

$^{76}\text{Ge}(^{18}\text{O},4n\gamma)$  1985Wa09

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	S. K. Basu, E. A. McCutchan		NDS 165,1 (2020)	1-Mar-2020

1985Wa09: E( $^{18}\text{O}$ )=40-80 MeV. Measured excit,  $\gamma\gamma$  coin,  $\gamma(\theta)$ ,  $\gamma$ -ray linear polarizations, DSA and recoil distance. Ge detectors.  
 $\alpha$ : [Additional information 1](#).

 $^{90}\text{Zr}$  Levels

E(level) <sup>†</sup>	J <sup>π</sup> <sup>‡</sup>	T <sub>1/2</sub> <sup>#</sup>	E(level) <sup>†</sup>	J <sup>π</sup> <sup>‡</sup>	T <sub>1/2</sub> <sup>#</sup>
0	0 <sup>+</sup>		6769.50 19	(12 <sup>+</sup> )	
1760.69 20	0 <sup>+</sup>		6953.96 7	(11) <sup>-</sup>	<28 ps
2186.285 8	2 <sup>+</sup>		7008.63 7	(11) <sup>-</sup>	
2319.002 8	5 <sup>-</sup>		7025.61 7	(10) <sup>+</sup>	
2739.29 5	4 <sup>-</sup>		7194.36 7	(11) <sup>+</sup>	<28 ps
2747.839 24	3 <sup>-</sup>		7223.91 7	(12) <sup>+</sup>	59 ps 10
3076.899 11	4 <sup>+</sup>		7437.84 8	(13) <sup>+</sup>	2.9 ps 5
3448.193 10	6 <sup>+</sup>		8058.42 11	(14) <sup>+</sup>	0.28 ps 14
3589.446 10	8 <sup>+</sup>		8958.13 23	(15) <sup>-</sup>	0.5 ps 3
5164.463 18	(8 <sup>+</sup> )		9707.0? 3	(16) <sup>-</sup>	0.49 ps 14
5247.498 23	9 <sup>+</sup>	<28 ps	9836.0 3	(15) <sup>+</sup>	
5644.04 5	10 <sup>+</sup>	<28 ps	10125.8 3	(16) <sup>+</sup>	0.62 ps 21
5792.07 3	9 <sup>(+)</sup>		10764.97 8	(17) <sup>+</sup>	0.14 ps 14
6279.69 11	(11) <sup>+</sup>		11403.9 11	(18) <sup>+</sup>	0.21 ps 11
6376.12 9	10 <sup>(-)</sup>	<28 ps	12110.8 11	(19) <sup>+</sup>	0.14 ps 5
6721.11 9	(10) <sup>-</sup>		12964.8 12	(20)	<0.35 ps

<sup>†</sup> From a least-squares fit to E $\gamma$ , by evaluators.

<sup>‡</sup> From 1985Wa09 based on  $\gamma(\theta)$ , linear polarization and RUL assuming J(initial)≥J(final) and using systematics for the alignment coefficients.

<sup>#</sup> From DSA and RDM (1985Wa09).

<sup>76</sup>Ge(<sup>18</sup>O,4n $\gamma$ ) **1985Wa09** (continued)

									$\gamma(^{90}\text{Zr})$		
$E_\gamma$	$I_\gamma^\dagger$	$E_i(\text{level})$	$J_i^\pi$	$E_f$	$J_f^\pi$	Mult. $^\ddagger$	$\delta^\ddagger$	$\alpha$	Comments		
29.57 8	14.5 20	7223.91	(12) <sup>+</sup>	7194.36	(11) <sup>+</sup>	(M1)		6.74 11	$\alpha(\text{K})=5.90$ 10; $\alpha(\text{L})=0.702$ 12; $\alpha(\text{M})=0.1222$ 20; $\alpha(\text{N})=0.0172$ 3; $\alpha(\text{O})=0.001165$ 19 $I_\gamma$ : From E. Warburton, priv. comm. Mult.: No polarization data available. Mult. is from intensity arguments ( $\alpha$ for E1 and M1 are 3.7 and 6.8, respectively). Absence of E2 admixture is from RUL.		
54.66 5	2.15 30	7008.63	(11) <sup>-</sup>	6953.96	(11) <sup>-</sup>				Mult.: $A_2=-0.016$ 4 (1985Wa09). $I_\gamma$ : From E. Warburton, priv. comm. $A_2=+0.076$ 16 (1985Wa09).		
132.717 <sup>@</sup> 3	16.5 10	2319.002	5 <sup>-</sup>	2186.285	2 <sup>+</sup>				$A_2=+0.001$ 1, $A_4=+0.001$ 1 (1985Wa09). $A_2=-0.003$ 12 (1985Wa09).		
<sup>x</sup> 134.34 3	4.0 7										
141.252 <sup>@</sup> 2	260 10	3589.446	8 <sup>+</sup>	3448.193	6 <sup>+</sup>	E2		0.316	$\alpha(\text{K})=0.268$ 4; $\alpha(\text{L})=0.0401$ 6; $\alpha(\text{M})=0.00699$ 10; $\alpha(\text{N})=0.000938$ 14; $\alpha(\text{O})=4.52\times 10^{-5}$ 7 $I_\gamma$ : Unresolved from impurity line. From intensity balance at the 3448 level, using $\alpha(\text{exp})=0.32$ for 141 $\gamma$ . Mult.: $A_2=+0.023$ 3, $A_4=-0.007$ 3, Pol= $+0.032$ 3 (1985Wa09).		
168.760 4	30.8 10	7194.36	(11) <sup>+</sup>	7025.61	(10) <sup>+</sup>	M1+E2		0.107 59	$\alpha(\text{K})=0.092$ 50; $\alpha(\text{L})=0.0124$ 75; $\alpha(\text{M})=0.0022$ 13; $\alpha(\text{N})=3.0\times 10^{-4}$ 18; $\alpha(\text{O})=1.64\times 10^{-5}$ 80 Mult.: $A_2=-0.030$ 2, $A_4=0.000$ 2, Pol= $-0.022$ 8 (1985Wa09).		
213.93 4	177 6	7437.84	(13) <sup>+</sup>	7223.91	(12) <sup>+</sup>	M1+E2	-0.07 3	0.0264 5	$\alpha(\text{K})=0.0232$ 4; $\alpha(\text{L})=0.00265$ 5; $\alpha(\text{M})=0.000461$ 8; $\alpha(\text{N})=6.53\times 10^{-5}$ 12; $\alpha(\text{O})=4.55\times 10^{-6}$ 7 Mult., $\delta$ : $A_2=-0.032$ 2, $A_4=+0.002$ 2, Pol= $-0.019$ 4 (1985Wa09).		
215.27 4	37.2 30	7223.91	(12) <sup>+</sup>	7008.63	(11) <sup>-</sup>				Mult., $\delta$ : $A_2=-0.037$ 9 (1985Wa09).		
269.93 5	78.5 25	7223.91	(12) <sup>+</sup>	6953.96	(11) <sup>-</sup>	E1(+M2)	-0.02 3	0.00651 16	$\alpha(\text{K})=0.00575$ 14; $\alpha(\text{L})=0.000638$ 17; $\alpha(\text{M})=0.000110$ 3; $\alpha(\text{N})=1.55\times 10^{-5}$ 5; $\alpha(\text{O})=1.06\times 10^{-6}$ 3 Mult., $\delta$ : $A_2=-0.026$ 1, Pol= $+0.036$ 6 (1985Wa09).		
287.55 7	18.0 5	7008.63	(11) <sup>-</sup>	6721.11	(10) <sup>-</sup>	M1+E2	-0.07 5	0.01235 21	$\alpha(\text{K})=0.01087$ 19; $\alpha(\text{L})=0.001231$ 23; $\alpha(\text{M})=0.000214$ 4; $\alpha(\text{N})=3.03\times 10^{-5}$ 6; $\alpha(\text{O})=2.13\times 10^{-6}$ 4 Mult., $\delta$ : $A_2=-0.035$ 2, Pol= $-0.035$ 12 (1985Wa09).		
289.83 6	22.3 9	10125.8	(16) <sup>+</sup>	9836.0	(15) <sup>+</sup>	M1(+E2)	-0.01 6	0.01205 18	$\alpha(\text{K})=0.01061$ 16; $\alpha(\text{L})=0.001199$ 19; $\alpha(\text{M})=0.000208$ 4; $\alpha(\text{N})=2.96\times 10^{-5}$ 5; $\alpha(\text{O})=2.07\times 10^{-6}$ 3 Mult., $\delta$ : $A_2=-0.025$ 3, Pol= $-0.030$ 14 (1985Wa09).		
329.059 <sup>&amp;</sup> 25	$\approx 0.58$	3076.899	4 <sup>+</sup>	2747.839	3 <sup>-</sup>						
337.65 <sup>&amp;</sup> 20	$\approx 0.12$	3076.899	4 <sup>+</sup>	2739.29	4 <sup>-</sup>						
345.24 20	8.6 7	6721.11	(10) <sup>-</sup>	6376.12	10 <sup>(-)</sup>				$A_2=+0.040$ 3, $A_4=0.000$ 3 (1985Wa09).		
371.295 <sup>@</sup> 7	6.1 5	3448.193	6 <sup>+</sup>	3076.899	4 <sup>+</sup>	E2		0.01064	$\alpha(\text{K})=0.00930$ 13; $\alpha(\text{L})=0.001119$ 16; $\alpha(\text{M})=0.000194$ 3; $\alpha(\text{N})=2.71\times 10^{-5}$ 4; $\alpha(\text{O})=1.712\times 10^{-6}$ 24 Mult.: $A_2=+0.027$ 5, $A_4=+0.004$ 5 (1985Wa09).		

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<sup>76</sup>Ge(<sup>18</sup>O,4n $\gamma$ ) **1985Wa09** (continued)

$\gamma(^{90}\text{Zr})$  (continued)

$E_\gamma$	$I_\gamma^\dagger$	$E_i(\text{level})$	$J_i^\pi$	$E_f$	$J_f^\pi$	Mult. <sup>‡</sup>	$\delta^\ddagger$	$\alpha$	Comments
420.29 <sup>&amp;</sup> 5	$\approx 0.12$	2739.29	4 <sup>-</sup>	2319.002	5 <sup>-</sup>				
425.59 <sup>&amp;</sup> 20	$\approx 0.14$	2186.285	2 <sup>+</sup>	1760.69	0 <sup>+</sup>				
<sup>x</sup> 429.9 8	13.2 10					M1		0.00457	$\alpha(\text{K})=0.00403$ 6; $\alpha(\text{L})=0.000451$ 7; $\alpha(\text{M})=7.83\times 10^{-5}$ 12; $\alpha(\text{N})=1.112\times 10^{-5}$ 17; $\alpha(\text{O})=7.86\times 10^{-7}$ 12 Mult.: $A_2=-0.033$ 4, Pol= $-0.025$ 8 ( <b>1985Wa09</b> ).
441.42 <sup>#b</sup> 13	$\leq 1^\#$	6721.11	(10 <sup>-</sup> )	6279.69	(11) <sup>+</sup>				
<sup>x</sup> 484.75 25	24.2 10					M1		0.00344	$\alpha(\text{K})=0.00303$ 5; $\alpha(\text{L})=0.000338$ 5; $\alpha(\text{M})=5.86\times 10^{-5}$ 9; $\alpha(\text{N})=8.33\times 10^{-6}$ 12; $\alpha(\text{O})=5.90\times 10^{-7}$ 9 Mult.: $A_2=-0.017$ 10, Pol= $-0.004$ 7 ( <b>1985Wa09</b> ).
489.81 15	12.0 5	6769.50	(12 <sup>+</sup> )	6279.69	(11) <sup>+</sup>	(M1+E2)	$-0.26$ 6	0.00342 6	$\alpha(\text{K})=0.00302$ 5; $\alpha(\text{L})=0.000337$ 6; $\alpha(\text{M})=5.86\times 10^{-5}$ 11; $\alpha(\text{N})=8.31\times 10^{-6}$ 15; $\alpha(\text{O})=5.85\times 10^{-7}$ 10 Mult., $\delta$ : $A_2=-0.062$ 5, $A_4=+0.014$ 5, Pol= $-0.005$ 7 ( <b>1985Wa09</b> ).
<sup>x</sup> 516.40 25	9.4 10					M1		0.00296	$\alpha(\text{K})=0.00261$ 4; $\alpha(\text{L})=0.000290$ 4; $\alpha(\text{M})=5.04\times 10^{-5}$ 7; $\alpha(\text{N})=7.17\times 10^{-6}$ 10; $\alpha(\text{O})=5.08\times 10^{-7}$ 8 Mult.: $A_2=-0.039$ 6, Pol= $-0.018$ 10 ( <b>1985Wa09</b> ).
561.55 <sup>&amp;</sup> 5	$\approx 0.55$	2747.839	3 <sup>-</sup>	2186.285	2 <sup>+</sup>				
584.04 <sup>#</sup> 8	$\#$	6376.12	10 <sup>(-)</sup>	5792.07	9 <sup>(+)</sup>				$I_\gamma$ : 14 +10-4. Pol= $-0.027$ 10.
620.58 8	148 5	8058.42	(14) <sup>+</sup>	7437.84	(13) <sup>+</sup>	M1+E2	$-0.14$ 5	0.00194	$\alpha(\text{K})=0.001712$ 25; $\alpha(\text{L})=0.000190$ 3; $\alpha(\text{M})=3.29\times 10^{-5}$ 5; $\alpha(\text{N})=4.68\times 10^{-6}$ 7; $\alpha(\text{O})=3.32\times 10^{-7}$ 5 Mult., $\delta$ : $A_2=-0.039$ 4, Pol= $-0.015$ 2 ( <b>1985Wa09</b> ).
639.0 <sup>a</sup> 8	44 <sup>a</sup> 10	10764.97	(17 <sup>+</sup> )	10125.8	(16) <sup>+</sup>	(M1+E2)		0.00194 14	$\alpha(\text{K})=0.00171$ 12; $\alpha(\text{L})=0.000192$ 16; $\alpha(\text{M})=3.3\times 10^{-5}$ 3; $\alpha(\text{N})=4.7\times 10^{-6}$ 4; $\alpha(\text{O})=3.27\times 10^{-7}$ 18 Mult., $\delta$ : $A_2=-0.046$ 5, Pol= $-0.017$ 7 ( <b>1985Wa09</b> ) for doublet.
639.0 <sup>a</sup> 8	38 <sup>a</sup> 10	11403.9	(18 <sup>+</sup> )	10764.97	(17 <sup>+</sup> )	(M1+E2)		0.00194 14	$\alpha(\text{K})=0.00171$ 12; $\alpha(\text{L})=0.000192$ 16; $\alpha(\text{M})=3.3\times 10^{-5}$ 3; $\alpha(\text{N})=4.7\times 10^{-6}$ 4; $\alpha(\text{O})=3.27\times 10^{-7}$ 18 Mult., $\delta$ : $A_2=-0.046$ 5, Pol= $-0.017$ 7 ( <b>1985Wa09</b> ) for doublet.
706.8 3	20.5 20	12110.8	(19 <sup>+</sup> )	11403.9	(18 <sup>+</sup> )	(M1(+E2))	$-0.3$ 5	0.00145 5	$\alpha(\text{K})=0.00128$ 4; $\alpha(\text{L})=0.000142$ 6; $\alpha(\text{M})=2.46\times 10^{-5}$ 10; $\alpha(\text{N})=3.50\times 10^{-6}$ 14; $\alpha(\text{O})=2.48\times 10^{-7}$ 7 Mult., $\delta$ : $A_2=-0.080$ 60, Pol= $+0.010$ 12 ( <b>1985Wa09</b> ).

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<sup>76</sup>Ge(<sup>18</sup>O,4n $\gamma$ ) 1985Wa09 (continued)

$\gamma(^{90}\text{Zr})$  (continued)

$E_\gamma$	$I_\gamma^\dagger$	$E_i(\text{level})$	$J_i^\pi$	$E_f$	$J_f^\pi$	Mult. <sup>‡</sup>	$\delta^\ddagger$	$\alpha$	Comments
<sup>x</sup> 713.05 20	13.6 5					M1		$1.41 \times 10^{-3}$	$\alpha(\text{K})=0.001247$ 18; $\alpha(\text{L})=0.0001375$ 20; $\alpha(\text{M})=2.39 \times 10^{-5}$ 4; $\alpha(\text{N})=3.39 \times 10^{-6}$ 5; $\alpha(\text{O})=2.42 \times 10^{-7}$ 4 Mult.: $A_2=+0.012$ 4, $A_4=+0.005$ 4, $\text{Pol}=-0.022$ 19 (1985Wa09).
748.87 <sup>b</sup> 20	16.0 8	9707.0?	(16 <sup>-</sup> )	8958.13	(15) <sup>-</sup>	(M1(+E2))	-0.15 15	$1.27 \times 10^{-3}$ 2	$\alpha(\text{K})=0.001119$ 17; $\alpha(\text{L})=0.0001234$ 19; $\alpha(\text{M})=2.14 \times 10^{-5}$ 4; $\alpha(\text{N})=3.04 \times 10^{-6}$ 5; $\alpha(\text{O})=2.17 \times 10^{-7}$ 4 Mult., $\delta$ : $A_2=-0.056$ 5, $\text{Pol}=-0.000$ 20 (1985Wa09).
757.78 <sup>&amp;</sup> 20 818.23 5	$\approx 0.18$ 69.2 20	3076.899 7194.36	4 <sup>+</sup> (11) <sup>+</sup>	2319.002 6376.12	5 <sup>-</sup> 10 <sup>(-)</sup>	E1(+M2)	-0.02 4	$4.30 \times 10^{-4}$ 10	$\alpha(\text{K})=0.000380$ 9; $\alpha(\text{L})=4.15 \times 10^{-5}$ 10; $\alpha(\text{M})=7.18 \times 10^{-6}$ 16; $\alpha(\text{N})=1.019 \times 10^{-6}$ 23; $\alpha(\text{O})=7.20 \times 10^{-8}$ 16 Mult., $\delta$ : $A_2=-0.026$ 3, $A_4=0.0004$ , $\text{Pol}=+0.031$ 3 (1985Wa09).
834.51 <sup>#b</sup> 8 854.0 3 890.613 <sup>@</sup> 10	<2 <sup>#</sup> 14 4 8.3 5	8058.42 12964.8 3076.899	(14) <sup>+</sup> (20) 4 <sup>+</sup>	7223.91 12110.8 2186.285	(12) <sup>+</sup> (19) <sup>+</sup> 2 <sup>+</sup>	E2		$8.82 \times 10^{-4}$	Pol= $+0.040$ 20 (1985Wa09). $\alpha(\text{K})=0.000777$ 11; $\alpha(\text{L})=8.69 \times 10^{-5}$ 13; $\alpha(\text{M})=1.507 \times 10^{-5}$ 22; $\alpha(\text{N})=2.13 \times 10^{-6}$ 3 $\alpha(\text{O})=1.479 \times 10^{-7}$ 21 Mult.: $A_2=+0.015$ 4, $A_4=-0.002$ 4 (1985Wa09).
899.71 20	92.7 30	8958.13	(15) <sup>-</sup>	8058.42	(14) <sup>+</sup>	E1(+M2)	-0.07 7	0.00036 3	$\alpha(\text{K})=0.000321$ 23; $\alpha(\text{L})=3.5 \times 10^{-5}$ 3; $\alpha(\text{M})=6.0 \times 10^{-6}$ 5; $\alpha(\text{N})=8.6 \times 10^{-7}$ 7; $\alpha(\text{O})=6.1 \times 10^{-8}$ 5 Mult., $\delta$ : $A_2=-0.034$ 2, $\text{Pol}=+0.043$ 15 (1985Wa09).
928.9 <sup>#b</sup> 7 929.03 <sup>#b</sup> 9 1032.19 10	<2.5 <sup>#</sup> $\leq 2$ <sup>#</sup> 22.0 9	10764.97 6721.11 6279.69	(17) <sup>+</sup> (10) <sup>-</sup> (11) <sup>+</sup>	9836.0 5792.07 5247.498	(15) <sup>+</sup> 9 <sup>(+)</sup> 9 <sup>+</sup>	E2		$6.24 \times 10^{-4}$	$\alpha(\text{K})=0.000551$ 8; $\alpha(\text{L})=6.11 \times 10^{-5}$ 9; $\alpha(\text{M})=1.060 \times 10^{-5}$ 15; $\alpha(\text{N})=1.502 \times 10^{-6}$ 21 $\alpha(\text{O})=1.050 \times 10^{-7}$ 15 Mult.: $A_2=+0.030$ 3, $A_4=-0.012$ 3, $\text{Pol}=+0.061$ 14 (1985Wa09).
1077.06 <sup>#b</sup> 8 1128.2 7 1129.182 <sup>@</sup> 10	$\leq 2$ <sup>#</sup> 50 6 340 12	6721.11 6376.12 3448.193	(10) <sup>-</sup> 10 <sup>(-)</sup> 6 <sup>+</sup>	5644.04 5247.498 2319.002	10 <sup>+</sup> 9 <sup>+</sup> 5 <sup>-</sup>	E1		$2.41 \times 10^{-4}$	$\alpha(\text{K})=0.000203$ 3; $\alpha(\text{L})=2.20 \times 10^{-5}$ 3; $\alpha(\text{M})=3.81 \times 10^{-6}$ 6; $\alpha(\text{N})=5.42 \times 10^{-7}$ 8;

<sup>76</sup>Ge(<sup>18</sup>O,4n $\gamma$ ) 1985Wa09 (continued)

$\gamma(^{90}\text{Zr})$  (continued)

$E_\gamma$	$I_\gamma^\dagger$	$E_i(\text{level})$	$J_i^\pi$	$E_f$	$J_f^\pi$	Mult. <sup>‡</sup>	$\delta^\ddagger$	$\alpha$	Comments
1167.70 20	39.0 16	10125.8	(16) <sup>+</sup>	8958.13	(15) <sup>-</sup>	E1(+M2)	-0.02 5	2.42×10 <sup>-4</sup> 5	$\alpha(\text{K})=0.000203$ 3; $\alpha(\text{L})=2.20\times 10^{-5}$ 3; $\alpha(\text{M})=3.81\times 10^{-6}$ 6; $\alpha(\text{N})=5.42\times 10^{-7}$ 8; $\alpha(\text{O})=3.85\times 10^{-8}$ 6 Mult.: $A_2=-0.020$ 1, $A_4=+0.001$ 2, Pol=+0.022 3 (1985Wa09).
1233.54 10	5.5 8	7025.61	(10) <sup>+</sup>	5792.07	9 <sup>(+)</sup>				$\alpha(\text{K})=0.000191$ 5; $\alpha(\text{L})=2.07\times 10^{-5}$ 5; $\alpha(\text{M})=3.59\times 10^{-6}$ 9; $\alpha(\text{N})=5.10\times 10^{-7}$ 12; $\alpha(\text{O})=3.63\times 10^{-8}$ 9 Mult., $\delta$ : $A_2=-0.028$ 4, Pol=+0.037 4 (1985Wa09).
1270.422@ 15	5.2 4	3589.446	8 <sup>+</sup>	2319.002	5 <sup>-</sup>				$A_2=-0.029$ 4, $A_4=-0.001$ 4 (1985Wa09).
1278.1#b 10	<1.5#	11403.9	(18) <sup>+</sup>	10125.8	(16) <sup>+</sup>				$A_2=+0.044$ 15.
1288.90#b 21	<2#	8058.42	(14) <sup>+</sup>	6769.50	(12) <sup>+</sup>				
1309.83 7	79.6 24	6953.96	(11) <sup>-</sup>	5644.04	10 <sup>+</sup>	E1(+M2)	+0.02 2	2.90×10 <sup>-4</sup> 5	$\alpha(\text{K})=0.0001560$ 23; $\alpha(\text{L})=1.687\times 10^{-5}$ 25; $\alpha(\text{M})=2.92\times 10^{-6}$ 5; $\alpha(\text{N})=4.15\times 10^{-7}$ 7; $\alpha(\text{O})=2.96\times 10^{-8}$ 5 Mult., $\delta$ : $A_2=-0.0258$ 6, $A_4=-0.0004$ 6, Pol=+0.032 4 (1985Wa09).
1345.9#b 8	<2#	12110.8	(19) <sup>+</sup>	10764.97	(17) <sup>+</sup>				
1364.73 20	13.2 5	7008.63	(11) <sup>-</sup>	5644.04	10 <sup>+</sup>	(E1(+M2))	-0.01 2	3.12×10 <sup>-4</sup>	$\alpha(\text{K})=0.0001452$ 21; $\alpha(\text{L})=1.569\times 10^{-5}$ 23; $\alpha(\text{M})=2.72\times 10^{-6}$ 4; $\alpha(\text{N})=3.86\times 10^{-7}$ 6; $\alpha(\text{O})=2.75\times 10^{-8}$ 4 Mult., $\delta$ : $A_2=-0.024$ 3, $A_4=0.004$ 4, Pol=+0.008 10 (1985Wa09).
1381.8 3	1.90 20	7025.61	(10) <sup>+</sup>	5644.04	10 <sup>+</sup>				$A_2=+0.008$ 20, $A_4=-0.019$ 30 (1985Wa09).
1402.27#b 7	<1#	7194.36	(11) <sup>+</sup>	5792.07	9 <sup>(+)</sup>				
1473.65 20	3.9 4	6721.11	(10) <sup>-</sup>	5247.498	9 <sup>+</sup>				$A_2=-0.004$ 6, $A_4=-0.004$ 6 (1985Wa09).
1520.29#b 22	<1#	8958.13	(15) <sup>-</sup>	7437.84	(13) <sup>+</sup>				
1550.3 3	3.50 30	7194.36	(11) <sup>+</sup>	5644.04	10 <sup>+</sup>	D			$A_2=-0.071$ 7, $A_4=-0.004$ 7 (1985Wa09).
1556.63#b 9	$\leq 1.5\#$	6721.11	(10) <sup>-</sup>	5164.463	(8) <sup>+</sup>				
1560.8#b 5	<1.5#	12964.8	(20)	11403.9	(18) <sup>+</sup>				
1575.009@ 20	3.0 5	5164.463	(8) <sup>+</sup>	3589.446	8 <sup>+</sup>				
1580.0 3	2.00 20	7223.91	(12) <sup>+</sup>	5644.04	10 <sup>+</sup>	(E2)		3.70×10 <sup>-4</sup>	$\alpha(\text{K})=0.000225$ 4; $\alpha(\text{L})=2.45\times 10^{-5}$ 4; $\alpha(\text{M})=4.25\times 10^{-6}$ 6; $\alpha(\text{N})=6.04\times 10^{-7}$ 9; $\alpha(\text{O})=4.29\times 10^{-8}$ 6 Mult.: $A_2=+0.048$ 14, $A_4=-0.018$ 18 (1985Wa09).
1658.035@ 20	95 5	5247.498	9 <sup>+</sup>	3589.446	8 <sup>+</sup>	E2(+M1)	+14 14	3.80×10 <sup>-4</sup> 17	$\alpha(\text{K})=0.000205$ 8; $\alpha(\text{L})=2.23\times 10^{-5}$ 7;

<sup>76</sup>Ge(<sup>18</sup>O,4n $\gamma$ ) **1985Wa09** (continued)

$\gamma(^{90}\text{Zr})$  (continued)

$E_\gamma$	$I_\gamma^\dagger$	$E_i(\text{level})$	$J_i^\pi$	$E_f$	$J_f^\pi$	Mult. <sup>‡</sup>	$\delta^\ddagger$	$\alpha$	Comments
									$\alpha(\text{M})=3.86\times 10^{-6}$ 13; $\alpha(\text{N})=5.49\times 10^{-7}$ 19; $\alpha(\text{O})=3.91\times 10^{-8}$ 17 I $\gamma$ : Unresolved from impurity lines. I $\gamma$ is from intensity balance. Mult., $\delta$ : A <sub>2</sub> =+0.004 4, A <sub>4</sub> =+0.030 5, Pol=+0.007 5 (1985Wa09).
1716.248 <sup>@</sup> 20	4.0 7	5164.463	(8 <sup>+</sup> )	3448.193	6 <sup>+</sup>				
1777.6 <sup>#</sup> 3	$\approx 22.3^\#$	9836.0	(15) <sup>+</sup>	8058.42	(14) <sup>+</sup>				A <sub>2</sub> =-0.022 2, A <sub>4</sub> =+0.002 2, Pol=+0.033 10 (1985Wa09).
1778.10 <sup>#</sup> 7	19.8 <sup>#</sup> 20	7025.61	(10) <sup>+</sup>	5247.498	9 <sup>+</sup>				A <sub>2</sub> =-0.022 3, A <sub>4</sub> =+0.002 2, Pol=+0.033 10 (1985Wa09).
1806.7 <sup>#b</sup> 8	<2 <sup>#</sup>	10764.97	(17) <sup>+</sup>	8958.13	(15) <sup>-</sup>				
1861.4 3	5.30 25	7025.61	(10) <sup>+</sup>	5164.463	(8 <sup>+</sup> )	(E2)		4.26 $\times 10^{-4}$	$\alpha(\text{K})=0.0001642$ 23; $\alpha(\text{L})=1.785\times 10^{-5}$ 25; $\alpha(\text{M})=3.09\times 10^{-6}$ 5; $\alpha(\text{N})=4.40\times 10^{-7}$ 7; $\alpha(\text{O})=3.14\times 10^{-8}$ 5 Mult.: A <sub>2</sub> =+0.028 10, A <sub>4</sub> =-0.006 12 (1985Wa09).
2054.55 5	130 4	5644.04	10 <sup>+</sup>	3589.446	8 <sup>+</sup>	E2		4.88 $\times 10^{-4}$	$\alpha(\text{K})=0.0001368$ 20; $\alpha(\text{L})=1.484\times 10^{-5}$ 21; $\alpha(\text{M})=2.57\times 10^{-6}$ 4; $\alpha(\text{N})=3.66\times 10^{-7}$ 6; $\alpha(\text{O})=2.62\times 10^{-8}$ 4 Mult.: A <sub>2</sub> =+0.0321 5, A <sub>4</sub> =-0.0102 5, Pol=+0.044 7 (1985Wa09).
2067.4 <sup>#b</sup> 3	<2 <sup>#</sup>	10125.8	(16) <sup>+</sup>	8058.42	(14) <sup>+</sup>				
2186.254 <sup>@</sup> 10	69.6 20	2186.285	2 <sup>+</sup>	0	0 <sup>+</sup>	E2		5.36 $\times 10^{-4}$	$\alpha(\text{K})=0.0001223$ 18; $\alpha(\text{L})=1.325\times 10^{-5}$ 19; $\alpha(\text{M})=2.29\times 10^{-6}$ 4; $\alpha(\text{N})=3.27\times 10^{-7}$ 5; $\alpha(\text{O})=2.34\times 10^{-8}$ 4 Mult.: A <sub>2</sub> =+0.002 2, A <sub>4</sub> =-0.003 2 (1985Wa09).
2202.60 3	25.5 10	5792.07	9 <sup>(+)</sup>	3589.446	8 <sup>+</sup>	(M1+E2)	-0.07 4	5.03 $\times 10^{-4}$	$\alpha(\text{K})=0.0001227$ 18; $\alpha(\text{L})=1.327\times 10^{-5}$ 19; $\alpha(\text{M})=2.30\times 10^{-6}$ 4; $\alpha(\text{N})=3.28\times 10^{-7}$ 5; $\alpha(\text{O})=2.36\times 10^{-8}$ 4 Mult., $\delta$ : A <sub>2</sub> =-0.034 3, A <sub>4</sub> =-0.004 3, Pol=+0.004 17 (1985Wa09).
2318.968 <sup>@</sup> 10	306 8	2319.002	5 <sup>-</sup>	0	0 <sup>+</sup>				
2747.6 <sup>&amp;</sup> 3	$\approx 0.03$	2747.839	3 <sup>-</sup>	0	0 <sup>+</sup>				

<sup>†</sup> From  $\gamma$ -ray data at E(<sup>18</sup>O)=60 MeV, except as noted.

<sup>‡</sup> From  $\gamma(\theta)$ ;  $\delta$  assumes given spin combinations.

<sup>#</sup> E $\gamma$  deduced from level energy difference, I $\gamma$  estimated.

<sup>@</sup> E $\gamma$  from <sup>90</sup>Nb  $\epsilon$  decay (1982Wa24).

<sup>&</sup> E $\gamma$  from <sup>90</sup>Nb  $\epsilon$  decay (1982Wa24), I $\gamma$  estimated.

$^{76}\text{Ge}(^{18}\text{O},4n\gamma)$  1985Wa09 (continued)

$\gamma(^{90}\text{Zr})$  (continued)

- <sup>a</sup> Multiply placed with intensity suitably divided.  
<sup>b</sup> Placement of transition in the level scheme is uncertain.  
<sup>x</sup>  $\gamma$  ray not placed in level scheme.

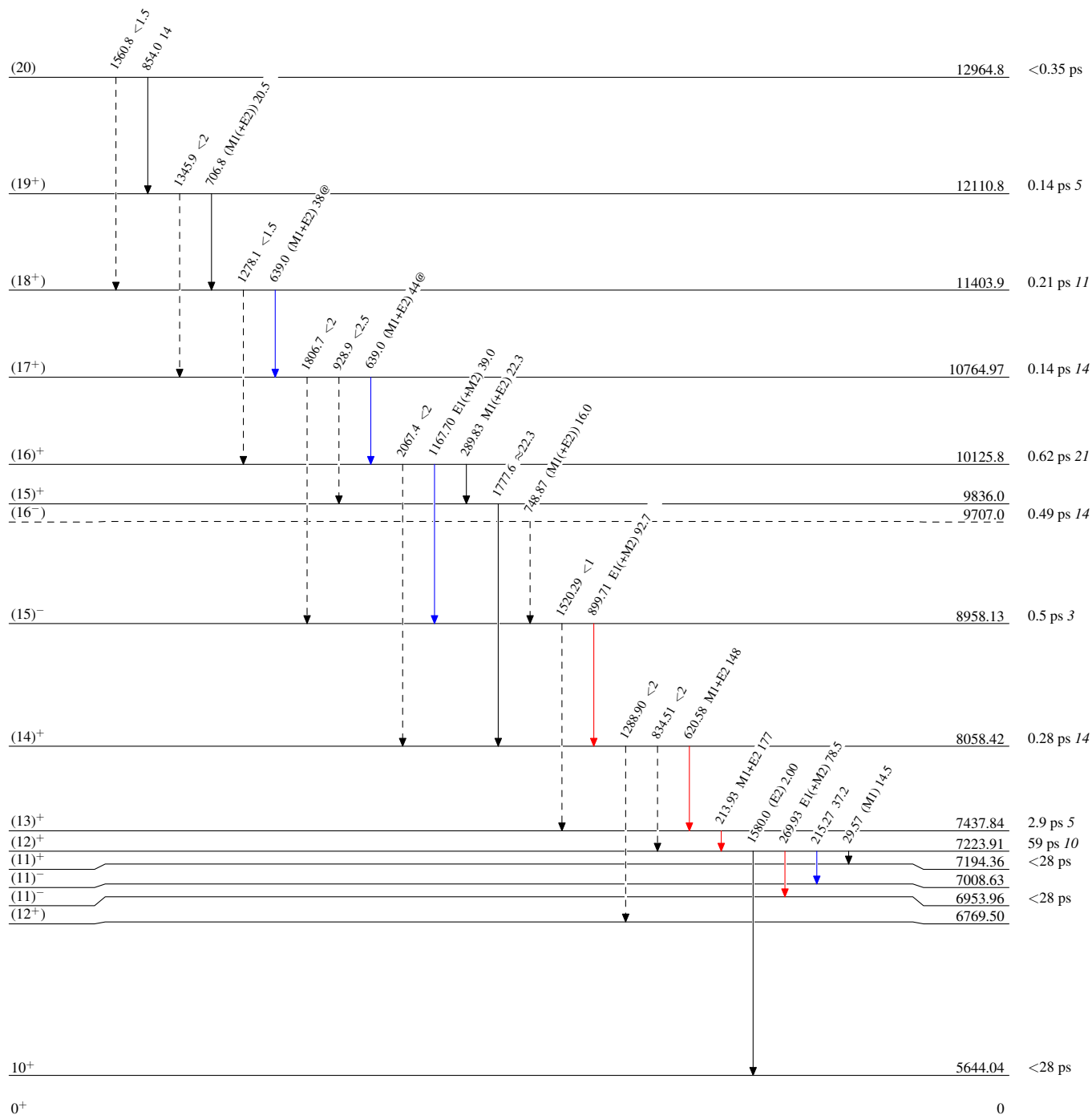
$^{76}\text{Ge}(^{18}\text{O},4n\gamma)$  1985Wa09

Level Scheme

Intensities: Relative  $I_\gamma$   
 @ Multiply placed: intensity suitably divided

Legend

- ▶  $I_\gamma < 2\% \times I_\gamma^{\text{max}}$
- ▶  $I_\gamma < 10\% \times I_\gamma^{\text{max}}$
- ▶  $I_\gamma > 10\% \times I_\gamma^{\text{max}}$
- - - -▶  $\gamma$  Decay (Uncertain)





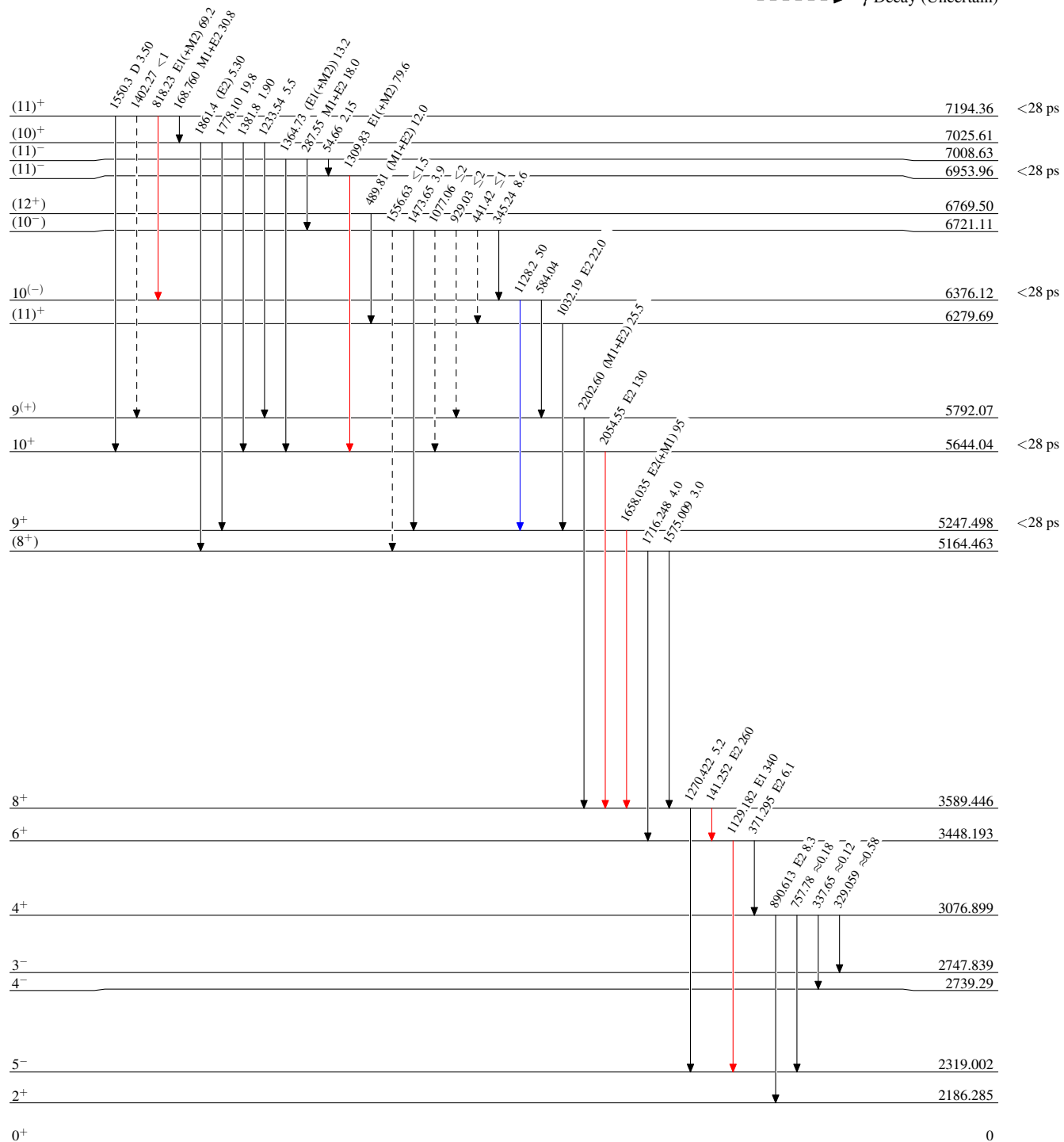
<sup>76</sup>Ge(18O,4nγ) 1985Wa09

Level Scheme (continued)

Intensities: Relative I<sub>γ</sub>  
 @ Multiply placed: intensity suitably divided

Legend

- I<sub>γ</sub> < 2% × I<sub>γ</sub><sup>max</sup>
- I<sub>γ</sub> < 10% × I<sub>γ</sub><sup>max</sup>
- I<sub>γ</sub> > 10% × I<sub>γ</sub><sup>max</sup>
- - - - - γ Decay (Uncertain)



$^{76}\text{Ge}(^{18}\text{O},4n\gamma)$  1985Wa09

## Level Scheme (continued)

Intensities: Relative  $I_\gamma$   
 @ Multiply placed: intensity suitably divided

## Legend

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

