^{18}O(^{18}O,3nγ) 2009Ch43

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Jun Chen and Balraj Singh	NDS 199,1 (2025)	30-Sep-2024

2009Ch43: E=34 MeV ^{18}O beam was produced from the 14UD BARC-TIFR Pelletron facility. Target was 1.6 mg/cm^2 ^{18}O in the form of Ta_2O_5 prepared by heating a 50 mg/cm^2 Ta foil in an atmosphere of enriched oxygen. γ rays were detected with an array of seven Compton-suppressed Clover Ge detectors placed at 30°, 60°, 90°, 120° and 150° relative to the beam direction. Measured Eγ, Iγ, $\gamma\gamma$-coin, $\gamma\gamma(\theta)$(DCO), $\gamma\gamma(\theta$,lin pol). Deduced levels, J, π, γ-ray multipolarities. Comparisons with truncated (1p-1h) shell-model calculations in the *sdpf* orbital space.

^{33}S Levels

E(level)[†]	J$^\pi$[‡]	Comments
0.0	3/2$^+$	
841.1 *8*	1/2$^+$	
1967.6 *7*	5/2$^+$	
2935.9 *8*	7/2$^-$	
3538.4 *13*		
3781.0 *13*	(9/2$^+$)	J$^\pi$: (5/2$^+$) in Adopted Levels.
4796.3 *16*	(11/2$^-$)	J$^\pi$: (7/2$^+$) in Adopted Levels.
4867.1 *13*		T$_{1/2}$: expected to be much less than 1 ps region, as 1931γ shows a full Doppler shift (2009Ch43).
5393.3 *19*		
5990.3 *22*		

[†] From a least-squares fit to γ-ray energies.
[‡] As proposed in 2009Ch43 based on their $\gamma\gamma(\theta)$(DCO) and $\gamma\gamma$(lin pol) data, unless otherwise noted.

γ(^{33}S)

DCO ratio corresponds to angles of 90° and 30° (or 150°). Expected ratios are ≈1 for ΔJ=2, quadrupole and ≈0.5 for ΔJ=1, dipole, when gated by ΔJ=2, quadrupole transition. Ratios are ≈2 for ΔJ=2, quadrupole and ≈1 for ΔJ=1, dipole, when gated on ΔJ=1, dipole transition (2009Ch43). Several DCO values are from e-mail reply received from the first author of 2009Ch43 on Sept 14, 2009.
For $\gamma\gamma$(lin pol) data under comments, a positive value indicates an electric nature and a negative value indicates a magnetic nature (2009Ch43).

E$_\gamma$[†]	I$_\gamma$[†]	E$_i$(level)	J$_i^\pi$	E$_f$	J$_f^\pi$	Mult.[‡]	Comments
597.0[@] *10*		5393.3		4796.3	(11/2$^-$)		
597.0[@] *10*		5990.3		5393.3			
602.5 *10*	0.11 *1*	3538.4		2935.9	7/2$^-$		
841.1 *10*	>0.63	841.1	1/2$^+$	0.0	3/2$^+$		Mult.: (M1+E2) in 2009Ch43 with no supporting data.
845.1 *10*	0.67 *3*	3781.0	(9/2$^+$)	2935.9	7/2$^-$	(E1)[#]	
968.4 *10*	48.5 *17*	2935.9	7/2$^-$	1967.6	5/2$^+$	E1+M2	DCO=0.84 *14*, POL=+0.032 *11* gate on 1968γ.
1015.3 *10*	0.37 *2*	4796.3	(11/2$^-$)	3781.0	(9/2$^+$)	(E1)[#]	
1126.5 *10*	0.63 *2*	1967.6	5/2$^+$	841.1	1/2$^+$		Mult.: (E2) in 2009Ch43 with no supporting data.
1931.2 *10*	0.62 *3*	4867.1		2935.9	7/2$^-$		
1967.6 *10*	100 *3*	1967.6	5/2$^+$	0.0	3/2$^+$	M1+E2	DCO=1.51 *25*, POL=+0.005 *9* gate on 968γ.
2935.6 *10*	46.7 *16*	2935.9	7/2$^-$	0.0	3/2$^+$		Mult.: (M2+E3) in 2009Ch43, with no supporting data.

[†] From 2009Ch43.

Continued on next page (footnotes at end of table)

^{18}O(^{18}O,3nγ) 2009Ch43 (continued)

$\gamma(^{33}S)$ (continued)

‡ As proposed by 2009Ch43 based on $\gamma\gamma(\theta)$(DCO) and $\gamma\gamma$(lin pol) data.
# Multipolarity consistent with qualitative $\gamma\gamma$(lin pol) results (2009Ch43).
@ Multiply placed.

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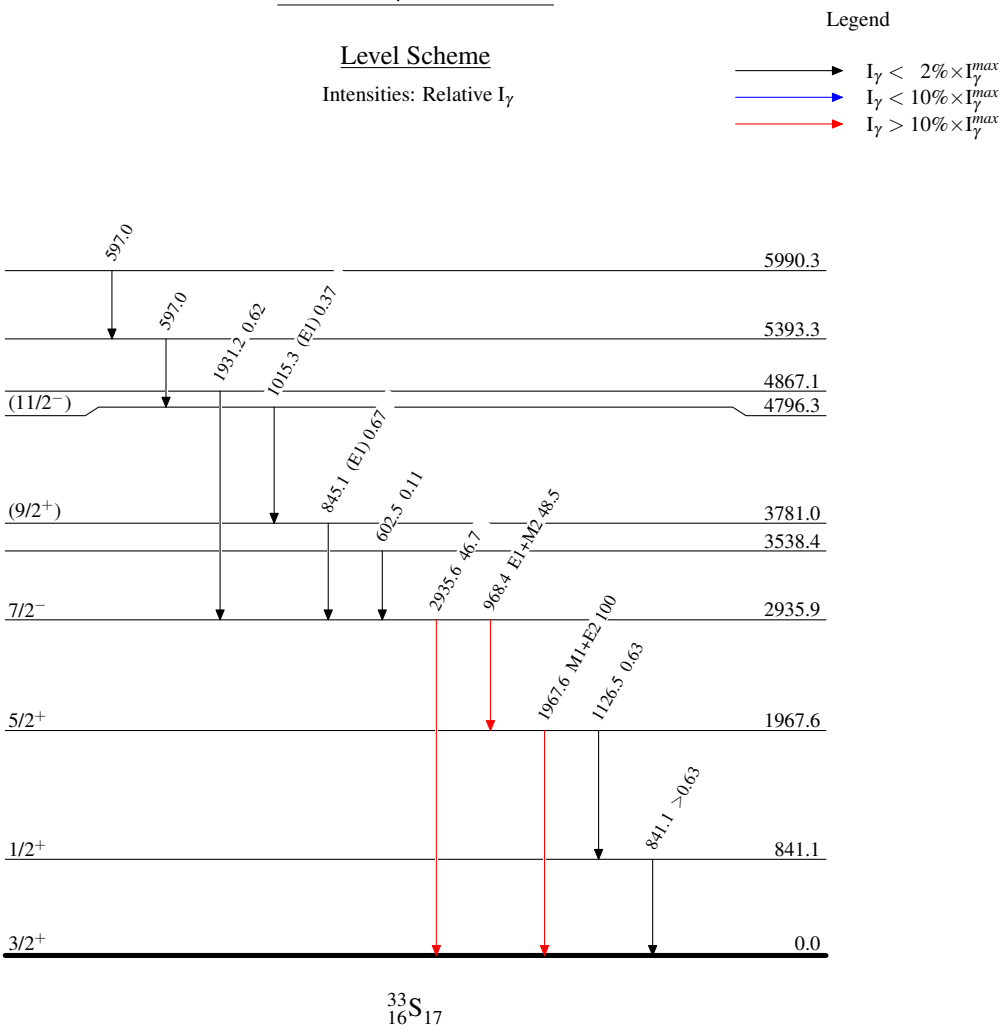
Level Scheme

Intensities: Relative I_γ



$^{33}_{16}S_{17}$