

$^{74}\text{Ge}(\text{n},\text{n}'\gamma)$ 2003Ko76,1987Do14,1970Ch15

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh, Ameenah R. Farhan		NDS 107, 1923 (2006)	30-Apr-2006

2003Ko76 (also 1996Ko41): measured $E\gamma$, $I\gamma$, $\gamma(\theta)$, excitation probabilities, lifetimes by DSA method.

1987Do14, 1988DoZU: fast neutron from a reactor, measured γ , $\gamma(\theta)$, lifetimes by DSA.

1970Ch15: $E=0.5\text{--}2.55$ MeV, measured γ , $\gamma(\theta)$ at 1.75, 2.13, 2.55 MeV.

Others: 1996Qu02, 1992Sk05, 1992Mu20, 1991Ej04, 1982Sh26, 1978Ef02, 1971Uh03, 1971Br18, 1961Ni03, 1959Ma05, 1957Si61.

All data are from 2003Ko76, unless otherwise stated.

WHF=Wolfenstein–Hauser–Feshbach analysis.

 ^{74}Ge Levels

E(level)	J^π [†]	$T_{1/2}$	Excitation probability	Comments
0.0	0^+			
595.89 7	2^+	$11.8^{\pm 3}_{-4}$ ps +11–10	53 3	
1204.30 7	2^+	$5.4^{\pm 3}_{-4}$ ps 8	19 1	
1463.70 9	4^+		6.0 3	
1482.76 12	0^+		4.2 1	
1697.20 9	$(3)^+$		6.8 3	
2165.36 10	$(3,4)^+$		2.1 2	J^π : 4^+ In 2003Ko76.
2198.01 9	2^+		3.6 2	
2227.01 10	0^+		1.1 1	
2536.53 11	3^-	0.24 ps +14–10	1.8 2	
2569.21 22	(6^+)		1.0 2	J^π : (4^+) In 2003Ko76.
2600.62 13	$(1,2,3)^+$	0.31 ps +12–10	1.3 1	J^π : 1^+ In 2003Ko76.
2670.00 12	4^+		1.0 1	
2693.87 10	$(3,4^+)$	0.052 ps +24–16	1.4 1	J^π : 2^+ In 2003Ko76.
2696.9 3	(2^+)		0.47 4	J^π : 5^+ In 2003Ko76.
2750.61 23	0^+		0.40 4	
2828.71 13	4^+		0.76 4	
2833.41 15	$(2)^+$	0.009 ps +4–3	1.10 4	
2856.04 25	0^+		0.30 4	
2878.14 17	(5^-)		0.25 3	
2925.56 16	$(3,4^+)$		0.58 3	J^π : 4^+ In 2003Ko76.
2935.42 13	3^-		0.56 5	J^π : 4^- In 2003Ko76.
2938.73 22	2^+	0.26 ps +15–7	0.60 5	J^π : 1^+ In 2003Ko76.
2949.15 11	(3^-)		0.76 4	J^π : 2^- In 2003Ko76.
2961.02 22	(5^-)		0.25 2	J^π : 0 In 2003Ko76.
2973.52 12	(3)		0.83 6	J^π : 2^+ In 2003Ko76.
2998.63 10	2^+		0.62 4	J^π : 1^+ In 2003Ko76.
3033.66 10	$(3,4^+)$	0.059 ps +10–7	0.70 4	J^π : 3 In 2003Ko76.
3048.90 21	4^+		0.50 3	
3059.7 10	$(2^+ \text{ to } 6^+)$		0.10 2	J^π : 6^+ In 2003Ko76.
3081.26 14	(3^+)	0.21 ps +7–5	0.71 4	J^π : 2^+ In 2003Ko76.
3104.57 13	5^-		0.24 3	
3117.82 17	$(3 \text{ to } 6)^-$		0.45 2	J^π : 4^- In 2003Ko76.
3139.32 22			0.07 1	J^π : 6^+ In 2003Ko76.
3140.57 11	3^-		0.60 5	
3175.36 10	3^-	0.097 ps +35–28	0.58 4	
3199.63 17	2^+	0.024 ps +8–4	0.40 3	J^π : 4^+ In 2003Ko76.

[†] From ‘Adopted Levels’.

[‡] DSA (1988DoZU).

$^{74}\text{Ge}(\text{n},\text{n}'\gamma)$ 2003Ko76,1987Do14,1970Ch15 (continued)

$\gamma(^{74}\text{Ge})$								
E_γ †	I_γ †	$E_i(\text{level})$	J_i^π	E_f	J_f^π	Mult. ‡	δ	Comments
182.4 2	0.40 2	3117.82	(3 to 6) ⁻	2935.42	3 ⁻			
233.4 1	0.10 1	1697.20	(3) ⁺	1463.70	4 ⁺			
468 1	≈0.2	2165.36	(3,4) ⁺	1697.20	(3) ⁺			
492.9 1	3.9 2	1697.20	(3) ⁺	1204.30	2 ⁺	M1+E2	+1.3 4	δ : from $A_2=+0.66$ 3 at $E(n)=2.13$ MeV (WHF) method (1970Ch15), δ sign given by (1970Ch15) is inconsistent with the phase convention used. $\delta=2.0$ +3-6 or 0.75 +15-6 from $A_2=+0.50$ 4, $A_4=+0.05$ 5 (WHF method, 1987Do14).
498 1	0.20 4	3033.66	(3,4) ⁺	2536.53	3 ⁻			
531.5 3	0.04 1	2696.9	(2) ⁺	2165.36	(3,4) ⁺			
544.8 2	0.06 2	3081.26	(3) ⁺	2536.53	3 ⁻			
595.9 1	100 5	595.89	2 ⁺	0.0	0 ⁺	E2		$A_2=+0.18$ 1 at $E(n)=1.75$ MeV, +0.16 1 at $E(n)=2.13$ MeV.
604 1	0.25 5	3140.57	3 ⁻	2536.53	3 ⁻			
608.4 1	18.2 3	1204.30	2 ⁺	595.89	2 ⁺	M1+E2	+2.2 3	δ : from $A_2=+0.18$ 4, $A_4=-0.04$ 5 using WHF method (1987Do14). $\delta=+2.2$ 3 or 0.0 1 (WHF method) and $\delta=+3$ 1 or +0.1 2 using population-parameter method (PPM) (1970Ch15), $A_2=+0.13$ 1, $A_4=-0.09$ 1 at $E(n)=1.75$ MeV. $A_2=+0.24$ 1 at $E(n)=2.13$ MeV (1970Ch15).
638.9 1	0.24 3	3175.36	3 ⁻	2536.53	3 ⁻			
663.2 2	0.20 2	3199.63	2 ⁺	2536.53	3 ⁻			
667.8 3	0.25 2	2833.41	(2) ⁺	2165.36	(3,4) ⁺			
701.5 2	1.4 2	2165.36	(3,4) ⁺	1463.70	4 ⁺			
712.8 2	0.15 2	2878.14	(5) ⁻	2165.36	(3,4) ⁺			
715.0 2	0.40 5	2198.01	2 ⁺	1482.76	0 ⁺			
734.2 2	0.15 2	2198.01	2 ⁺	1463.70	4 ⁺			
770 1	0.16 3	2935.42	3 ⁻	2165.36	(3,4) ⁺			
784.0 2	0.20 2	2949.15	(3) ⁻	2165.36	(3,4) ⁺			
808 1	0.20 4	2973.52	(3)	2165.36	(3,4) ⁺			
840 1	0.1	2536.53	3 ⁻	1697.20	(3) ⁺			
851 1	0.10 2	3048.90	4 ⁺	2198.01	2 ⁺			
867.8 1	8.9 3	1463.70	4 ⁺	595.89	2 ⁺			$A_2=+0.21$ 2 at $E(n)=1.75$ MeV, +0.27 1 at $E(n)=2.13$ MeV (1970Ch15).
883 1	0.20 2	3048.90	4 ⁺	2165.36	(3,4) ⁺			
886.8 1	4.6 1	1482.76	0 ⁺	595.89	2 ⁺			$A_2=0.0$ at $E(n)=2.13$ MeV.
939.2 1	0.16 2	3104.57	5 ⁻	2165.36	(3,4) ⁺			
942.5 2	0.07 1	3140.57	3 ⁻	2198.01	2 ⁺			
961.1 1	1.9 1	2165.36	(3,4) ⁺	1204.30	2 ⁺	(M1(+E2))	0.01 1	δ : from $A_2=+0.39$ 6, $A_4=-0.10$ 8 (WHF method, 1987Do14).
972 1	0.30 5	2670.00	4 ⁺	1697.20	(3) ⁺			
975 1	≈0.04	3140.57	3 ⁻	2165.36	(3,4) ⁺			
993.7 1	1.8 2	2198.01	2 ⁺	1204.30	2 ⁺			
999.8 5	0.40 4	2696.9	(2) ⁺	1697.20	(3) ⁺			
1021.9 1	0.30 3	2227.01	0 ⁺	1204.30	2 ⁺			E_γ : poor fit; level-energy difference=1022.7.
1101.3 1	5.1 2	1697.20	(3) ⁺	595.89	2 ⁺	M1+E2	+0.34 5	δ : from $A_2=+0.20$ 1 at $E(n)=2.13$ MeV (WHF) method (1970Ch15). $\delta=0.47$ 5 from $A_2=+0.26$ 4, $A_4=-0.05$ 5 (WHF) method (1987Do14).
1105.5 2	1.0 2	2569.21	(6) ⁺	1463.70	4 ⁺			

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$^{74}\text{Ge}(\text{n},\text{n}'\gamma)$ **2003Ko76,1987Do14,1970Ch15** (continued) $\gamma(^{74}\text{Ge})$ (continued)

$E_\gamma^\dagger$	$I_\gamma^\dagger$	$E_i(\text{level})$	J_i^π	E_f	J_f^π	Mult. ‡	δ	Comments
1131.5 1	0.76 4	2828.71	4 ⁺	1697.20	(3) ⁺			
1135.9 2	0.14 2	2833.41	(2) ⁺	1697.20	(3) ⁺			
1204.2 1	10 1	1204.30	2 ⁺	0.0	0 ⁺	E2		$A_2=+0.35$ 1 at $E(\text{n})=1.75$ MeV, $+0.28$ 1 at $E(\text{n})=2.13$ MeV (1970Ch15).
1206 1	0.3 1	2670.00	4 ⁺	1463.70	4 ⁺			
1228.3 2	0.48 3	2925.56	(3,4) ⁺	1697.20	(3) ⁺			
1233 1	0.03 1	2696.9	(2) ⁺	1463.70	4 ⁺			
1332.9 2	0.50 5	2536.53	3 ⁻	1204.30	2 ⁺			E_γ : poor fit; level-energy difference=1332.2.
1383.9 2	0.20 2	3081.26	(3) ⁺	1697.20	(3) ⁺			
1414.4 2	0.10 2	2878.14	(5 ⁻)	1463.70	4 ⁺			
1443.4 1	0.14 2	3140.57	3 ⁻	1697.20	(3) ⁺			
1471.7 1	0.40 4	2935.42	3 ⁻	1463.70	4 ⁺			
1478.0 2	0.09 2	3175.36	3 ⁻	1697.20	(3) ⁺			
1489.6 1	1.1 1	2693.87	(3,4) ⁺	1204.30	2 ⁺			
1509.8 1	0.38 3	2973.52	(3)	1463.70	4 ⁺			
1546.4 3	0.20 3	2750.61	0 ⁺	1204.30	2 ⁺			
1570.1 1	0.15 2	3033.66	(3,4) ⁺	1463.70	4 ⁺			
1596 1	0.10 2	3059.7	(2 ⁺ to 6 ⁺)	1463.70	4 ⁺			
1602.2 2	0.40 4	2198.01	2 ⁺	595.89	2 ⁺			
1617.6 2	0.45 4	3081.26	(3 ⁺)	1463.70	4 ⁺			
1631.9 1	0.8 10	2227.01	0 ⁺	595.89	2 ⁺			E_γ : poor fit; level-energy difference=1631.1.
1640.9 2	0.08 2	3104.57	5 ⁻	1463.70	4 ⁺			
1651.8 3	0.15 3	2856.04	0 ⁺	1204.30	2 ⁺			
1654.1 2	0.05 1	3117.82	(3 to 6) ⁻	1463.70	4 ⁺			
1675.6 2	0.07 1	3139.32		1463.70	4 ⁺			
1676.7 2	0.09 1	3140.57	3 ⁻	1463.70	4 ⁺			
1721.3 2	0.10 2	2925.56	(3,4) ⁺	1204.30	2 ⁺			
1744.7 2	0.10 2	2949.15	(3 ⁻)	1204.30	2 ⁺			
1756.7 2	0.25 2	2961.02	(5 ⁻)	1204.30	2 ⁺			
1794.3 1	0.12 2	2998.63	2 ⁺	1204.30	2 ⁺			
1829.8 1	0.30 2	3033.66	(3,4) ⁺	1204.30	2 ⁺			E_γ : poor fit; level-energy difference=1829.3.
1844.6 2	0.20 2	3048.90	4 ⁺	1204.30	2 ⁺			
1940.4 2	1.8 2	2536.53	3 ⁻	595.89	2 ⁺	D(+Q)	+0.02 2	δ : from $A_2=-0.19$ 4, $A_4=+0.03$ 6 (WHF method,1987Do14).
1971.0 2	0.05 1	3175.36	3 ⁻	1204.30	2 ⁺			
2004.7 1	1.3 1	2600.62	(1,2,3) ⁺	595.89	2 ⁺			
2074.1 1	0.40 4	2670.00	4 ⁺	595.89	2 ⁺			
2097.9 1	0.30 4	2693.87	(3,4) ⁺	595.89	2 ⁺			
2154.6 3	0.20 3	2750.61	0 ⁺	595.89	2 ⁺			
2198.2 2	0.9 1	2198.01	2 ⁺	0.0	0 ⁺			
2237.9 2	0.71 3	2833.41	(2) ⁺	595.89	2 ⁺			
2260.0 4	0.15 3	2856.04	0 ⁺	595.89	2 ⁺			
2342.8 2	0.60 5	2938.73	2 ⁺	595.89	2 ⁺			
2353.2 1	0.46 4	2949.15	(3 ⁻)	595.89	2 ⁺			
2402.7 1	0.40 3	2998.63	2 ⁺	595.89	2 ⁺			
2435.2 2	0.05 1	3033.66	(3,4) ⁺	595.89	2 ⁺			E_γ : poor fit; level-energy difference=2437.7.
2579.4 1	0.20 3	3175.36	3 ⁻	595.89	2 ⁺			
2603.6 2	0.20 2	3199.63	2 ⁺	595.89	2 ⁺			
2973.5 3	0.25 5	2973.52	(3)	0.0	0 ⁺			
2999 1	0.10 2	2998.63	2 ⁺	0.0	0 ⁺			

[†] From 2003Ko76, unless otherwise stated. Branching ratios for selected levels are given by 1970Ch15.[‡] From $\gamma(\theta)$ and $T_{1/2}(\text{level})$ (1970Ch15,1987Do14,1988DoZU).

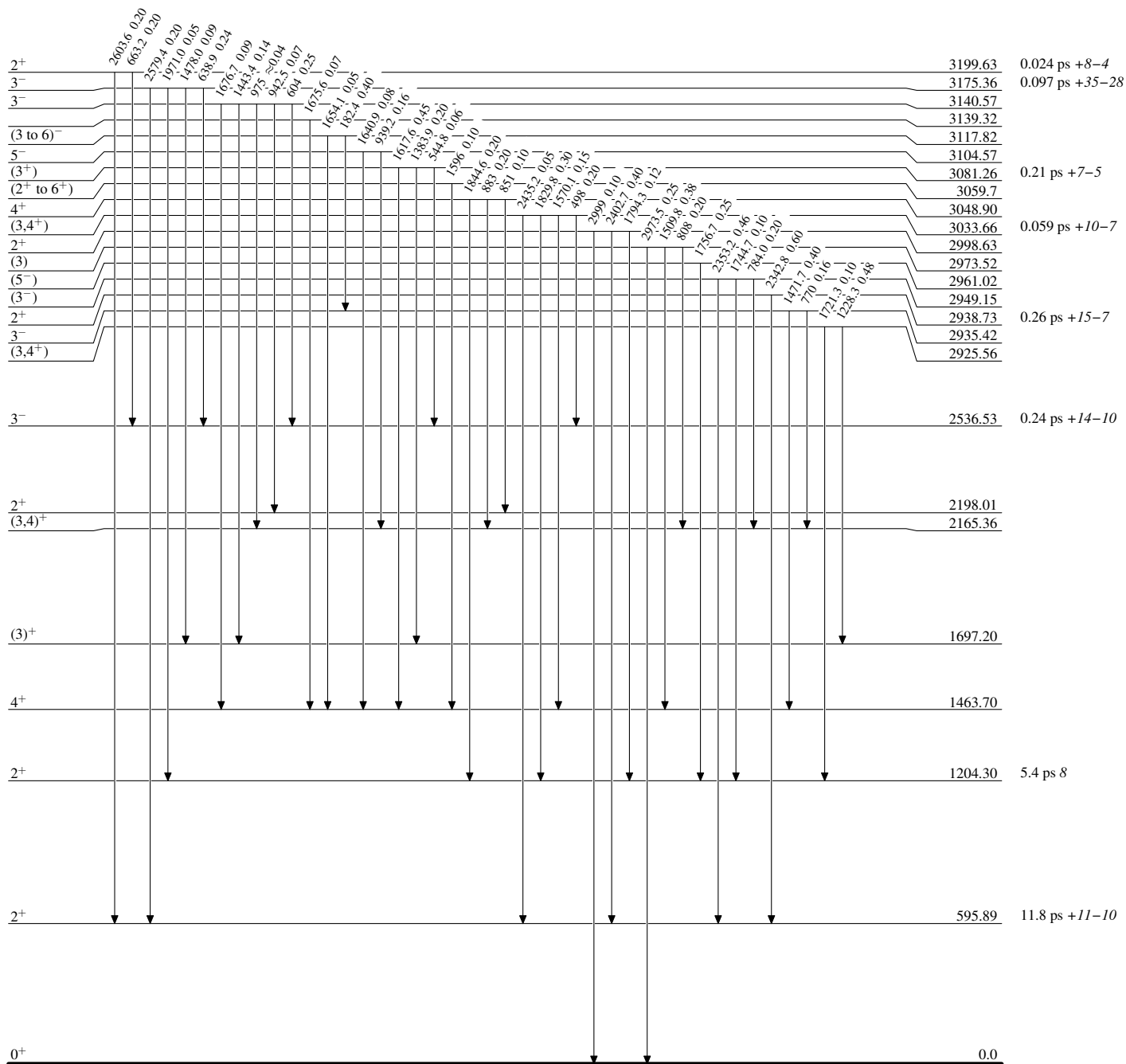
$^{74}\text{Ge}(\text{n},\text{n}'\gamma)$ 2003Ko76,1987Do14,1970Ch15

Level Scheme

Intensities: Relative I_γ

Legend

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

 $^{74}\text{Ge}_{42}$

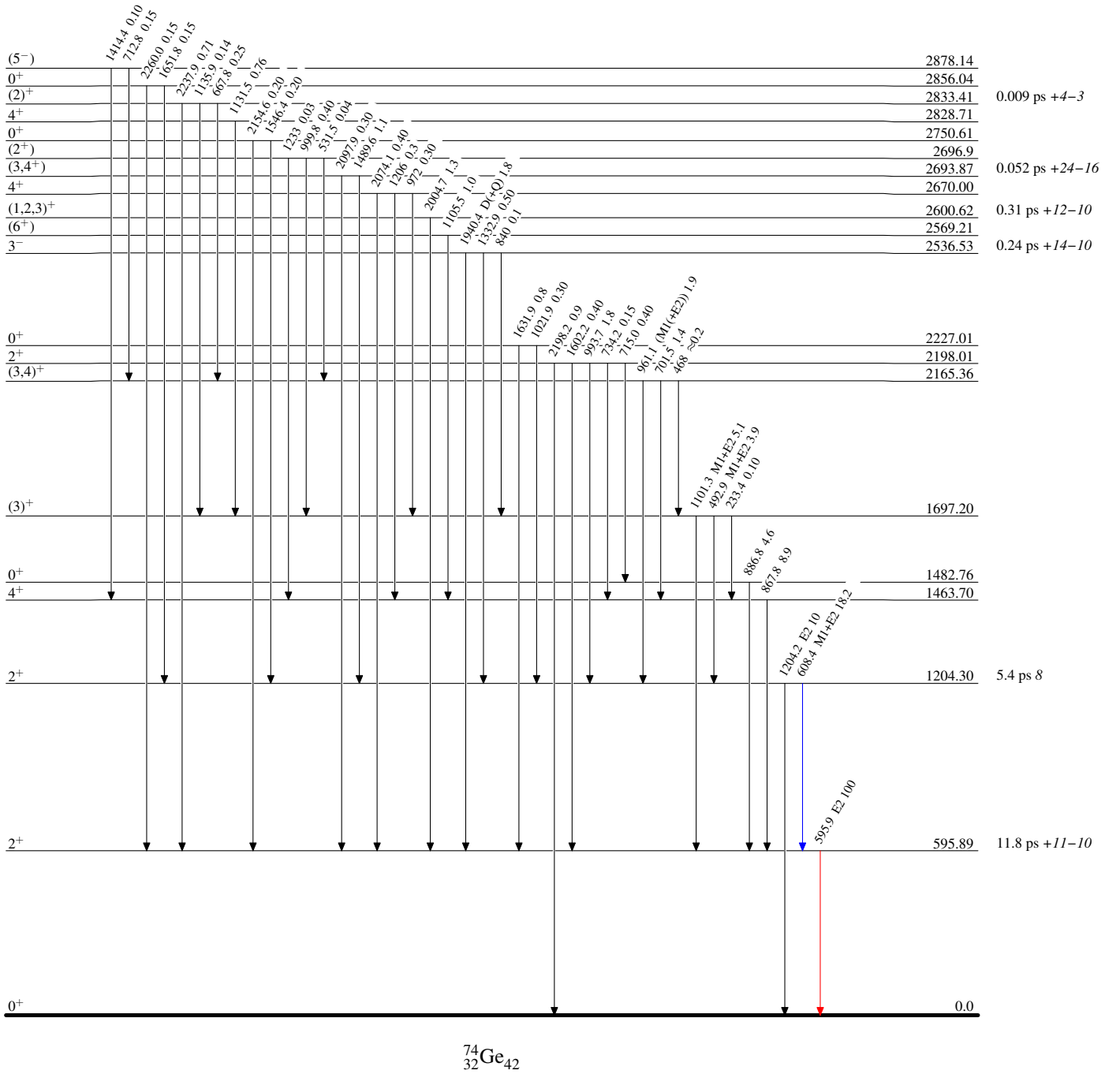
$^{74}\text{Ge}(\text{n},\text{n}'\gamma)$ 2003Ko76,1987Do14,1970Ch15

Level Scheme (continued)

Intensities: Relative I_γ

Legend

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

 $^{74}\text{Ge}_{42}$