^{76}Ge(^{7}Li,3nγ) 2000Ra25

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh	NDS 105, 223 (2005)	22-Jun-2005

2000Ra25: E=32 MeV. Measured Eγ, Iγ, $\gamma\gamma$ and $\gamma\gamma(\theta)$(DCO), lifetimes (by DSA) using an array of twelve Compton-suppressed HPGe detectors besides fourteen BGO elements.

Other:

1979PiZR, 1979PiZQ, 1982PiZX: E=22-30 MeV; measured γ, $\gamma\gamma$, $\gamma(\theta)$ and excitation functions. The authors reported positive parity band based on configuration=((π g$_{9/2}$)(ν g$_{9/2}$)) but the detailed results are not available. High-spin levels at 2256, (11$^+$); 2942, (12$^+$) and 3210, (13$^+$) were proposed in this work in addition to many other levels reported in low-ion reactions: (p,nγ); (d,2nγ) and (α,pnγ) by 1984Do02.

^{80}Br Levels

E(level)[†]	J$^\pi$[‡]	T$_{1/2}$[#]	E(level)[†]	J$^\pi$[‡]	T$_{1/2}$[#]
0.0	1$^+$		1851.2[b] *3*	9$^-$	
37.0520 *20*	2$^-$		1954.3[c] *7*	(7$^-$,9$^-$)	
85.838 *6*	5$^-$		2001.69[a] *22*	(8$^+$,10$^+$)	
331.13[&] *10*	5$^+$		2256.96[&] *22*	11$^+$	0.35 ps *14*
357.31[@] *10*	6$^+$		2379.0 *7*		
379.91[b] *9*	6$^-$		2796.8[a] *4*	(9$^+$,11$^+$)	
447.91[&] *14*	7$^+$		2915.0[c] *8*	(9$^-$,11$^-$)	
615.41[@] *17*	8$^+$		2944.06[@] *22*	12$^+$	0.63 ps *+21−14*
774.27[b] *9*	7$^-$		3212.0 *4*		
1130.2[c] *6*	(5$^-$,7$^-$)		3605.0[&] *11*	(13$^+$)	
1140.98[&] *19*	9$^+$		3658.1 *7*		
1534.2[a] *3*	(7$^+$,9$^+$)		4450.1[@] *11*	(14$^+$)	
1588.05[@] *19*	10$^+$	0.76 ps *+27−21*			

[†] From least-squares fit to Eγ's.
[‡] From 'Adopted Levels' for low-lying states; from $\gamma\gamma(\theta)$ data and band assignments in 2000Ra25 for higher levels. In 'Adopted Levels levels', most of the spin-parity assignments are given in parentheses since strong arguments form their assignments are lacking.
[#] From Doppler-shift attenuation method (2000Ra25).
[@] Band(A): $\pi g_{9/2}\nu g_{9/2}$, α=0.
[&] Band(a): $\pi g_{9/2}\nu g_{9/2}$, α=1.
[a] Band(B): γ cascade based on (7$^+$,9$^+$).
[b] Band(C): γ cascade based on (6$^-$).
[c] Band(D): γ cascade based on (5$^-$,7$^-$).

γ(^{80}Br)

DCO ratios correspond to ΔJ=2 (E2) gated spectra, unless states otherwise.

E$_\gamma$[†]	I$_\gamma$	E$_i$(level)	J$_i^\pi$	E$_f$	J$_f^\pi$	Mult.[‡]	δ	Comments
26.18[#] *3*		357.31	6$^+$	331.13	5$^+$			
37.052[#] *2*		37.0520	2$^-$	0.0	1$^+$			
48.786[#] *5*		85.838	5$^-$	37.0520	2$^-$			
90.6 *1*	100 *8*	447.91	7$^+$	357.31	6$^+$	D(+Q)	−0.07 *+5−8*	DCO=0.49 *6*; 0.52 *3* (ΔJ=0 gated).

Continued on next page (footnotes at end of table)

^{76}Ge(^{7}Li,3nγ) 2000Ra25 (continued)

$\gamma(^{80}Br)$ (continued)

E_γ[†]	I_γ	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	δ	Comments
116.8 *10*	<1	447.91	7^+	331.13	5^+			
167.5 *1*	86 *7*	615.41	8^+	447.91	7^+	D(+Q)	−0.02 *4*	DCO=0.56 *5*; 0.56 *3* (ΔJ=0 gated).
245.3 *1*	95 *8*	331.13	5^+	85.838	5^-	D		DCO=1.04 *7*.
258.0 *10*	<1	615.41	8^+	357.31	6^+			
271.4 *3*	8.3 *12*	357.31	6^+	85.838	5^-	D		DCO=1.05 *13* (ΔJ=1 gated).
294.1 *1*	20.5 *24*	379.91	6^-	85.838	5^-	D+Q		DCO=0.71 *10*.
355.9 *6*	4.0 *9*	1130.2	$(5^-,7^-)$	774.27	7^-			Mult.: ΔJ=0, D or ΔJ=2, Q. DCO=1.02 *30*.
394.4 *1*	15.6 *19*	774.27	7^-	379.91	6^-	D+Q		DCO=1.15 *17*; 1.43 *18* (ΔJ=1 gated).
447.1 *1*	22.8 *25*	1588.05	10^+	1140.98	9^+	(M1(+E2))	−0.12 *+8−5*	DCO=0.53 *7* (ΔJ=0 gated); 0.80 *9* (ΔJ=1 gated).
467.4 *10*	2.7 *6*	2001.69	$(8^+,10^+)$	1534.2	$(7^+,9^+)$	(D+Q)		DCO=1≈(ΔJ=1 gated).
525.6 *1*	52 *5*	1140.98	9^+	615.41	8^+	D+Q	−0.15 *4*	DCO=0.46 *4* (ΔJ=0 gated); 0.84 *7* (ΔJ=1 gated).
668.9 *1*	18 *3*	2256.96	11^+	1588.05	10^+	D(+Q)	−0.04 *5*	DCO=0.52 *11*; 0.57 *8* (ΔJ=0 gated).
687 *1*	<1	2944.06	12^+	2256.96	11^+			
688.4 *1*	11.7 *20*	774.27	7^-	85.838	5^-	Q		DCO=1.10 *21*.
693.1 *10*	<1	1140.98	9^+	447.91	7^+			
714.0 *6*	4.1 *9*	3658.1		2944.06	12^+			
795.1 *3*	9.8 *18*	2796.8	$(9^+,11^+)$	2001.69	$(8^+,10^+)$	D+Q		DCO=1.09 *16* (ΔJ=1 gated).
824.2 *10*	2.8 *7*	1954.3	$(7^-,9^-)$	1130.2	$(5^-,7^-)$	(Q)		DCO=1.08 *32* (355.9 γ gated).
860.7 *1*	21 *3*	2001.69	$(8^+,10^+)$	1140.98	9^+	D+Q		DCO=0.95 *12* (ΔJ=1 gated).
918.8 *3*	7.0 *13*	1534.2	$(7^+,9^+)$	615.41	8^+	D+Q		DCO=0.55 *9* (ΔJ=0 gated).
955.0 *3*	7.9 *16*	3212.0		2256.96	11^+			
960.6 *10*	1.9 *7*	2915.0	$(9^-,11^-)$	1954.3	$(7^-,9^-)$			
972.6 *1*	22 *2*	1588.05	10^+	615.41	8^+	(E2)		DCO=0.94 *21*; 1.61 *16* (ΔJ=1 gated).
1063.8 *10*	2.7 *9*	2915.0	$(9^-,11^-)$	1851.2	9^-			Mult.: ΔJ=0, D or ΔJ=2, Q. DCO=0.99 *25*.
1076.9 *3*	9.9 *19*	1851.2	9^-	774.27	7^-	(Q)		DCO=0.94 *23*.
1086.3 *3*	7.4 *15*	1534.2	$(7^+,9^+)$	447.91	7^+			Mult.: ΔJ=0, D or ΔJ=2, Q. DCO=1.01 *17* (ΔJ=0 gated).
1116.0 *6*	5.2 *13*	2256.96	11^+	1140.98	9^+			
1180.0 *10*	3.6 *9*	1954.3	$(7^-,9^-)$	774.27	7^-			Mult.: ΔJ=0, D or ΔJ=2, Q. DCO=0.86 *24*.
1238.0 *6*	6.1 *13*	2379.0		1140.98	9^+			
1348 *1*	3.0 *7*	3605.0	(13^+)	2256.96	11^+			
1356.0 *1*	15.6 *25*	2944.06	12^+	1588.05	10^+	(E2)		DCO=1.06 *24*.
1506 *1*	2.1 *6*	4450.1	(14^+)	2944.06	12^+			

[†] Uncertainty assigned as 0.1 keV for Iγ≥10, 0.3 keV for Iγ=7-10; 0.6 keV for Iγ=4-7 and 1 keV for Iγ<4, based on a general comment by 2000Ra25.

[‡] Since γγ(θ) data are insensitive to determination of parity, the evaluator has assigned dipole or D+Q to ΔJ=1 or 0 transitions and Q to ΔJ=2 transitions, as indicated by DCO ratio. For levels where lifetimes are available, RUL is used to assign parity. The mult=D here refers to M1 or E1, μ<=D+Q to M1+E2 and mult=Q to E2 in 2000Ra25.

[#] From 'adopted gammas'.

^{76}Ge(^{7}Li,3nγ) 2000Ra25

Level Scheme

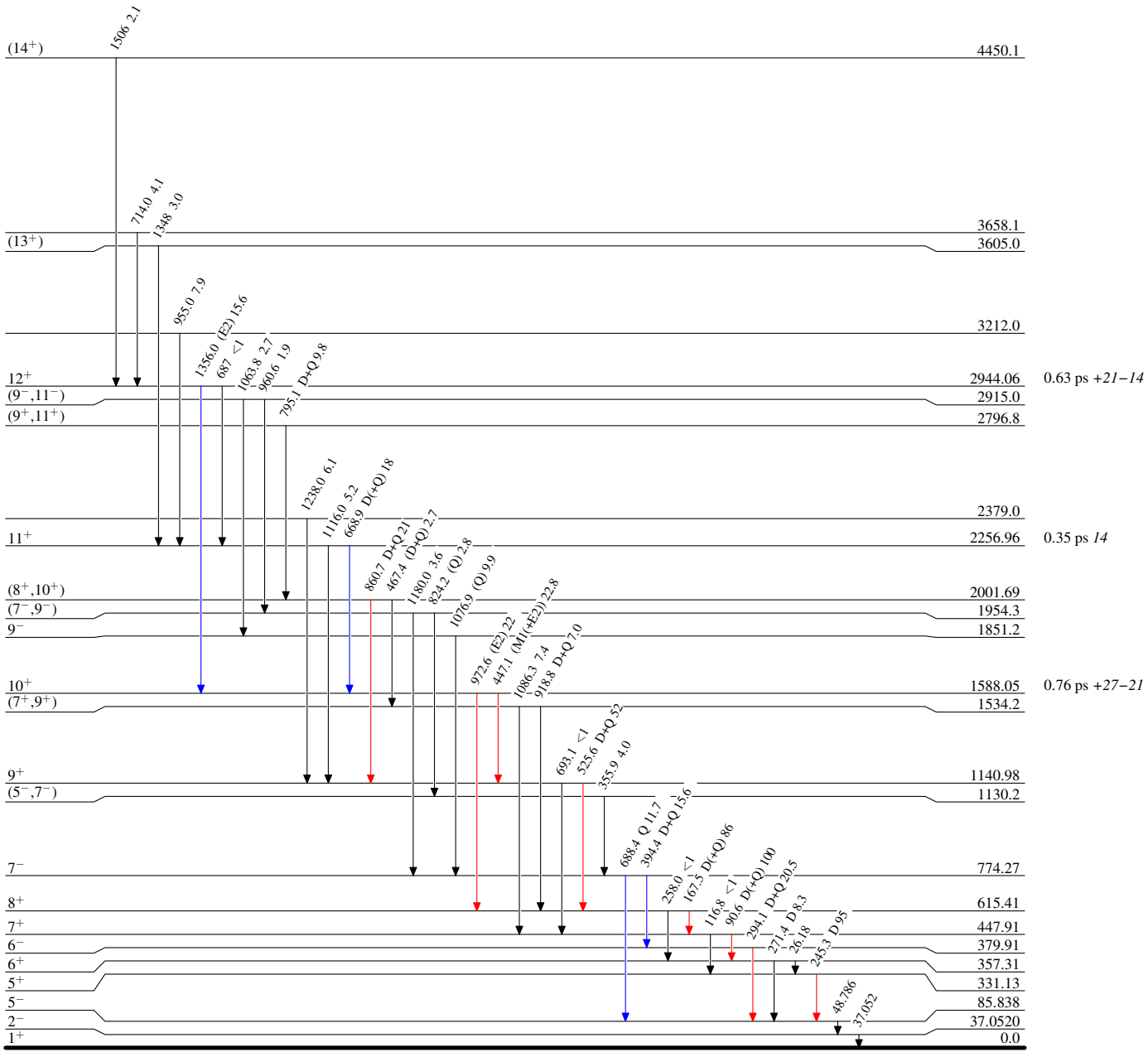
Intensities: Relative I_γ

Legend

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

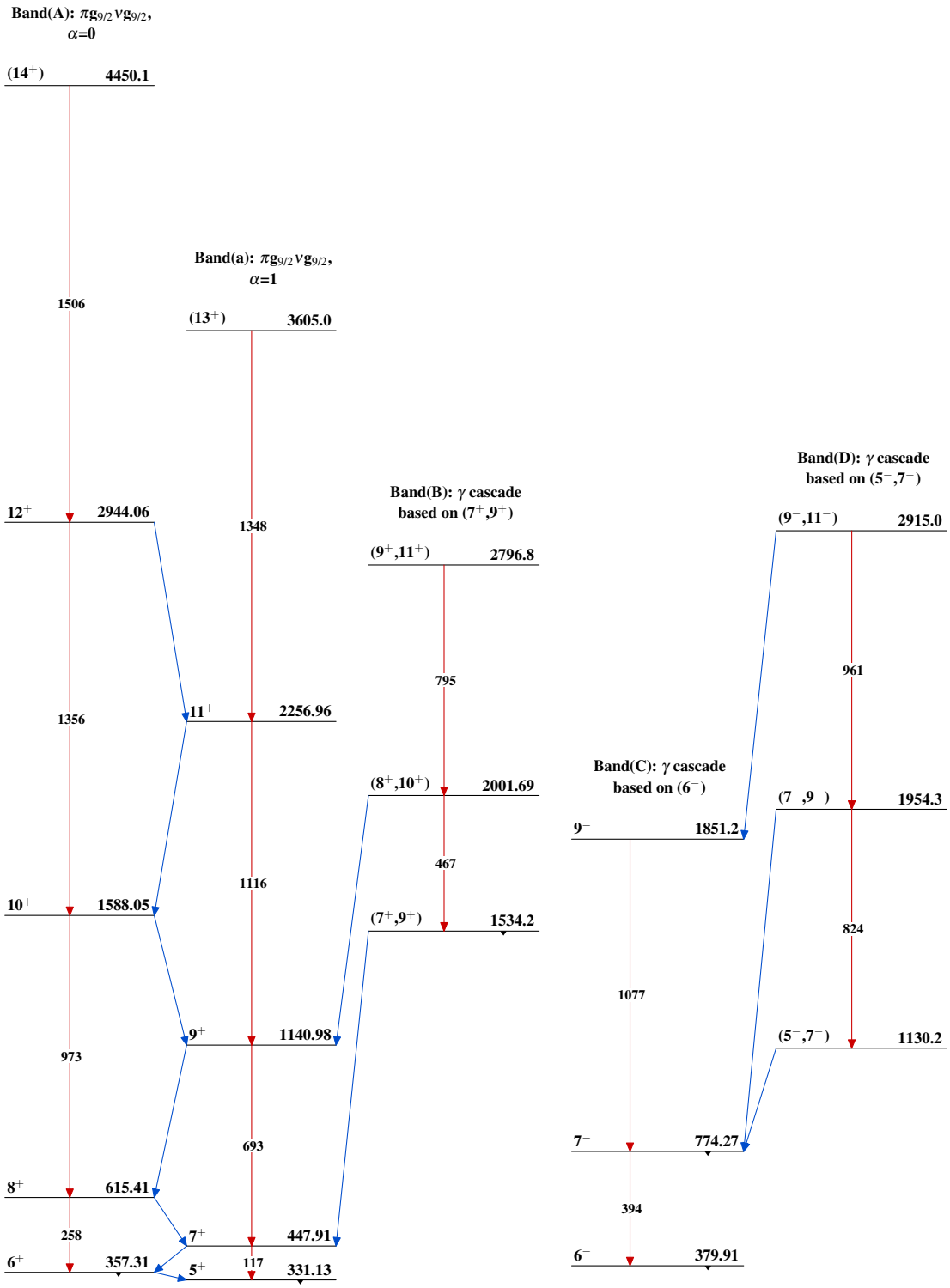
$I_\gamma < 10\% \times I_\gamma^{max}$

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



$^{80}_{35}Br_{45}$

^{76}Ge(^{7}Li,3nγ) 2000Ra25



$^{80}_{35}Br_{45}$