

¹⁸²W(n,γ) E=4.1 eV **1973Ca02,1969MuZQ**

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Coral M. Baglin	NDS 134, 149 (2016)	15-Apr-2015

1969MuZQ: natural W target; Ge detector; measured primary E_γ, I_γ for six resonances; E(n) from time of flight.

1973Ca02: neutrons from high flux beam reactor; neutron monochromator; two Ge(Li) detectors (FWHM≈1 keV At 122 keV for one detector, FWHM=6-8 keV At 6 MeV for the other); 94.3% isotopically enriched ¹⁸²W target; measured E_γ, I_γ for 4.1 eV and 7.6 eV resonances.

¹⁸³W Levels

E(level) [†]	J ^π [‡]	L	S	Comments
0	1/2 ⁻			
46.56 10	3/2 ⁻			
99.28 14	5/2 ⁻			
206.9 3	7/2 ⁻			
209.05 11	3/2 ⁻			
292.12 14	5/2 ⁻			
310.2 6	9/2 ⁻			
412.21 15	7/2 ⁻			
453.09 14	7/2 ⁻			
535.0 10				
873.0 13	(1/2,3/2,5/2 ⁺)			
904.53 15	(5/2 ⁻)			
934.46 14	1/2 ⁻			
1002.2 3	7/2 ⁻			
1026.47 12	(3/2) ⁻			
1052.96 23	(5/2) ⁻			
1274.89? 25	(5/2 ⁺)			level introduced by evaluator to accommodate 822γ In accord with Adopted Levels, Gammas.
1437.33 12	(1/2 ⁻ ,3/2 ⁻)			J ^π : 1973Ca02 include possible 1/2 ⁺ which seems unlikely due to deexcitation to the J ^π =5/2 ⁻ level.
≈1545	(≤9/2)			
1612.24 15	(1/2 ⁻ ,3/2,5/2 ⁻)			
1629.95 18	(1/2 ⁻ ,3/2,5/2 ⁻)			J ^π : 1973Ca02 include possible 1/2 ⁺ which seems unlikely due to deexcitation to the J ^π =5/2 ⁻ level.
1673.44 15	(3/2 ⁻ ,5/2 ⁻)			
1730.0 13	(3/2) ⁻			
1811.41 17	1/2 ⁻			
1823.98 18	(3/2) ⁻			
1840.0 13	5/2 ⁺			
1866.60 18	(3/2 ⁻ ,5/2,7/2 ⁻)			J ^π : 1973Ca02 include possible 3/2 ⁺ which seems unlikely due to deexcitation to the J ^π =7/2 ⁻ level.
1885.41 13	(1/2 ⁻ ,3/2)			
1920.0 13	(1/2 ⁻ ,3/2)			
1945.14 12	3/2 ⁻			
1983.87 16	3/2 ⁻			
2099.15 14	(3/2 ⁻ ,5/2 ⁻)			
2126.71 13	3/2 ⁻			J ^π : 1973Ca02 include possible (1/2 ⁻) which seems unlikely due to reported deexcitation to a J ^π =7/2 ⁻ level.
2165.60 18	(3/2) ⁻			
2179.0 13	(3/2)			
2327.0 13	(1/2 ⁻ ,3/2,5/2 ⁻)			
6193.1 8	1/2 ⁺	0	4.155×10 ⁻³ 5	E(level): rounded value from (n,γ) E=res is 6190.81. J ^π : assuming s-wave capture by 0 ⁺ g.s. of target. Γ _γ =0.0495 eV 2, gΓ _n =0.001545 eV 3 (2006MuZX).

Continued on next page (footnotes at end of table)

$^{182}\text{W}(n,\gamma)$ E=4.1 eV **1973Ca02,1969MuZQ** (continued) ^{183}W Levels (continued)† From least-squares fit to E_γ (normalized $\chi^2=1.3$).

‡ From Adopted Levels, except as noted.

 $\gamma(^{183}\text{W})$ I γ normalization: from I(6190 γ)=9.7 5 per 100 n captures (**1969MuZQ**). other I(6194 γ)=9.0 (**1967Ra06**).

E_γ †	I_γ ‡	$E_i(\text{level})$	J_i^π	E_f	J_f^π
98.8 7	100 50	99.28	5/2 ⁻	0	1/2 ⁻
107.8 7	99 50	206.9	7/2 ⁻	99.28	5/2 ⁻
143.0 7	6 3	453.09	7/2 ⁻	310.2	9/2 ⁻
162.3 7	2.0×10 ² 10	209.05	3/2 ⁻	46.56	3/2 ⁻
192.9 7	3.3 17	292.12	5/2 ⁻	99.28	5/2 ⁻
205.1 7	8 4	412.21	7/2 ⁻	206.9	7/2 ⁻
209.4 7	25 [#] 13	209.05	3/2 ⁻	0	1/2 ⁻
211	1.3 [@] CA	310.2	9/2 ⁻	99.28	5/2 ⁻
245.6 ^b 7	21 ^b 11	292.12	5/2 ⁻	46.56	3/2 ⁻
245.6 ^b 7	21 ^b 11	453.09	7/2 ⁻	206.9	7/2 ⁻
291.8 7	31 16	292.12	5/2 ⁻	0	1/2 ⁻
313.3 7	35 18	412.21	7/2 ⁻	99.28	5/2 ⁻
^x 320.9 7	1.2 6				
^x 326.4 2	0.70 14				
353.9 2	5.1 26	453.09	7/2 ⁻	99.28	5/2 ⁻
365.5 2	2.9 6	412.21	7/2 ⁻	46.56	3/2 ⁻
^x 371.4 2	0.40 8				
^x 400.7 2	0.90 18				
406.4 2	0.80 16	453.09	7/2 ⁻	46.56	3/2 ⁻
^x 419.8 2	0.80 16				
451.9 2	0.50 10	904.53	(5/2 ⁻)	453.09	7/2 ⁻
^x 464.6 2	0.40 8				
^x 559.7 2	0.90 18				
^x 611.8 2	4.7 9				
^x 633.9 2	2.3 5				
≈640.2	0.90 18	1052.96	(5/2 ⁻)	412.21	7/2 ⁻
^x 652.3 2	11.9 24				
695.4 ^b 2	29 ^b 6	904.53	(5/2 ⁻)	209.05	3/2 ⁻
695.4 ^b 2	29 ^b 6	1629.95	(1/2 ⁻ , 3/2, 5/2 ⁻)	934.46	1/2 ⁻
^x 707.6 2	1.9 4				
^x 713.3 2	0.90 18				
734.4 2	0.60 12	1026.47	(3/2 ⁻)	292.12	5/2 ⁻
^x 776.3 2	4.0 8				
^x 804.4 2	1.3 3				
817.4 2	12.3 25	1026.47	(3/2 ⁻)	209.05	3/2 ⁻
821.8 ^{&c} 2	1.1 6	1274.89?	(5/2 ⁺)	453.09	7/2 ⁻
^x 825.9 2	0.6 3				
^x 834.5 2	1.20 24				
846.1 2	9.9 20	1052.96	(5/2 ⁻)	206.9	7/2 ⁻
857.6 2	4.9 10	904.53	(5/2 ⁻)	46.56	3/2 ⁻
^x 866.4 2	33 7				
888.1 2	27 5	934.46	1/2 ⁻	46.56	3/2 ⁻
927.2 2	15 3	1026.47	(3/2 ⁻)	99.28	5/2 ⁻
^x 941.2 2	6 3				
953.6 2	1.20 24	1052.96	(5/2 ⁻)	99.28	5/2 ⁻

Continued on next page (footnotes at end of table)

$^{182}\text{W}(n,\gamma) E=4.1 \text{ eV}$ **1973Ca02,1969MuZQ (continued)** $\gamma(^{183}\text{W})$ (continued)

E_γ^\dagger	I_γ^\ddagger	$E_i(\text{level})$	J_i^π	E_f	J_f^π
$^x960.0$ 2	3.0 6				
979.9 2	60 12	1026.47	(3/2) ⁻	46.56	3/2 ⁻
$^x1017.8$ 2	5.2 10				
1026.4 2	100 20	1026.47	(3/2) ⁻	0	1/2 ⁻
1100.4 ^{ac} 2	11.6 23	2126.71	3/2 ⁻	1026.47	(3/2) ⁻
$^x1128.3$ 2	2.8 6				
$^x1149.8$ 2	2.4 5				
1163.4 2	3.7 19	2165.60	(3/2) ⁻	1002.2	7/2 ⁻
1164.9 2	4.5 23	2099.15	(3/2 ⁻ ,5/2 ⁻)	934.46	1/2 ⁻
$^x1182.6$ 2	2.5 5				
1192.3 2	7 4	2126.71	3/2 ⁻	934.46	1/2 ⁻
$^x1209.9$ 2	3.1 6				
1228.2 2	1.8 4	1437.33	(1/2 ⁻ ,3/2 ⁻)	209.05	3/2 ⁻
$^x1236.0$ 2	1.9 4				
$^x1245.0$ 2	1.9 10				
$^x1262.6$ 2	2.2 4				
$^x1288.9$ 2	4.5 9				
$^x1294.2$ 2	3.0 15				
1337.9 ^b 2	1.4 ^b 3	1437.33	(1/2 ⁻ ,3/2 ⁻)	99.28	5/2 ⁻
1337.9 ^b 2	1.4 ^b 3	1629.95	(1/2 ⁻ ,3/2,5/2 ⁻)	292.12	5/2 ⁻
$^x1343.4$ 2	1.3 7				
$^x1347.3$ 2	1.4 3				
≈ 1370.0	1.4 7	1823.98	(3/2) ⁻	453.09	7/2 ⁻
$^x1371.9$ 2	1.1 6				
1390.8 2	1.3 7	1437.33	(1/2 ⁻ ,3/2 ⁻)	46.56	3/2 ⁻
$^x1406.4$ 2	1.3 3				
1411.4 2	7 4	1823.98	(3/2) ⁻	412.21	7/2 ⁻
$^x1416.6$ 2	7.0 35				
$^x1423.8$ 2	7.2 14				
1437.5 2	9.7 19	1437.33	(1/2 ⁻ ,3/2 ⁻)	0	1/2 ⁻
1454.8 2	3.0 15	1866.60	(3/2 ⁻ ,5/2,7/2 ⁻)	412.21	7/2 ⁻
$^x1470.6$ 2	3.4 7				
$^x1485.8$ 2	4.0 8				
$^x1503.8$ 2	5.8 12				
$^x1510.2$ 2	7.5 15				
$^x1523.2$ 2	4.8 10				
$^x1528.7$ 2	2.9 15				
$^x1556.5$ 2	2.9 15				
1565.9 2	2.6 13	1612.24	(1/2 ⁻ ,3/2,5/2 ⁻)	46.56	3/2 ⁻
$^x1569.9$ 2	3.5 7				
$^x1580.0$ 2	3.1 6				
$^x1586.7$ 2	3.8 8				
$^x1595.1$ 2	4.5 9				
1602.5 2	4.0 8	1811.41	1/2 ⁻	209.05	3/2 ⁻
1612.0 2	5.3 27	1612.24	(1/2 ⁻ ,3/2,5/2 ⁻)	0	1/2 ⁻
1615.3 2	15 3	1823.98	(3/2) ⁻	209.05	3/2 ⁻
1627.2 2	22 4	1673.44	(3/2 ⁻ ,5/2 ⁻)	46.56	3/2 ⁻
$^x1633.5$ 2	8.7 17				
1653.0 2	6 3	1945.14	3/2 ⁻	292.12	5/2 ⁻
$^x1661.1$ 2	3.6 7				
1673.1 ^b 2	2.5 ^b 5	1673.44	(3/2 ⁻ ,5/2 ⁻)	0	1/2 ⁻
1673.1 ^b 2	2.5 ^b 5	2126.71	3/2 ⁻	453.09	7/2 ⁻
1676.4 2	1.8 4	1885.41	(1/2 ⁻ ,3/2)	209.05	3/2 ⁻
$^x1684.3$ 2	2.0 4				
1691.6 2	4.5 9	1983.87	3/2 ⁻	292.12	5/2 ⁻

Continued on next page (footnotes at end of table)

$^{182}\text{W}(n,\gamma) E=4.1 \text{ eV}$ **1973Ca02,1969MuZQ (continued)** $\gamma(^{183}\text{W})$ (continued)

E_γ^\dagger	I_γ^\ddagger	$E_i(\text{level})$	J_i^π	E_f	J_f^π	Comments
^x 1713.5 2	2.0 4					
^x 1725.9 2	2.2 4					
1735.9 2	21 4	1945.14	3/2 ⁻	209.05	3/2 ⁻	
1753.2 2	1.8 9	2165.60	(3/2 ⁻)	412.21	7/2 ⁻	
1764.7 2	3.5 7	1811.41	1/2 ⁻	46.56	3/2 ⁻	
^x 1790.8 2	1.9 4					
^x 1796.6 2	1.9 4					
1819.6 2	1.9 10	1866.60	(3/2 ⁻ ,5/2,7/2 ⁻)	46.56	3/2 ⁻	
1838.7 2	12.4 25	1885.41	(1/2 ⁻ ,3/2)	46.56	3/2 ⁻	
^x 1848.6 2	5.2 10					
^x 1853.4 2	2.6 5					
1885.5 2	7.6 15	1885.41	(1/2 ⁻ ,3/2)	0	1/2 ⁻	
1889.9 2	3.4 7	2099.15	(3/2 ⁻ ,5/2 ⁻)	209.05	3/2 ⁻	
1898.3 2	5.1 10	1945.14	3/2 ⁻	46.56	3/2 ⁻	
^x 1907.2 2	3.3 7					
1945.6 2	2.9 6	1945.14	3/2 ⁻	0	1/2 ⁻	
1984.0 2	4.3 9	1983.87	3/2 ⁻	0	1/2 ⁻	
^x 2023.5 2	3.4 7					
^x 2029.2 2	1.7 3					
^x 2035.4 2	1.9 4					
^x 2062.6 2	3.3 17					
^x 2071.2 2	2.2 4					
2080.8 2	5.8 12	2126.71	3/2 ⁻	46.56	3/2 ⁻	
^x 2092.9 2	1.9 4					
2099.1 2	3.0 6	2099.15	(3/2 ⁻ ,5/2 ⁻)	0	1/2 ⁻	
2119.2 2	4.1 8	2165.60	(3/2 ⁻)	46.56	3/2 ⁻	
2126.5 2	2.7 14	2126.71	3/2 ⁻	0	1/2 ⁻	
^x 2135.3 2	2.7 14					
^x 2138.1 2	4.5 23					
2170 8	0.9 5	2165.60	(3/2 ⁻)	0	1/2 ⁻	E_γ : broad peak; possibly complex (1973Ca02).
3866		6193.1	1/2 ⁺	2327.0	(1/2 ⁻ ,3/2,5/2 ⁻)	from 1969MuZQ only.
4014		6193.1	1/2 ⁺	2179.0	(3/2)	I_γ : 1.0 3 (1969MuZQ).
4028 3		6193.1	1/2 ⁺	2165.60	(3/2 ⁻)	E_γ : from 1969MuZQ only.
4066 3		6193.1	1/2 ⁺	2126.71	3/2 ⁻	I_γ : 0.5 3 (1969MuZQ).
4094 3		6193.1	1/2 ⁺	2099.15	(3/2 ⁻ ,5/2 ⁻)	I_γ : 0.61 9 (1973Ca02).
4210 3		6193.1	1/2 ⁺	1983.87	3/2 ⁻	I_γ : 0.68 10 (1973Ca02), 0.41 21 (1969MuZQ).
4248 3		6193.1	1/2 ⁺	1945.14	3/2 ⁻	I_γ : 1.06 16 (1973Ca02), 0.9 3 (1969MuZQ).
4273		6193.1	1/2 ⁺	1920.0	(1/2 ⁻ ,3/2)	I_γ : 0.19 6 (1973Ca02), ≤0.21 (1969MuZQ).
4307 3		6193.1	1/2 ⁺	1885.41	(1/2 ⁻ ,3/2)	I_γ : 3.1 5 (1973Ca02), 2.89 21 (1969MuZQ).
4325 3		6193.1	1/2 ⁺	1866.60	(3/2 ⁻ ,5/2,7/2 ⁻)	E_γ : from 1969MuZQ only.
4353		6193.1	1/2 ⁺	1840.0	5/2 ⁺	I_γ : 0.10 21 (1969MuZQ).
4369 3		6193.1	1/2 ⁺	1823.98	(3/2 ⁻)	I_γ : 2.5 4 (1973Ca02), 3.09 21 (1969MuZQ).
4382 3		6193.1	1/2 ⁺	1811.41	1/2 ⁻	I_γ : 0.29 4 (1973Ca02), 0.62 21 (1969MuZQ).
4463		6193.1	1/2 ⁺	1730.0	(3/2 ⁻)	E_γ : from 1969MuZQ only.
4520 3		6193.1	1/2 ⁺	1673.44	(3/2 ⁻ ,5/2 ⁻)	I_γ : 0.41 21 (1969MuZQ).
4563 3		6193.1	1/2 ⁺	1629.95	(1/2 ⁻ ,3/2,5/2 ⁻)	I_γ : 0.90 14 (1973Ca02).
4582 3		6193.1	1/2 ⁺	1612.24	(1/2 ⁻ ,3/2,5/2 ⁻)	I_γ : 0.90 14 (1973Ca02).
4755 3		6193.1	1/2 ⁺	1437.33	(1/2 ⁻ ,3/2 ⁻)	I_γ : 0.37 6 (1973Ca02).
5166 3		6193.1	1/2 ⁺	1026.47	(3/2 ⁻)	E_γ : from 1969MuZQ only.
5259 3		6193.1	1/2 ⁺	934.46	1/2 ⁻	I_γ : ≤0.21 (1969MuZQ).
5320		6193.1	1/2 ⁺	873.0	(1/2,3/2,5/2 ⁺)	I_γ : 1.15 17 (1973Ca02), 1.96 21 (1969MuZQ).
						I_γ : 0.87 13 (1973Ca02), 0.82 21 (1969MuZQ).
						I_γ : 0.28 4 (1973Ca02).
						I_γ : 0.96 14 (1973Ca02).
						I_γ : 18.9 28 (1973Ca02), 20.0 21 (1969MuZQ).
						I_γ : 0.64 10 (1973Ca02), 0.93 21 (1969MuZQ).
						E_γ : from 1969MuZQ only.
						I_γ : ≤0.21 (1969MuZQ).

Continued on next page (footnotes at end of table)

$^{182}\text{W}(n,\gamma) E=4.1 \text{ eV}$ **1973Ca02,1969MuZQ (continued)** $\gamma(^{183}\text{W})$ (continued)

E_γ †	$E_i(\text{level})$	J_i^π	E_f	J_f^π	Comments
5658	6193.1	1/2 ⁺	535.0		E_γ : from 1969MuZQ only. I_γ : 0.31 10 (1969MuZQ).
5984 3	6193.1	1/2 ⁺	209.05	3/2 ⁻	I_γ : 0.43 6 (1973Ca02), 0.52 10 (1969MuZQ).
6146 3	6193.1	1/2 ⁺	46.56	3/2 ⁻	I_γ : 3.6 5 (1973Ca02), 3.2 1 (1969MuZQ).
6193 3	6193.1	1/2 ⁺	0	1/2 ⁻	I_γ : 10.0 15 (1973Ca02).

† From 1973Ca02, except As noted; absolute uncertainty of 3 keV for primary transitions is shown, relative uncertainty is 1 keV. 1969MuZQ report E_γ for primary transitions only.

‡ Intensity relative to $I(1026\gamma)=100$ (1973Ca02) for secondary transitions. primary transition intensities relative to $I(6193\gamma)=10.0$ are given In comments and these can be converted to intensity/100 n captures by multiplying by 0.97 5 based on $I(6194\gamma)=9.7 5$ (1969MuZQ). Other $I(6194\gamma)/100$ n captures: 9.0 (1967Ra06).

May include contribution from unresolved $E_\gamma=211$ from 310 level.

@ From intensity of 143 γ feeding the level.

& Placement by 1973Ca02 from an 1824-keV level was unconfirmed In other reaction studies. placed by evaluator from a 1275 level instead, consistent with Adopted Levels, Gammas.

^a Placement indicated As uncertain because, although No other branch from 2126 level is so strong, this placement has not been confirmed by any other study. an 1100-keV γ is known to deexcite a 1309 level, so 1973Ca02's placement from the 2127 level is not ADOPTED.

^b Multiply placed with undivided intensity.

^c Placement of transition in the level scheme is uncertain.

^x γ ray not placed in level scheme.

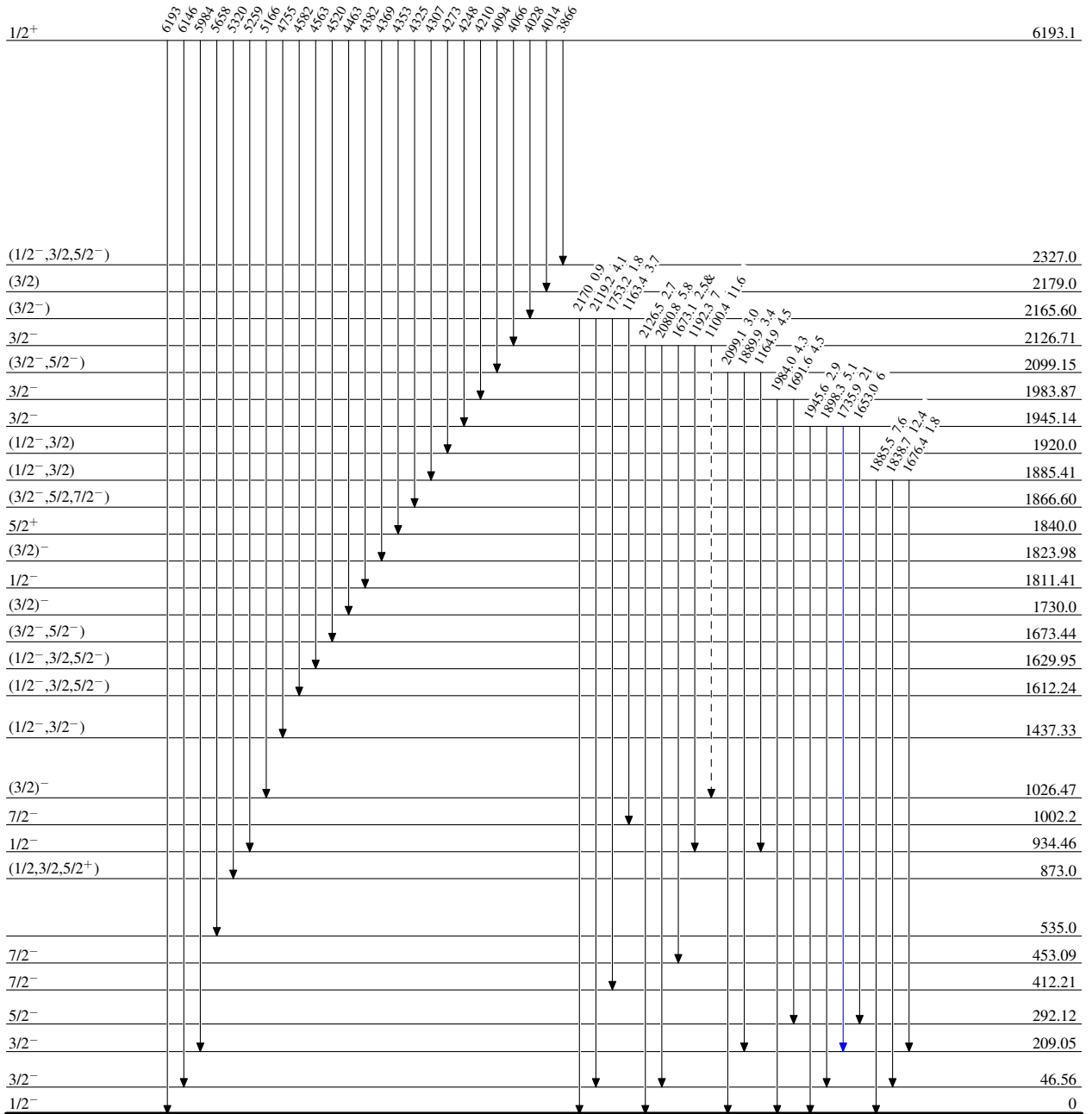
$^{182}\text{W}(n,\gamma) E=4.1 \text{ eV}$ 1973Ca02,1969MuZQ

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)



$^{182}\text{W}(n,\gamma) E=4.1 \text{ eV}$ 1973Ca02,1969MuZQ

Level Scheme (continued)

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)

