^{160}Gd(^{35}Cl,5nγ) 2005Xi06

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh, [1] and Jun Chen[2]	NDS 169, 1 (2020)	15-Oct-2020

2005Xi06 (also 2005Zh31): E=167,175 MeV. Measured Eγ, Iγ, $\gamma\gamma$, $\gamma\gamma$(t), $\gamma\gamma(\theta)$(DCO and ADO) using an array of 12 HPGe detectors with BGO anti-Compton shields at the HI-13 tandem accelerator facility of the China Institute of Atomic Energy (CIAE). The Cu absorbers were placed in front of the detectors to minimize contribution from x-ray peaks from Gd and Pb. The gamma rays in coincidence were detected within a time window of 200 ns.

^{190}Tl Levels

E(level)[†]	J$^{\pi}$[‡]	Comments
325.2 *5*	9$^-$	Additional information 1.
389.0[#] *5*	10$^-$	
661.3[#] *5*	11$^-$	B(M1,272.3γ)/B(E2,336.1γ)≥2.17 (2005Xi06).
941.8[#] *5*	12$^-$	B(M1,280.5γ)/B(E2,552.8γ)=2.7 *5* (2005Xi06).
1243.6[@] *6*	(11)	
1324.2[#] *5*	13$^-$	B(M1,382.4γ)/B(E2,662.8γ)=2.5 *5* (2005Xi06).
1494.5[@] *8*	(12)	
1651.3[#] *5*	14$^-$	B(M1,327.1γ)/B(E2,709.5γ)=2.3 *5* (2005Xi06).
1824.0[@] *8*	(13)	
2081.7[#] *6*	15$^-$	B(M1,430.5γ)/B(E2,757.5γ)=1.5 *6* (2005Xi06).
2153.5[@] *9*	(14)	
2412.6[#] *6*	16$^-$	B(M1,330.9γ)/B(E2,761.3γ)=1.6 *6* (2005Xi06).
2508.6[@] *10*	(15)	
2752.5[#] *7*	17$^-$	
2990.8?[#] *8*	(18$^-$)	

[†] From least-squares fit to Eγ values. The level energies are with reference to the 89-keV level, kept as fixed with no uncertainty in the fitting procedure. Absolute uncertainty for each level is 12 keV, the same as that for 89-keV level.
[‡] As proposed by 2005Xi06 based on $\gamma\gamma(\theta)$ data and band assignments.
[#] Band(A): $\pi h_{9/2}\otimes\nu i_{13/2}$.
[@] Band(B): Band based on (11).

γ(^{190}Tl)

DCO=Iγ(±45°)/Iγ(90°); typical values of DCO were ≈1 and ≈0.7 for ΔJ=1 and stretched ΔJ=2 transitions, respectively.
Typical values of R(ADO) were 1.3 and 0.7 for stretched pure ΔJ=2 and stretched ΔJ=1 transitions, respectively.

E$_{\gamma}$[†]	I$_{\gamma}$[#]	E$_i$(level)	J$_i^{\pi}$	E$_f$	J$_f^{\pi}$	Mult.[@]	Comments
238.3[a] *5*	10.4 *31*	2990.8?	(18$^-$)	2752.5	17$^-$	D	R(ADO)=0.72 *18*.
250.9 *5*	12.2 *37*	1494.5	(12)	1243.6	(11)	D	R(ADO)=0.67 *27*.
272.3[‡] *1*	100 *5*	661.3	11$^-$	389.0	10$^-$	D	DCO=0.99 *12* E$_{\gamma}$: 272.4 (1981Kr20). R(ADO)=0.65 *6*.
280.5[‡] *1*	66.1 *33*	941.8	12$^-$	661.3	11$^-$	D	DCO=1.02 *12* E$_{\gamma}$: 280.5 (1981Kr20). R(ADO)=0.66 *8*.

Continued on next page (footnotes at end of table)

^{160}Gd(^{35}Cl,5nγ) 2005Xi06 (continued)

$\gamma(^{190}Tl)$ (continued)

E_γ[†]	I_γ[#]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[@]	Comments
327.1 *3*	26.1 *39*	1651.3	14^-	1324.2	13^-	D	DCO=1.04 *15* R(ADO)=0.64 *12*.
329.5[&] *3*	≤23.0[&]	1824.0	(13)	1494.5	(12)	(D)	R(ADO)=0.65 *26* for doublet.
329.5[&] *3*	≤23.0[&]	2153.5	(14)	1824.0	(13)	(D)	
330.9 *5*	6.8 *20*	2412.6	16^-	2081.7	15^-	D	R(ADO)=0.66 *18*.
336.1[a] *5*	≤5.0	661.3	11^-	325.2	9^-		
339.9 *5*	14.3 *43*	2752.5	17^-	2412.6	16^-	D	R(ADO)=0.67 *22*.
355.1 *5*	8.8 *26*	2508.6	(15)	2153.5	(14)	(D)	R(ADO)=0.6 *3*.
382.4[‡] *1*	41.5 *21*	1324.2	13^-	941.8	12^-	D	DCO=1.01 *15* E_γ: 382.2 (1981Kr20). R(ADO)=0.72 *9*.
430.5 *5*	14.7 *44*	2081.7	15^-	1651.3	14^-	D	DCO=0.99 *22* R(ADO)=0.71 *17*.
552.8 *1*	32.2 *16*	941.8	12^-	389.0	10^-	Q	DCO=0.70 *28* Additional information 2. R(ADO)=1.22 *17*.
582.3 *3*	15.7 *24*	1243.6	(11)	661.3	11^-	D	R(ADO)=0.67 *18*. Mult.: ΔJ=(0), dipole.
662.8 *3*	20.1 *30*	1324.2	13^-	661.3	11^-	Q	DCO=0.69 *20* R(ADO)=1.24 *16*.
670.8 *5*	10.7 *32*	2752.5	17^-	2081.7	15^-	Q	R(ADO)=1.22 *19*.
709.5 *1*	30.5 *15*	1651.3	14^-	941.8	12^-	Q	DCO=0.70 *20* R(ADO)=1.26 *16*.
757.5 *3*	18.6 *28*	2081.7	15^-	1324.2	13^-	Q	DCO=0.70 *21* R(ADO)=1.26 *17*.
761.3 *3*	17.3 *26*	2412.6	16^-	1651.3	14^-	Q	DCO=0.71 *21* R(ADO)=1.24 *17*.
854.5 *3*	15.4 *23*	1243.6	(11)	389.0	10^-	D	R(ADO)=0.70 *18*.

[†] ΔEγ=0.1-0.5 keV (authors′ note). Evaluators assign 0.1 keV for Iγ>30, 0.3 keV for Iγ=15-30 and 0.5 keV for Iγ<15 keV.

[‡] This γ also reported by 1981Kr20 in ^{168}Er(^{27}Al,5nγ); ^{169}Tm(^{25}Mg,4nγ); and ^{176}Hf(^{19}F,5nγ) in a 382.2 → 380.4 → 272.4 γ cascade.

[#] ΔIγ=5-30% (authors′ note). Evaluators assign 5% for Iγ>30, 15% keV for Iγ=15-30, and 30% for Iγ<15 keV.

[@] Assigned by the evaluators based on DCO and ADO ratios. Mult=Q indicates ΔJ=2, quadrupole (most likely E2), and mult=D indicates ΔJ=1, dipole, unless otherwise noted.

[&] Multiply placed with undivided intensity.

[a] Placement of transition in the level scheme is uncertain.

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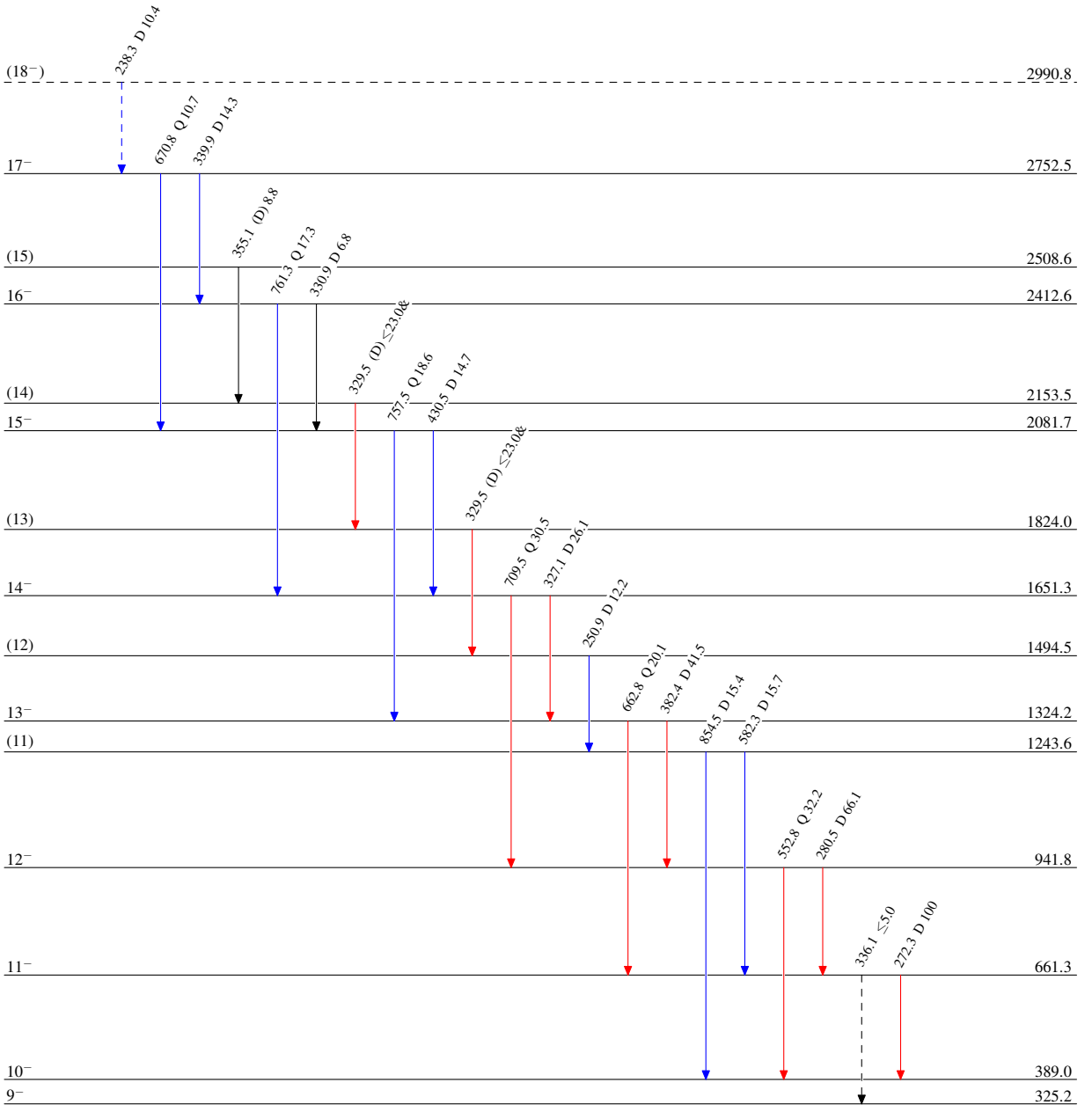
Level Scheme

Intensities: Relative I_γ

& 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)



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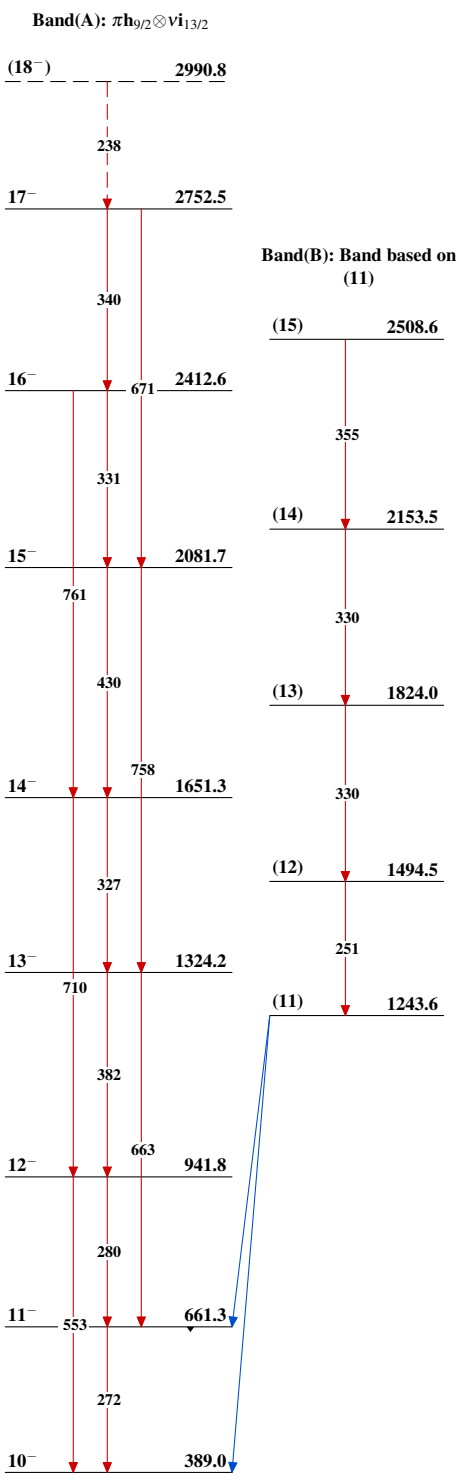

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