^{98}Mo(n,n′γ) 1984Me04

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Jun Chen, Balraj Singh	NDS 164, 1 (2020)	15-Feb-2020

1984Me04: E=fast neutrons were produced from the 5-MW research reactor in Budapest. Target was 10 g 95.9% enriched ^{98}Mo. γ rays were detected with Ge(Li) detectors (FWHM=2.5 keV at 1332 keV). Measured Eγ, Iγ, γγ-coin, γ(θ) (90°−150°). Deduced levels, J, π, γ-ray multipolarities, mixing ratios. Comparisons with available data and theoretical calculations. 1984Me04 also report a large amount of data on ^{98}Mo from β^- decay of ^{98}Nb isomer.

Additional information 1.

Others:

1971McZG (also 1970SwZZ), 1965Ki07, 1962Do12.

All data are from 1984Me04, unless otherwise noted.

^{98}Mo Levels

A level reported at 1812 (1970SwZZ) is discarded since it is not confirmed in 1984Me04.

E(level)‡	Jπ†	E(level)‡	Jπ†	E(level)‡	Jπ†	E(level)‡	Jπ†
0.0	0^+	2206.83 *6*	2^+	2572.67 *13*	3	3068.0 *3*	(3^-)
734.83 *4*	0^+	2223.96 *6*	4^+	2619.84 *17*	3^+	3210.7 *4*	(4^+)
787.412 *18*	2^+	2333.41 *6*	4^+@	2620.83 *8*	5^-	3211.9 *6*	(4^+)
1432.254 *21*	2^+	2343.76 *12*	6^+	2644.8? *4*	$(1,2^+)$	3325.9? *3*	4^+
1510.05 *3*	4^+	2418.38 *9*	2^+	2679.1? *10*		3393.8? *4*	(4^+)
1758.58 *3*	2^+	2419.16 *7*	4^+	2701.03 *20*	2^+	3419.8? *6*	4^+
1963.11 *8*	0^+	2485.23 *11*	3^+	2767.7? *3*	4^+	3456.3? *2*	(4^+)
2017.57 *4*	3^-	2506.46 *13*	5^+	2795.66 *21*	4^-	3738.4? *2*	4^+
2037.56 *7*	0^+	2526.2? *3*	2^+	2837.4? *4*	6^+		
2104.77 *5*	3^+#	2561.74 *11*	(2^-)	2915.5 *3*	2^+		

† From Adopted Levels.

‡ From least-squares fit to Eγ data.

Spin from 672γ, 1317γ(θ). $J^\pi=3^-$ would give unrealistic E1+M2 admixture (1984Me04).

@ Spin from 1546γ(θ) (1984Me04).

γ(^{98}Mo)

Eγ	Iγ	E_i(level)	J_i^π	E_f	J_f^π	Mult.†	δ†	Comments
157.6‡a *4*	0.09 *4*	2837.4?	6^+	2679.1?				
171.9‡ *7*	0.14 *8*	2506.46	5^+	2333.41	4^+			
258.98 *4*	1.35 *4*	2017.57	3^-	1758.58	2^+			
447.2 *3*	0.29 *5*	3068.0	(3^-)	2620.83	5^-			
x450.85‡ *10*	0.61 *6*							
531.3‡ *3*	0.44 *6*	1963.11	0^+	1432.254	2^+			
544.2 *4*	0.21 *8*	2561.74	(2^-)	2017.57	3^-			
555.4 *3*	0.45# *8*	2572.67	3	2017.57	3^-			
574.4 *3*	0.45# *8*	2333.41	4^+	1758.58	2^+			
603.1 *4*	0.40 *8*	2620.83	5^-	2017.57	3^-			
644.81 *2*	10.9 *6*	1432.254	2^+	787.412	2^+	(M1+E2)	+1.70 *16*	A_2=+0.255 *15*; A_4=−0.005 *20* δ: from γ(θ). δ=+0.13 *4* is also possible but less likely from syst which suggest

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^{98}Mo(n,n′γ) 1984Me04 (continued)

γ(^{98}Mo) (continued)

E_γ	I_γ	E_i(level)	J_i^π	E_f	J_f^π	Mult.[†]	δ[†]	Comments
								dominant E2 component for transitions from second 2^+ to first 2^+ states. 1970SwZZ give δ=2.3.
660.7 *4*	0.20 *4*	2419.16	4^+	1758.58	2^+			
672.50 *4*	1.37 *6*	2104.77	3^+	1432.254	2^+	(M1+E2)	+5.8 *9*	A_2=+0.33 *2*; A_4=+0.15 *3*
713.87 *5*	1.07 *5*	2223.96	4^+	1510.05	4^+			A_2=+0.32 *6*; A_4=−0.06 *7*
722.66 *2*	15.8 *2*	1510.05	4^+	787.412	2^+			A_2=+0.284 *4*; A_4=−0.064 *5* δ(M3/E2)=−0.05 *11* or unrealistic value of −14 *4* from γ(θ).
734.8 *1*		734.83	0^+	0.0	0^+	E0		E_γ,Mult.: from Adopted Gammas.
787.38 *2*	100 *1*	787.412	2^+	0.0	0^+	Q		A_2=+0.209 *8*; A_4=−0.021 *11*
792.0 *2*	1.6 *2*	2223.96	4^+	1432.254	2^+			
814.1[‡] *2*	0.26 *2*	2572.67	3	1758.58	2^+			
823.35 *7*	0.75 *4*	2333.41	4^+	1510.05	4^+			A_2=+0.16 *9*; A_4=+0.11 *11* δ: −2.7 *+11−21* or −0.24 *20* from γ(θ).
833.70 *11*	1.37[#] *7*	2343.76	6^+	1510.05	4^+			
[x]860.8 *3*	0.16[#] *4*							
[x]889.8 *3*	0.11 *3*							
900.96[@] *15*	0.48[@] *4*	2333.41	4^+	1432.254	2^+			E_γ: placed from a separate level at 2333.1, 2^+ in Adopted dataset, based on results in (α,2nγ).
900.96[@a] *15*	0.48[@] *4*	3738.4?	4^+	2837.4?	6^+			
906.1[a] *3*	0.18 *3*	3325.9?	4^+	2419.16	4^+			
909.54 *8*	0.62 *4*	2419.16	4^+	1510.05	4^+			
971.14 *3*	4.46 *6*	1758.58	2^+	787.412	2^+	(M1+E2)	−1.6 *+7−15*	A_2=−0.23 *3*; A_4=−0.02 *4*
975.2 *3*	0.21 *6*	2485.23	3^+	1510.05	4^+			
985.8 *2*	0.44 *8*	2418.38	2^+	1432.254	2^+			
987.6 *8*	0.10 *8*	2419.16	4^+	1432.254	2^+			
993.6[a] *9*	0.04	3325.9?	4^+	2333.41	4^+			
996.44 *13*	0.57 *6*	2506.46	5^+	1510.05	4^+			
1023.74 *3*	6.12 *8*	1758.58	2^+	734.83	0^+	Q		A_2=+0.242 *13*; A_4=−0.033 *17*
[x]1048.4 *4*	0.23[#] *4*							
1052.96 *13*	0.73 *5*	2485.23	3^+	1432.254	2^+			
1093.9[a] *3*	0.70 *17*	2526.2?	2^+	1432.254	2^+			
1110.78 *7*	0.81 *5*	2620.83	5^-	1510.05	4^+	D		A_2=−0.29 *8*; A_4=−0.04 *10*
[x]1167.8 *5*	0.20 *4*							
(1169)		2679.1?		1510.05	4^+			E_γ: from Adopted Gammas.
1175.66 *8*	1.04 *5*	1963.11	0^+	787.412	2^+			
1187.6 *3*	0.23 *4*	2619.84	3^+	1432.254	2^+			
1193.1 *4*	0.16 *4*	3210.7	(4^+)	2017.57	3^-			
1212.7[a] *5*	0.28 *10*	2644.8?	$(1,2^+)$	1432.254	2^+			
1230.17 *4*	5.3 *3*	2017.57	3^-	787.412	2^+	D+Q	−0.04 *1*	A_2=−0.275 *8*; A_4=+0.008 *12*
1250.14 *6*	1.22 *5*	2037.56	0^+	787.412	2^+			
1285.6 *2*	0.74 *6*	2795.66	4^-	1510.05	4^+			
1317.43 *11*	1.54 *6*	2104.77	3^+	787.412	2^+	(M1+E2)	+3.1 *6*	A_2=+0.46 *3*; A_4=+0.10 *4*
[x]1389.6 *3*	0.14 *3*							
1394.7[a] *3*	0.16 *4*	3738.4?	4^+	2343.76	6^+			
1419.41 *5*	2.45 *5*	2206.83	2^+	787.412	2^+			
1432.30 *3*	9.25 *11*	1432.254	2^+	0.0	0^+	Q		A_2=+0.280 *5*; A_4=−0.020 *6*
1437.0 *3*	0.25 *4*	2223.96	4^+	787.412	2^+			
[x]1468.6 *3*	0.20 *3*							
1546.06 *8*	1.74 *8*	2333.41	4^+	787.412	2^+			A_2=+0.318 *11*; A_4=+0.032 *13* Mult.,δ: 1984Me04 deduced

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^{98}Mo(n,n′γ) 1984Me04 (continued)

γ(^{98}Mo) (continued)

E_γ	I_γ	E_i(level)	J_i^π	E_f	J_f^π	Mult.[†]	Comments
							δ(E2/M1)=+0.45 *16*, but inconsistent with adopted ΔJ=2.
1631.03[&] *10*	0.50[&] *5*	2418.38	2^+	787.412	2^+		I_γ: total Iγ=0.87 *5*. Intensity division is based on Adopted Gammas.
1631.03[&] *10*	0.37[&] *5*	2419.16	4^+	787.412	2^+		E_γ: poor fit. Level-energy difference=1632.2.
[x]1690.4 *3*	0.25 *4*						
1697.8 *2*	0.70 *5*	2485.23	3^+	787.412	2^+		
1701.8 *6*	0.18 *5*	3211.9	(4^+)	1510.05	4^+		
1759.1 *2*	0.41 *5*	1758.58	2^+	0.0	0^+		
1774.31 *11*	1.21 *6*	2561.74	(2^-)	787.412	2^+		
1785.1 *2*	0.28 *4*	2572.67	3	787.412	2^+		
[x]1824.5 *4*	0.16 *3*						
1832.4 *2*	0.47 *4*	2619.84	3^+	787.412	2^+		
[x]1869.5 *3*	0.14 *3*						
1883.7[a] *4*	0.11 *3*	3393.8?	(4^+)	1510.05	4^+		
1909.6[@a] *6*	0.15[@] *4*	2644.8?	$(1,2^+)$	734.83	0^+		
1909.7[@a] *6*	0.15[@] *4*	3419.8?	4^+	1510.05	4^+		
1913.6 *2*	0.48 *5*	2701.03	2^+	787.412	2^+		
1945.7[a] *3*	0.46 *5*	3456.3?	(4^+)	1510.05	4^+		
1980.3[a] *3*	0.09 *3*	2767.7?	4^+	787.412	2^+		
2017.3 *3*	0.90 *5*	2017.57	3^-	0.0	0^+	[E3]	
2024.2[@a] *2*	0.31[@] *4*	3456.3?	(4^+)	1432.254	2^+		
[x]2082.2 *3*	0.24 *5*						
2128.1 *3*	0.27 *4*	2915.5	2^+	787.412	2^+		
[x]2201.8 *5*	0.17[#] *7*						

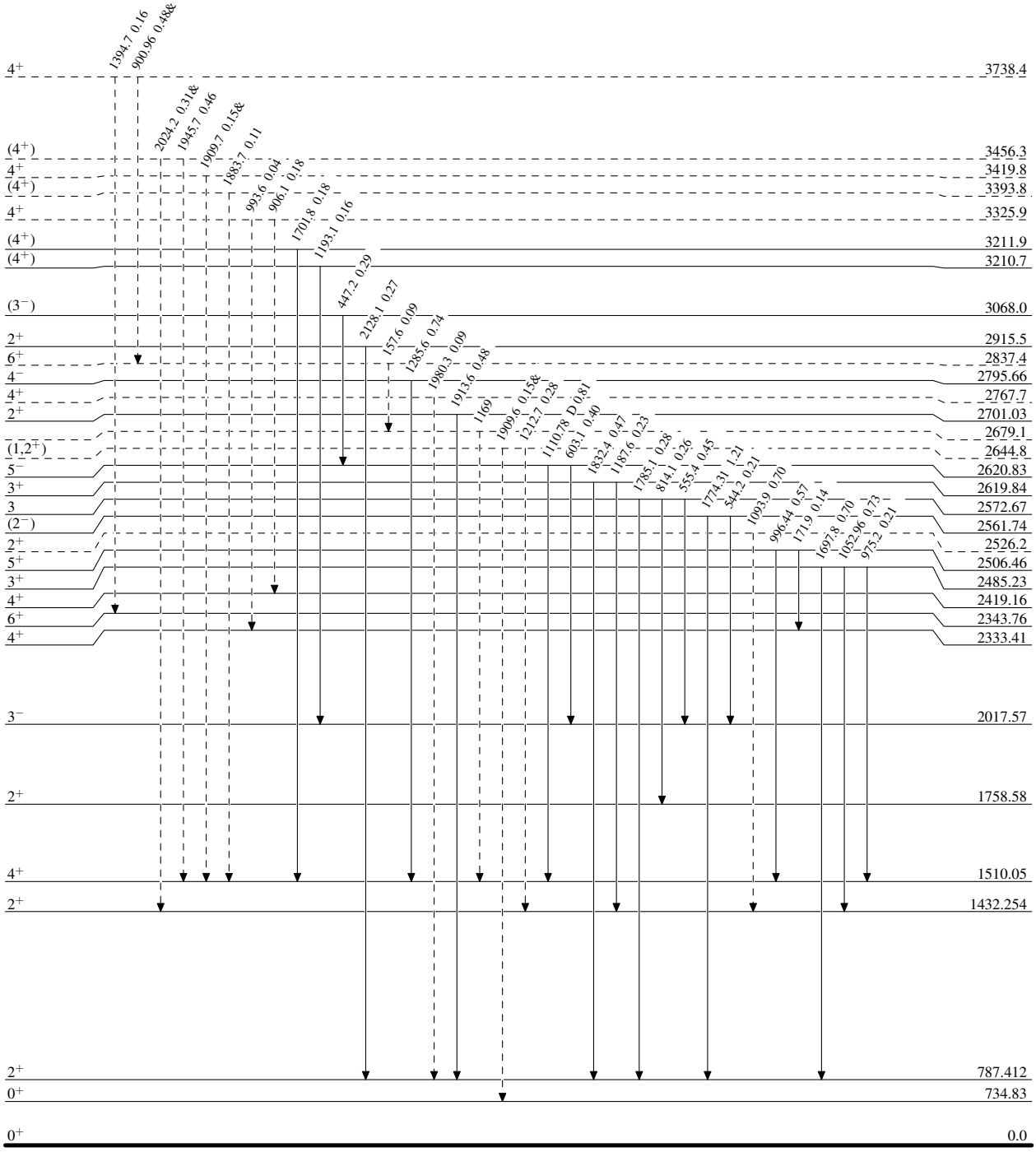
[†] From γ(θ) data in 1984Me04; large δ(Q/D) is assigned (M1+E2).
[‡] Probably a multiplet (1984Me04).
[#] Uncertain intensity due to presence of a strong background line (1984Me04).
[@] Multiply placed with undivided intensity.
[&] Multiply placed with intensity suitably divided.
[a] Placement of transition in the level scheme is uncertain.
[x] γ ray not placed in level scheme.

^{98}Mo(n,n′γ) 1984Me04

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)



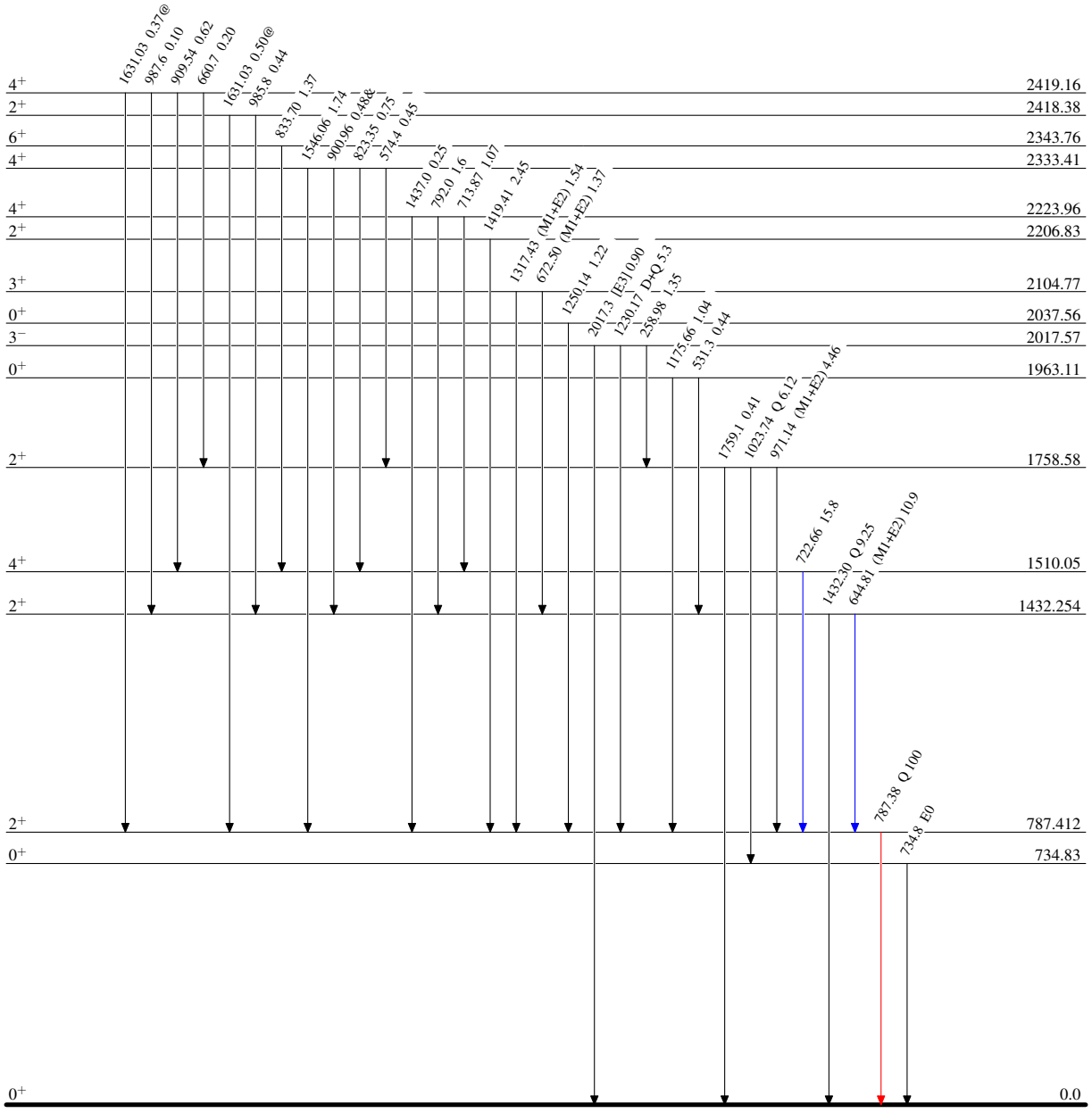
$^{98}_{42}Mo_{56}$

^{98}Mo(n,n′γ) 1984Me04

Level Scheme (continued)

Intensities: Relative I_γ
& Multiply placed: undivided intensity given
@ Multiply placed: intensity suitably divided

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



$^{98}_{42}Mo_{56}$