

¹⁹²Os(¹⁴C,4n γ) 1995Ba70

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	F. G. Kondev	NDS 196,342 (2024)	1-Sep-2023

1995Ba70: E=76 MeV provided by the VICKSI accelerator at HMI Berlin. Target: 99.0% enriched, 100 mg/cm² thick. Measured E γ , I γ , $\gamma\gamma$, $\gamma\gamma(\theta)$ (DCO) using the OSIRIS array consisting of 12 Ge detectors.

²⁰²Pb Levels

E(level) [†]	J π [‡]	T _{1/2} [#]	Comments
2169.83 8	9 ⁻	3.54 h 2	Additional information 1. E(level),J π : From Adopted Levels.
3057.8 4	11 ⁻		
3191.5 4	10 ⁺		
3237.6 5	12 ⁺	24.2 ns 3	
3328.8 6	12		
3955.4 6	13 ⁺		
4023.1 7			
4068.7 7	13		
4091.2 7	14 ⁺		
4091.2+x	16 ⁺	106 ns 3	Additional information 2.
4091.2+y [@]			Additional information 3.
4170.6 6	14 ⁺		
4252.7+y [@] 5			
4323.1+x 4	15		
4445.6+x 4	16 ⁺		
4452.8+x 6	16		
4496.0+y [@] 7			
4828.9+y [@] 9			
5236.5+y [@] 10			
5242.4+x 4	17 ⁻		
5251.7+x 5	18 ⁺		
5251.7+u	19 ⁻	108 ns 3	Additional information 4. This level de-excites to the 5242.5+x keV, 17 ⁻ and the 5251.7+x-keV, 18 ⁺ levels via yet unobserved low-energy γ -ray transitions.
5454.5+u 5	(18 ⁻)		
5703.0+y [@] 11			
5941.2+u 5	(20 ⁻)		
6092.4+u 5	21 ⁻		
6092.4+w? ^{&}			Additional information 5.
6220.7+y [@] 12			
6275.4+w? ^{&} 5			
6515.5+w? ^{&} 7			
6811.8+w? ^{&} 9			
7173.7+w? ^{&} 10			
7593.2+w? ^{&} 11			
8080.4+w? ^{&} 12			

[†] From a least-squares fit to E γ by assuming $\Delta E\gamma=0.5$ keV, unless otherwise stated.

[‡] From 1995Ba70, unless otherwise stated.

[#] From Adopted Levels.

[@] Band(A): Magnetic-Rotation Band 1.

¹⁹²Os(¹⁴C,4n γ) **1995Ba70 (continued)**

²⁰²Pb Levels (continued)

& Band(B): Magnetic-Rotation Band 2. Tentatively assigned to ²⁰²Pb because the coincidence relations were ambiguous. Not observed by 2000Go47 in ¹⁹⁸Pt(⁹Be,5n).

<u>$\gamma(^{202}\text{Pb})$</u>									
<u>Eγ[†]</u>	<u>Iγ[†]</u>	<u>E_i(level)</u>	<u>Jπ_i</u>	<u>E_f</u>	<u>Jπ_f</u>	<u>Mult.[‡]</u>	<u>α[#]</u>	<u>I_(γ+ce)[†]</u>	<u>Comments</u>
46.0		3237.6	12 ⁺	3191.5	10 ⁺	E2	240.8 34		α (L)=179.6 25; α (M)=47.2 7 α (N)=11.87 17; α (O)=2.101 29; α (P)=0.0718 10
122.5		4445.6+x	16 ⁺	4323.1+x	15	D			
129.7		4452.8+x	16	4323.1+x	15	D			
161.5		4252.7+y		4091.2+y		M1(+E2)	1.7 7	100 19	ce(K)/(γ +ce)=0.42 19; ce(L)/(γ +ce)=0.16 5; ce(M)/(γ +ce)=0.039 14 ce(N)/(γ +ce)=0.010 4; ce(O)/(γ +ce)=0.0018 6; ce(P)/(γ +ce)=1.3×10 ⁻⁴ 5 α (K)=1.1 8; α (L)=0.41 8; α (M)=0.104 25 α (N)=0.026 6; α (O)=0.0049 9; α (P)=0.00035 8
179.8	99.8 9	3237.6	12 ⁺	3057.8	11 ⁻	E1	0.1014 14		α (K)=0.0821 12; α (L)=0.01475 21; α (M)=0.00346 5 α (N)=0.000869 12; α (O)=0.0001666 23; α (P)=1.433×10 ⁻⁵ 20
183.0		6275.4+w?		6092.4+w?		M1(+E2)	1.1 5	100 23	ce(K)/(γ +ce)=0.37 17; ce(L)/(γ +ce)=0.122 33; ce(M)/(γ +ce)=0.030 9 ce(N)/(γ +ce)=0.0077 23; ce(O)/(γ +ce)=0.0014 4; ce(P)/(γ +ce)=1.1×10 ⁻⁴ 4 α (K)=0.8 6; α (L)=0.260 24; α (M)=0.065 9 α (N)=0.0164 23; α (O)=0.00309 29; α (P)=2.3×10 ⁻⁴ 7
202.7	4.2 8	5454.5+u	(18 ⁻)	5251.7+u	19 ⁻	(M1+E2)	0.8 4		α (K)=0.6 4; α (L)=0.180 4; α (M)=0.0446 32 α (N)=0.0113 8; α (O)=0.00214 5; α (P)=1.7×10 ⁻⁴ 6
215.0	2.5 5	4170.6	14 ⁺	3955.4	13 ⁺	M1(+E2)	0.7 4		α (K)=0.5 4; α (L)=0.147 4; α (M)=0.0362 12 α (N)=0.00917 27; α (O)=0.00174 5; α (P)=1.4×10 ⁻⁴ 5
231.8	14.3 19	4323.1+x	15	4091.2+x	16 ⁺	D			
240.1		6515.5+w?		6275.4+w?		M1(+E2)	0.51 28	92 11	ce(K)/(γ +ce)=0.25 13; ce(L)/(γ +ce)=0.067 14; ce(M)/(γ +ce)=0.0164 31 ce(N)/(γ +ce)=0.0041 8; ce(O)/(γ +ce)=0.00079 16; ce(P)/(γ +ce)=6.6×10 ⁻⁵ 29 α (K)=0.38 27; α (L)=0.101 10; α (M)=0.0247 12 α (N)=0.00626 32; α (O)=0.00120 11; α (P)=1.0×10 ⁻⁴ 4
243.3		4496.0+y		4252.7+y		M1(+E2)	0.49 27	83 12	ce(K)/(γ +ce)=0.24 13;

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¹⁹²Os(¹⁴C,4n γ) **1995Ba70 (continued)**

$\gamma(^{202}\text{Pb})$ (continued)

E_γ^\dagger	I_γ^\dagger	$E_i(\text{level})$	J_i^π	E_f	J_f^π	Mult. ‡	$\alpha^\#$	$I_{(\gamma+ce)}^\dagger$	Comments
									ce(L)/($\gamma+ce$)=0.065 13; ce(M)/($\gamma+ce$)=0.0158 30 ce(N)/($\gamma+ce$)=0.0040 8; ce(O)/($\gamma+ce$)=0.00077 16; ce(P)/($\gamma+ce$)=6.4 $\times 10^{-5}$ 29 $\alpha(K)$ =0.36 26; $\alpha(L)$ =0.096 10; $\alpha(M)$ =0.0236 13 $\alpha(N)$ =0.00598 35; $\alpha(O)$ =0.00114 12; $\alpha(P)$ =1.0 $\times 10^{-4}$ 4
271.1 296.3	11.3 17	3328.8 6811.8+w?	12	3057.8 6515.5+w?	11 ⁻	D M1(+E2)	0.28 16	72 12	ce(K)/($\gamma+ce$)=0.17 10; ce(L)/($\gamma+ce$)=0.040 10; ce(M)/($\gamma+ce$)=0.0096 20 ce(N)/($\gamma+ce$)=0.0024 5; ce(O)/($\gamma+ce$)=0.00047 12; ce(P)/($\gamma+ce$)=4.2 $\times 10^{-5}$ 20 $\alpha(K)$ =0.21 15; $\alpha(L)$ =0.051 11; $\alpha(M)$ =0.0123 21 $\alpha(N)$ =0.0031 5; $\alpha(O)$ =0.00060 13; $\alpha(P)$ =5.3 $\times 10^{-5}$ 25
332.9		4828.9+y		4496.0+y		M1(+E2)	0.20 12	46 7	ce(K)/($\gamma+ce$)=0.13 8; ce(L)/($\gamma+ce$)=0.029 8; ce(M)/($\gamma+ce$)=0.0071 18 ce(N)/($\gamma+ce$)=0.0018 5; ce(O)/($\gamma+ce$)=3.5 $\times 10^{-4}$ 10; ce(P)/($\gamma+ce$)=3.2 $\times 10^{-5}$ 16 $\alpha(K)$ =0.16 11; $\alpha(L)$ =0.035 10; $\alpha(M)$ =0.0085 20 $\alpha(N)$ =0.0022 5; $\alpha(O)$ =4.2 $\times 10^{-4}$ 11; $\alpha(P)$ =3.8 $\times 10^{-5}$ 19
354.6 361.9	47 6	4445.6+x 7173.7+w?	16 ⁺	4091.2+x 6811.8+w?	16 ⁺	M1(+E2)	0.16 9	43 7	ce(K)/($\gamma+ce$)=0.11 6; ce(L)/($\gamma+ce$)=0.024 7; ce(M)/($\gamma+ce$)=0.0057 16 ce(N)/($\gamma+ce$)=0.0014 4; ce(O)/($\gamma+ce$)=2.8 $\times 10^{-4}$ 9; ce(P)/($\gamma+ce$)=2.6 $\times 10^{-5}$ 13 $\alpha(K)$ =0.13 8; $\alpha(L)$ =0.027 8; $\alpha(M)$ =0.0066 18 $\alpha(N)$ =0.0017 4; $\alpha(O)$ =3.2 $\times 10^{-4}$ 10; $\alpha(P)$ =3.0 $\times 10^{-5}$ 15
407.6		5236.5+y		4828.9+y		M1(+E2)	0.12 7	27 5	ce(K)/($\gamma+ce$)=0.08 5; ce(L)/($\gamma+ce$)=0.017 6; ce(M)/($\gamma+ce$)=0.0041 13 ce(N)/($\gamma+ce$)=0.00105 33; ce(O)/($\gamma+ce$)=2.0 $\times 10^{-4}$ 7; ce(P)/($\gamma+ce$)=1.9 $\times 10^{-5}$ 10 $\alpha(K)$ =0.09 6; $\alpha(L)$ =0.019 7; $\alpha(M)$ =0.0046 14 $\alpha(N)$ =0.0012 4; $\alpha(O)$ =2.3 $\times 10^{-4}$ 8; $\alpha(P)$ =2.2 $\times 10^{-5}$ 11
419.5		7593.2+w?		7173.7+w?		M1(+E2)	0.11 6	28 5	ce(K)/($\gamma+ce$)=0.08 5;

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¹⁹²Os(¹⁴C,4n γ) **1995Ba70** (continued)

γ (²⁰²Pb) (continued)

E_γ †	I_γ †	E_i (level)	J_i^π	E_f	J_f^π	Mult. ‡	α #	$I_{(\gamma+ce)}$ †	Comments
									ce(L)/($\gamma+ce$)=0.016 6; ce(M)/($\gamma+ce$)=0.0038 12 ce(N)/($\gamma+ce$)=9.7×10 ⁻⁴ 32; ce(O)/($\gamma+ce$)=1.9×10 ⁻⁴ 7; ce(P)/($\gamma+ce$)=1.8×10 ⁻⁵ 9 α (K)=0.09 6; α (L)=0.018 6; α (M)=0.0042 14 α (N)=0.00107 35; α (O)=2.1×10 ⁻⁴ 7; α (P)=2.0×10 ⁻⁵ 10
466.5		5703.0+y		5236.5+y		M1(+E2)	0.08 5	32 8	ce(K)/($\gamma+ce$)=0.06 4; ce(L)/($\gamma+ce$)=0.012 5; ce(M)/($\gamma+ce$)=0.0029 10 ce(N)/($\gamma+ce$)=7.3×10 ⁻⁴ 26; ce(O)/($\gamma+ce$)=1.4×10 ⁻⁴ 5; ce(P)/($\gamma+ce$)=1.4×10 ⁻⁵ 7 α (K)=0.07 4; α (L)=0.013 5; α (M)=0.0031 11 α (N)=7.9×10 ⁻⁴ 28; α (O)=1.5×10 ⁻⁴ 6; α (P)=1.5×10 ⁻⁵ 8
487.2		8080.4+w?		7593.2+w?		M1(+E2)	0.07 4	40 8	ce(K)/($\gamma+ce$)=0.054 32; ce(L)/($\gamma+ce$)=0.011 4; ce(M)/($\gamma+ce$)=0.0026 9 ce(N)/($\gamma+ce$)=6.5×10 ⁻⁴ 24; ce(O)/($\gamma+ce$)=1.3×10 ⁻⁴ 5; ce(P)/($\gamma+ce$)=1.2×10 ⁻⁵ 6 α (K)=0.06 4; α (L)=0.012 4; α (M)=0.0027 10 α (N)=7.0×10 ⁻⁴ 25; α (O)=1.4×10 ⁻⁴ 5; α (P)=1.3×10 ⁻⁵ 7
517.7		6220.7+y		5703.0+y		M1(+E2)	0.06 4	15 9	ce(K)/($\gamma+ce$)=0.047 28; ce(L)/($\gamma+ce$)=0.009 4; ce(M)/($\gamma+ce$)=0.0022 8 ce(N)/($\gamma+ce$)=5.5×10 ⁻⁴ 21; ce(O)/($\gamma+ce$)=1.1×10 ⁻⁴ 4; ce(P)/($\gamma+ce$)=1.1×10 ⁻⁵ 6 α (K)=0.050 31; α (L)=0.010 4; α (M)=0.0023 9 α (N)=5.9×10 ⁻⁴ 22; α (O)=1.2×10 ⁻⁴ 5; α (P)=1.1×10 ⁻⁵ 6
626.7		3955.4	13 ⁺	3328.8	12	D			α (K)=0.024 14; α (L)=0.0045 19; α (M)=0.0011 4
689.4	22.4 29	5941.2+u	(20 ⁻)	5251.7+u	19 ⁻	(M1+E2)	0.030 16		α (N)=2.7×10 ⁻⁴ 11; α (O)=5.3×10 ⁻⁵ 22; α (P)=5.4×10 ⁻⁶ 27
717.6	29.7 33	3955.4	13 ⁺	3237.6	12 ⁺	M1(+E2)	0.027 14		α (K)=0.022 12; α (L)=0.0040 17; α (M)=1.0×10 ⁻³ 4 α (N)=2.4×10 ⁻⁴ 10; α (O)=4.8×10 ⁻⁵ 20; α (P)=4.9×10 ⁻⁶ 24
785.5	20.3 26	4023.1		3237.6	12 ⁺				

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$^{192}\text{Os}(^{14}\text{C},4n\gamma)$ **1995Ba70** (continued) $\gamma(^{202}\text{Pb})$ (continued)

E_γ [†]	I_γ [†]	$E_i(\text{level})$	J_i^π	E_f	J_f^π	Mult. [‡]	α [#]	Comments
796.9	24.2 29	5242.4+x	17 ⁻	4445.6+x	16 ⁺	E1	0.00380 5	$\alpha(\text{K})=0.00316$ 4; $\alpha(\text{L})=0.000489$ 7; $\alpha(\text{M})=0.0001131$ 16 $\alpha(\text{N})=2.86\times 10^{-5}$ 4; $\alpha(\text{O})=5.65\times 10^{-6}$ 8; $\alpha(\text{P})=5.76\times 10^{-7}$ 8
831.1 840.6 5	8.2 7 73 7	4068.7 6092.4+u	13 21 ⁻	3237.6 5251.7+u	12 ⁺ 19 ⁻	D E2	0.00940 13	$\alpha(\text{K})=0.00736$ 10; $\alpha(\text{L})=0.001556$ 22; $\alpha(\text{M})=0.000374$ 5 $\alpha(\text{N})=9.47\times 10^{-5}$ 13; $\alpha(\text{O})=1.838\times 10^{-5}$ 26; $\alpha(\text{P})=1.707\times 10^{-6}$ 24
853.6	30 4	4091.2	14 ⁺	3237.6	12 ⁺	E2	0.00911 13	$\alpha(\text{K})=0.00714$ 10; $\alpha(\text{L})=0.001499$ 21; $\alpha(\text{M})=0.000360$ 5 $\alpha(\text{N})=9.12\times 10^{-5}$ 13; $\alpha(\text{O})=1.771\times 10^{-5}$ 25; $\alpha(\text{P})=1.650\times 10^{-6}$ 23
888.1	100 8	3057.8	11 ⁻	2169.83	9 ⁻	E2	0.00842 12	$\alpha(\text{K})=0.00663$ 9; $\alpha(\text{L})=0.001362$ 19; $\alpha(\text{M})=0.000326$ 5 $\alpha(\text{N})=8.27\times 10^{-5}$ 12; $\alpha(\text{O})=1.609\times 10^{-5}$ 23; $\alpha(\text{P})=1.513\times 10^{-6}$ 21
933.2	8.2 14	4170.6	14 ⁺	3237.6	12 ⁺	E2	0.00763 11	$\alpha(\text{K})=0.00604$ 8; $\alpha(\text{L})=0.001212$ 17; $\alpha(\text{M})=0.000289$ 4 $\alpha(\text{N})=7.33\times 10^{-5}$ 10; $\alpha(\text{O})=1.430\times 10^{-5}$ 20; $\alpha(\text{P})=1.359\times 10^{-6}$ 19
1021.5	13.3 21	3191.5	10 ⁺	2169.83	9 ⁻	E1	2.41×10^{-3} 3	$\alpha(\text{K})=0.002010$ 28; $\alpha(\text{L})=0.000306$ 4; $\alpha(\text{M})=7.06\times 10^{-5}$ 10 $\alpha(\text{N})=1.785\times 10^{-5}$ 25; $\alpha(\text{O})=3.54\times 10^{-6}$ 5; $\alpha(\text{P})=3.66\times 10^{-7}$ 5
1151.1	59 5	5242.4+x	17 ⁻	4091.2+x	16 ⁺	E1	1.95×10^{-3} 3	$\alpha(\text{K})=0.001628$ 23; $\alpha(\text{L})=0.0002461$ 34; $\alpha(\text{M})=5.67\times 10^{-5}$ 8 $\alpha(\text{N})=1.435\times 10^{-5}$ 20; $\alpha(\text{O})=2.85\times 10^{-6}$ 4; $\alpha(\text{P})=2.96\times 10^{-7}$ 4; $\alpha(\text{IPF})=4.67\times 10^{-6}$ 7
1160.5	17.3 26	5251.7+x	18 ⁺	4091.2+x	16 ⁺	E2	0.00500 7	$\alpha(\text{K})=0.00403$ 6; $\alpha(\text{L})=0.000741$ 10; $\alpha(\text{M})=0.0001752$ 25 $\alpha(\text{N})=4.44\times 10^{-5}$ 6; $\alpha(\text{O})=8.72\times 10^{-6}$ 12; $\alpha(\text{P})=8.63\times 10^{-7}$ 12; $\alpha(\text{IPF})=1.397\times 10^{-6}$ 20

[†] From 1995Ba70. The in-band I_γ values are relative to the strongest in-band transition, while the others are relative to $I_\gamma(888.1\gamma)=100$.

[‡] From 1995Ba70 based on $\gamma\gamma(\theta)(\text{DCO})$, but values were not given by the authors.

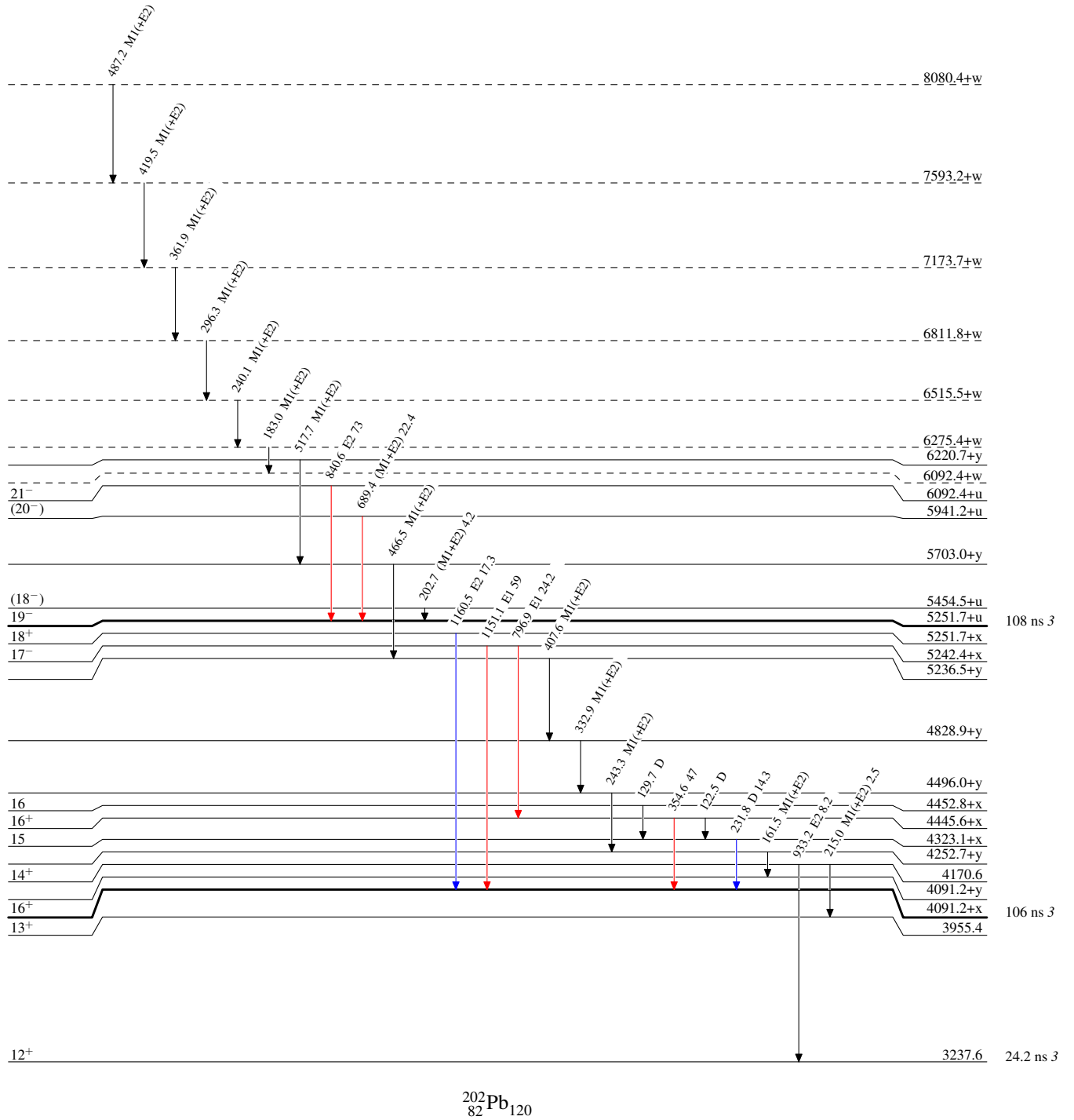
[#] Additional information 6.

$^{192}\text{Os}(^{14}\text{C},4n\gamma)$ 1995Ba70

Level Scheme
Intensities: Relative I_γ

Legend

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



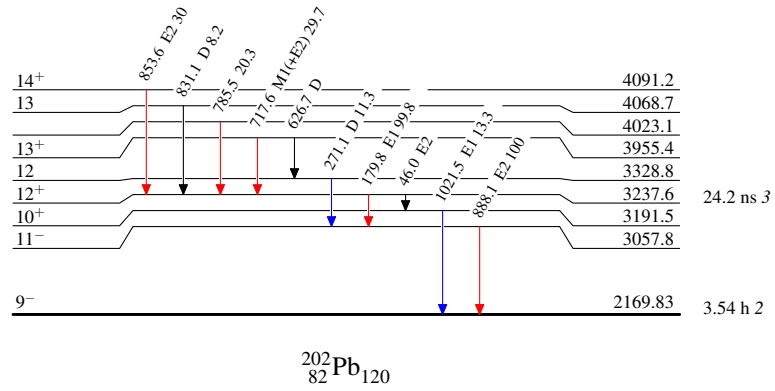
$^{192}\text{Os}(^{14}\text{C},4n\gamma)$ **1995Ba70**

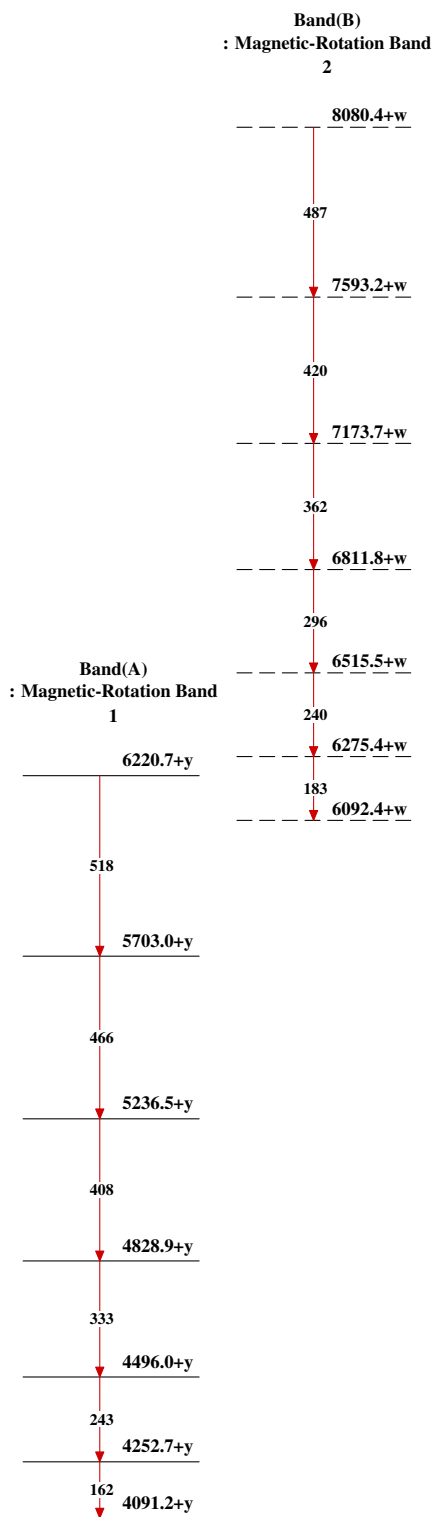
Level Scheme (continued)

Intensities: Relative I_γ

Legend

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



$^{192}\text{Os}(^{14}\text{C},4n\gamma)$ 1995Ba70 $^{202}_{82}\text{Pb}_{120}$