky calculations.

^{139}Ce Levels

Detailed multi-quasiparticle shell-model configurations for $19/2^-$ to $35/2^-$ levels are given in Table III of 2009Ch26.

E(level)[†]	J$^\pi$[‡]	T$_{1/2}$[#]	Comments
0.0	$3/2^+$		
754.0[@] *5*	$11/2^-$	57.58 s *32*	%IT=100
2063.0 *7*	$13/2^-$		
2361.0[@] *7*	$15/2^-$		
2631.7[@] *9*	$19/2^-$	70 ns *5*	
2819.4 *10*	$21/2^-$		
3186.8 *11*	$23/2^-$		
3876.7[a] *11*	$23/2^-$		
4013.5[&] *11*	$23/2^-$		
4083.6[&] *11*	$25/2^-$		
4098.8[a] *11*	$25/2^-$		
4276.5[&] *11*	$27/2^-$		
4404.3[a] *11*	$27/2^-$		
4570.5 *12*	$(29/2^-)$		
4756.3[&] *12*	$29/2^-$		
4808.1[a] *12*	$29/2^-$		
5211.5 *13*	$(31/2^-)$		
5297.5 *12*	$29/2^-$		
5532.3[&] *12*	$31/2^-$		
5884.5[a] *13*	$31/2^-$		
5916.3 *13*	$31/2^-$		
5917.3[&] *13*	$33/2^-$		
6156.3[&] *14*	$35/2^-$		

[†] From least-squares fit to Eγ data.
[‡] From multipolarities deduced from measurement of DCO ratios and linear polarization of γ rays.
[#] From Adopted Levels.
[@] Band(A): γ cascade based on $11/2^-$.
[&] Band(B): γ cascade based on $23/2^-$, 4013.5.
[a] Band(C): γ cascade based on $23/2^-$, 3876.7.

^{130}Te(^{12}C,3nγ):E=65 MeV 2009Ch26 (continued)

$\gamma(^{139}Ce)$

DCO gate on ΔJ=1, dipole transitions, unless otherwise stated. Expected DCO ≈ 1.6 for ΔJ=2, quadrupole and ≈1.0 for ΔJ=1, dipole for gate on ΔJ=1, dipole. For ΔJ=2, quadrupole gate, expected DCO ≈ 1.0 for ΔJ=2 quadrupole and ≈ 0.6 for ΔJ=1, dipole.
Measured PDCO (polarization) ratios, but values are not listed in table 1 of 2009Ch26.

E_γ	I_γ	E_i(level)	J_i^π	E_f	J_f^π	Mult.[†]	α[‡]	Comments
70.1 *5*	3.2 *3*	4083.6	25/2$^-$	4013.5	23/2$^-$	[M1]	3.29 *9*	
187.7 *5*	93 *9*	2819.4	21/2$^-$	2631.7	19/2$^-$	D		DCO=0.97 *6*
192.9 *5*	30 *3*	4276.5	27/2$^-$	4083.6	25/2$^-$	D		DCO=0.96 *7*
206.9 *5*	3.0 *3*	4083.6	25/2$^-$	3876.7	23/2$^-$	[M1]	0.1556 *24*	
222.1 *5*	4.3 *4*	4098.8	25/2$^-$	3876.7	23/2$^-$	D		DCO=1.10 *22*
234.8 *5*	4.8 *5*	5532.3	31/2$^-$	5297.5	29/2$^-$	D+Q		DCO=1.4 *3*
239.0 *5*	8.4 *8*	6156.3	35/2$^-$	5917.3	33/2$^-$	D+Q		DCO=1.4 *3*
263.0 *5*	0.4 *1*	4276.5	27/2$^-$	4013.5	23/2$^-$			
270.7 *5*	100 *10*	2631.7	19/2$^-$	2361.0	15/2$^-$	E2	0.0676 *11*	DCO=1.07 *2* POL=+0.08 *4*. DCO gate on ΔJ=2, quadrupole transition.
294.0[#] *5*	9.3 *9*	4570.5	(29/2$^-$)	4276.5	27/2$^-$	D+Q		DCO=1.11 *4*
298.0 *5*	2.1 *2*	2361.0	15/2$^-$	2063.0	13/2$^-$			
305.5 *5*	23.9 *24*	4404.3	27/2$^-$	4098.8	25/2$^-$	D		DCO=1.03 *12*
367.4 *5*	59 *6*	3186.8	23/2$^-$	2819.4	21/2$^-$	D+Q		DCO=1.09 *6*
385.0 *5*	5.9 *6*	5917.3	33/2$^-$	5532.3	31/2$^-$	D+Q		DCO=1.14 *20*
403.8 *5*	27 *3*	4808.1	29/2$^-$	4404.3	27/2$^-$	D+Q		DCO=2.24 *18*
479.8 *5*	15.6 *16*	4756.3	29/2$^-$	4276.5	27/2$^-$	D+Q		DCO=0.92 *9*
527.6[#] *5*	2.6 *3*	4404.3	27/2$^-$	3876.7	23/2$^-$			
641.0[#] *5*	5.6 *6*	5211.5	(31/2$^-$)	4570.5	(29/2$^-$)			
672.7[#] *5*	2.3 *2*	4756.3	29/2$^-$	4083.6	25/2$^-$			
709.3[#] *5*	2.2 *2*	4808.1	29/2$^-$	4098.8	25/2$^-$			
754.0 *5*	10.2 *10*	754.0	11/2$^-$	0.0	3/2$^+$	M4	0.0801	Mult.: from Adopted Gammas.
776.0 *5*	7.9 *8*	5532.3	31/2$^-$	4756.3	29/2$^-$	D		DCO=1.1 *5*
896.8 *5*	24.8 *25*	4083.6	25/2$^-$	3186.8	23/2$^-$	D		DCO=0.95 *4*
912.0 *5*	9.8 *10*	4098.8	25/2$^-$	3186.8	23/2$^-$	D+Q		DCO=0.71 *9*
1021.0 *5*	3.6 *4*	5297.5	29/2$^-$	4276.5	27/2$^-$	D+Q		DCO=0.45 *14*
1057.3 *5*	6.3 *6*	3876.7	23/2$^-$	2819.4	21/2$^-$	D+Q		DCO=0.55 *10*
1076.4 *5*	10.9 *11*	5884.5	31/2$^-$	4808.1	29/2$^-$	D+Q		DCO=1.4 *3*
1108.2 *5*	5.3 *5*	5916.3	31/2$^-$	4808.1	29/2$^-$	D+Q		DCO=0.86 *19*
1161.0[#] *5*	1.1 *1*	5917.3	33/2$^-$	4756.3	29/2$^-$			Initial level J^π labeled as 31/2$^-$ in table I of 2009Ch26 is a misprint.
1194.1 *5*	10.6 *11*	4013.5	23/2$^-$	2819.4	21/2$^-$	D		DCO=0.90 *13*
1213.9[#] *5*	1.9 *2*	5297.5	29/2$^-$	4083.6	25/2$^-$			
1217.5 *5*	12.3 *12*	4404.3	27/2$^-$	3186.8	23/2$^-$	Q		DCO=1.66 *9*
1255.8 *5*	6.5 *7*	5532.3	31/2$^-$	4276.5	27/2$^-$	Q		DCO=1.53 *25*
1279.4 *5*	13.3 *13*	4098.8	25/2$^-$	2819.4	21/2$^-$	Q		DCO=1.61 *19*
1309.0 *5*	6.1 *6*	2063.0	13/2$^-$	754.0	11/2$^-$			
1607.0 *5*	97 *10*	2361.0	15/2$^-$	754.0	11/2$^-$			

[†] 2009Ch26 assign E1, M1 or M1+E2 for ΔJ=1, dipole or D+Q transitions, and E2 for ΔJ=2, quadrupole transitions. In the absence of parity-sensitive measurements, but in consideration of timing resolution of ≈50 ns in $\gamma\gamma$-coin measurement and RUL for E2 and M2 transitions, evaluators assign (M1), (M1+E2) and (E2) for Eγ<500 keV, and D, D+Q or Q for higher energy transitions.
[‡] Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation

Continued on next page (footnotes at end of table)

^{130}Te(^{12}C,3nγ):E=65 MeV 2009Ch26 (continued)

$\gamma(^{139}Ce)$ (continued)

based on γ-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.
Placement of transition in the level scheme is uncertain.

^{130}Te(^{12}C,3nγ):E=65 MeV 2009Ch26

Level Scheme

Intensities: Relative I_γ

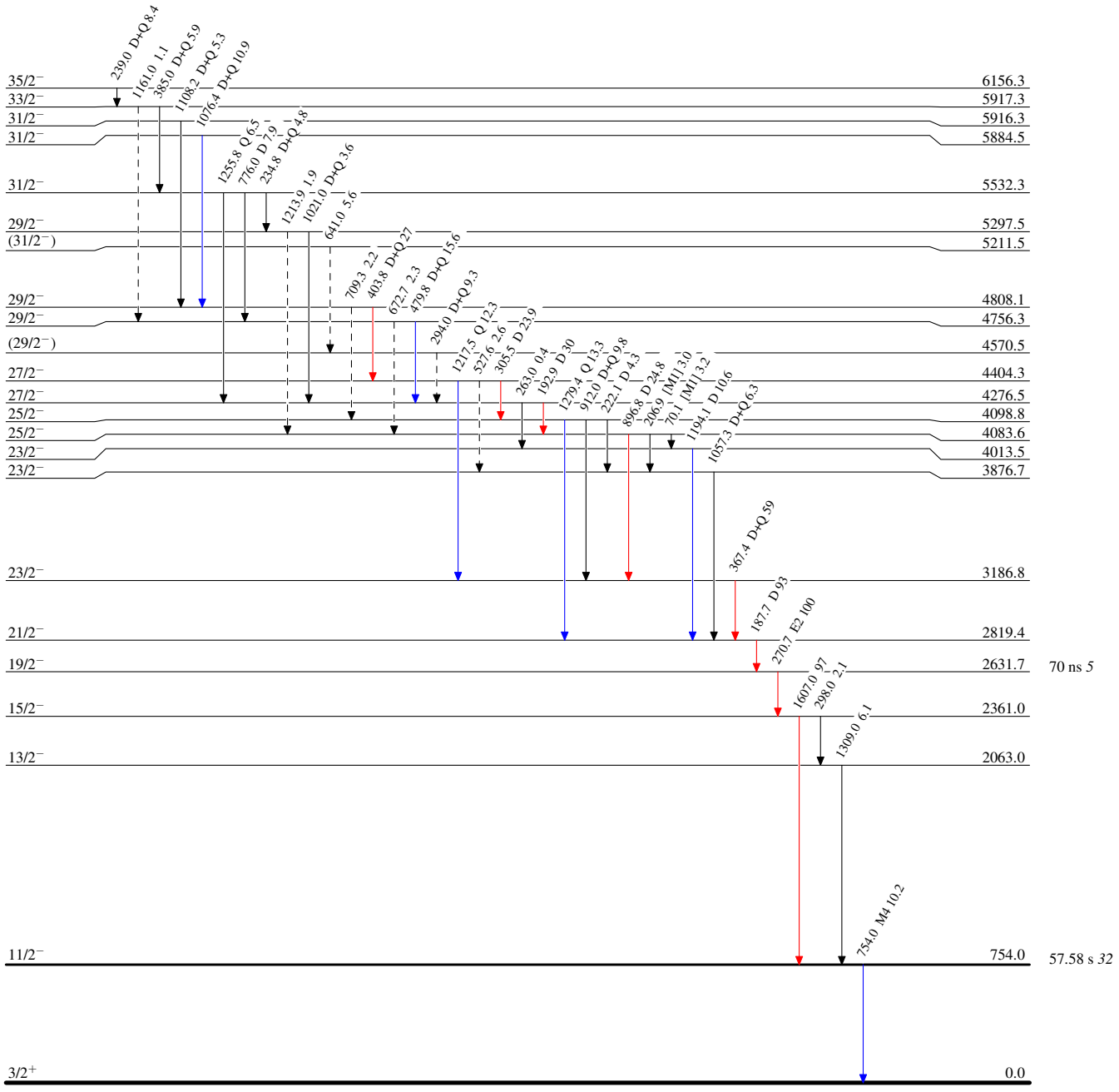
Legend

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

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

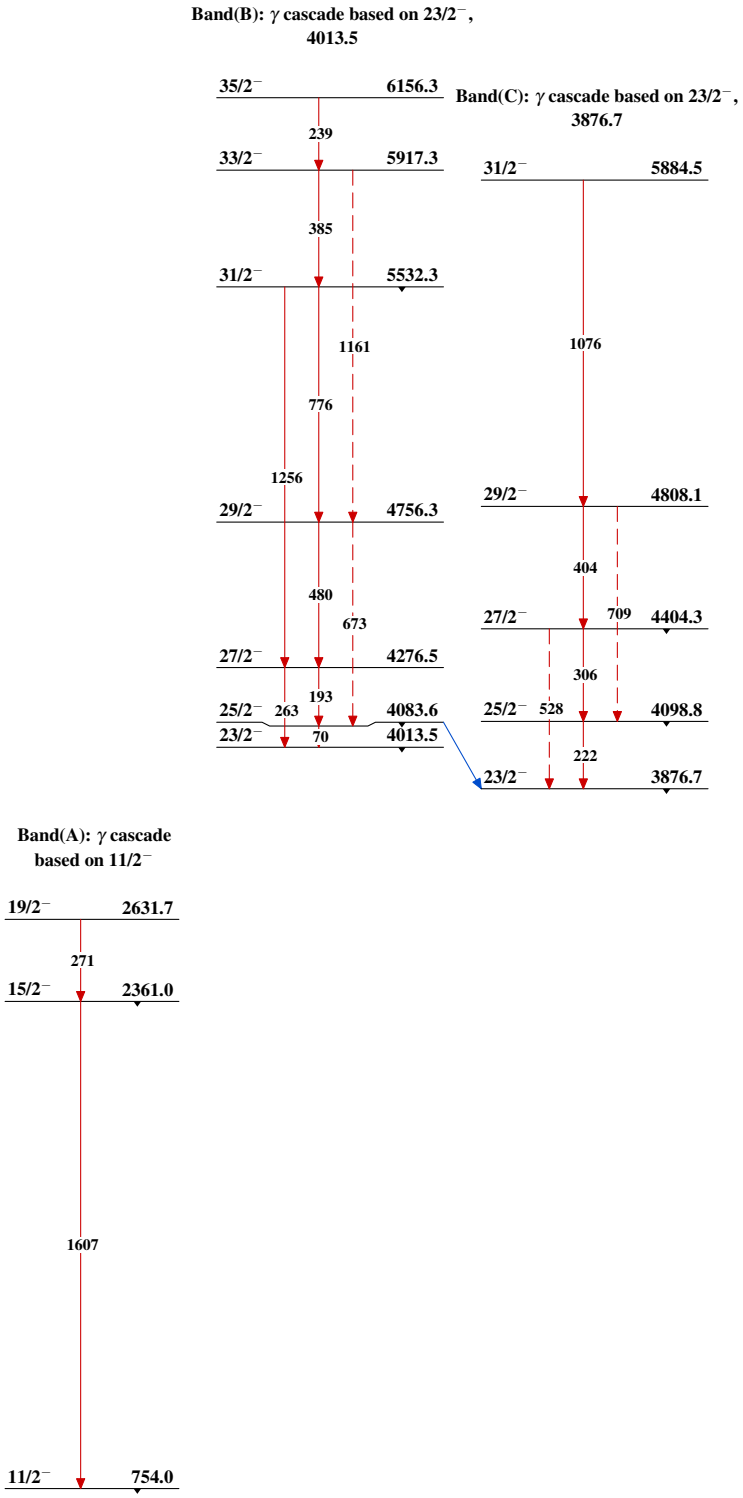
$I_\gamma > 10\% \times I_\gamma^{max}$

γ Decay (Uncertain)



$^{139}_{58}Ce_{81}$

^{130}Te(^{12}C,3nγ):E=65 MeV 2009Ch26



$^{139}_{58}Ce_{81}$