^{98}Mo(^{3}He,2nγ)   **1986Wh04**

| | History | | |
Type	Author	Citation	Literature Cutoff Date
Full Evaluation	E. Browne, J. K. Tuli	NDS 145, 25 (2017)	1-Jul-2017

E=13 MeV.

Measured γ, $\gamma\gamma$, $\gamma(\theta)$, linear pol, excit, $\gamma(\theta)$ from oriented nuclei (1986Wh04,1983Wh01).

^{99}Ru Levels

E(level)	J$^{\pi\dagger}$	E(level)	J$^{\pi\dagger}$	E(level)	J$^{\pi\dagger}$	E(level)	J$^{\pi\dagger}$
0	5/2$^+$	1118.4	(7/2$^+$)	1572.27	15/2$^-$	2020.7	15/2$^+$
89.76	3/2$^+$	1200.72	5/2$^+$	1583.9	(7/2,5/2)	2113	
322.28	3/2$^+$	1262.8	(9/2$^+$)	1685.17	7/2$^+$	2168.5	(7/2)
340.76	7/2$^+$	1277.76	7/2$^+$	1711.4		2224	(13/2$^+$,9/2$^+$)
442.8	1/2$^+$	1290.78	7/2$^-$	1718	9/2$^-$	2268.2	(19/2)$^-$
575.9	5/2$^+$	1306.5	(7/2$^+$)	1823		2383.1	9/2$^{(+)}$
617.9	7/2$^+$	1319.8	11/2$^+$	1847.3	(11/2$^+$)	2394.0	(17/2$^-$)
719.89	9/2$^+$	1382.5	(1/2$^+$,3/2)	1861.0	13/2$^-$	2401.8	(17/2)$^+$
734.15	5/2$^+$	1474.9	(7/2,5/2)	1899		2411.8	
1048.4	11/2$^+$	1497.84	13/2$^+$	1944.38	11/2$^-$	3354	
1069.9	11/2$^-$	1499.72	9/2$^+$	1966.1	13/2$^+$		

† From combination of $\gamma(\theta)$, linear pol, excit, $\gamma(\theta)$ from oriented nuclei data, for details of analysis see 1986Wh04.

^{98}Mo(^{3}He,2nγ)   **1986Wh04 (continued)**

$\gamma(^{99}$Ru)

E_γ	I_γ	E_i(level)	J_i^π	E_f	J_f^π	Mult.	$\delta^\ddagger$	$\alpha^\dagger$	Comments
89.76	310 8	89.76	$3/2^+$	0	$5/2^+$				
277.15	30 10	617.9	$7/2^+$	340.76	$7/2^+$				δ: $\delta=-0.3$ to $+2$.
322.28	230 5	322.28	$3/2^+$	0	$5/2^+$	M1+(E2)	-0.01 2	0.01367	α(K)=0.01196 17; α(L)=0.001400 20; α(M)=0.000257 4
									α(N)=4.16×10^{-5} 6; α(O)=2.20×10^{-6} 3
									Mult.: A$_2$=−0.08 2; pol=−0.18 4.
328.50	36 3	1048.4	$11/2^+$	719.89	$9/2^+$	M1+E2	$+0.17$ 2	0.01322	α(K)=0.01156 17; α(L)=0.001359 20; α(M)=0.000249 4
									α(N)=4.03×10^{-5} 6; α(O)=2.12×10^{-6} 3
									Mult.: A$_2$=−0.03 20.
340.76	1000	340.76	$7/2^+$	0	$5/2^+$	M1+(E2)	-0.020 5	0.01188	α(K)=0.01041 15; α(L)=0.001215 17; α(M)=0.000223 4
									α(N)=3.61×10^{-5} 5; α(O)=1.91×10^{-6} 3
									Mult.: A$_2$=−0.200 15; pol=−0.230 13 (in original article misprint
									pol=230 13).
350.02	458 5	1069.9	$11/2^-$	719.89	$9/2^+$	E1+(M2)	-0.15 4	0.0050 6	α(K)=0.0044 5; α(L)=0.00051 6; α(M)=9.4×10^{-5} 11
									α(N)=1.52×10^{-5} 18; α(O)=7.8×10^{-7} 9
									Mult.: A$_2$=−0.27 1; pol=+0.14 2.
352.73	111 3	442.8	$1/2^+$	89.76	$3/2^+$	M1		0.01090	α(K)=0.00955 14; α(L)=0.001114 16; α(M)=0.000204 3
									α(N)=3.31×10^{-5} 5; α(O)=1.750×10^{-6} 25
									Mult.: A$_2$=−0.06 5; pol=0.00 7.
379.13	29 3	719.89	$9/2^+$	340.76	$7/2^+$	M1+E2	$+0.7$ 2	0.0102 5	α(K)=0.0089 4; α(L)=0.00108 6; α(M)=0.000198 12
									α(N)=3.18×10^{-5} 18; α(O)=1.59×10^{-6} 6
									Mult.: A$_2$=−0.04 13; pol=−0.31 18.
466.66	35 10	1200.72	$5/2^+$	734.15	$5/2^+$				
486.14	160 5	575.9	$5/2^+$	89.76	$3/2^+$	M1+(E2)	-0.02 3	0.00498	α(K)=0.00436 7; α(L)=0.000504 7; α(M)=9.24×10^{-5} 13
									α(N)=1.498×10^{-5} 21; α(O)=7.97×10^{-7} 12
									Mult.: A$_2$=−0.19 3; pol=−0.21 6.
502.36	220 5	1572.27	$15/2^-$	1069.9	$11/2^-$	E2		0.00527	α(K)=0.00458 7; α(L)=0.000565 8; α(M)=0.0001037 15
									α(N)=1.658×10^{-5} 24; α(O)=7.98×10^{-7} 12
									Mult.: A$_2$=+0.11 3; pol=+0.32 6.
528.15	60 10	617.9	$7/2^+$	89.76	$3/2^+$				
528.7	22 5	1262.8	$(9/2^+)$	734.15	$5/2^+$				
542.9	39 7	1118.4	$(7/2^+)$	575.9	$5/2^+$				
575.90	96 10	575.9	$5/2^+$	0	$5/2^+$	M1+E2	-0.3 2	0.00335 6	α(K)=0.00294 5; α(L)=0.000339 7; α(M)=6.22×10^{-5} 13
									α(N)=1.007×10^{-5} 19; α(O)=5.33×10^{-7} 8
									Mult.: A$_2$=+0.01 4; pol=−0.02 8.
600.02	47 5	1319.8	$11/2^+$	719.89	$9/2^+$	M1+E2	$+0.8$ 5	0.00308 7	α(K)=0.00270 6; α(L)=0.000316 11; α(M)=5.80×10^{-5} 19
									α(N)=9.4×10^{-6} 3; α(O)=4.85×10^{-7} 7
									Mult.: A$_2$=+0.02 8; pol=+0.13 12.
617.91	410 5	617.9	$7/2^+$	0	$5/2^+$	M1+E2	-0.32 7	0.00283	α(K)=0.00249 4; α(L)=0.000287 5; α(M)=5.25×10^{-5} 8
									α(N)=8.50×10^{-6} 13; α(O)=4.51×10^{-7} 7
									Mult.: A$_2$=−0.39 2; pol=−0.07 3.
644.64	62 3	734.15	$5/2^+$	89.76	$3/2^+$				
648.0	48 5	1718	$9/2^-$	1069.9	$11/2^-$	M1+E2	$+0.30$ 30	0.00253	α(K)=0.00222 4; α(L)=0.000256 5; α(M)=4.68×10^{-5} 9

$\gamma(^{99}\text{Ru})$ (continued)

E_γ	I_γ	E_i(level)	J_i^π	E_f	J_f^π	Mult.	$\delta^\ddagger$	$\alpha^\dagger$	Comments
									$\alpha(N)=7.59\times10^{-6}$ *13*; $\alpha(O)=4.03\times10^{-7}$ *6*
									Mult.: A$_2$=+0.28 *15*; pol=−0.16 *14*.
659.8	25 *5*	1277.76	$7/2^+$	617.9	$7/2^+$	M1+E2	+0.05 *5*	0.00243	$\alpha(K)=0.00213$ *3*; $\alpha(L)=0.000244$ *4*; $\alpha(M)=4.47\times10^{-5}$ *7*
									$\alpha(N)=7.24\times10^{-6}$ *11*; $\alpha(O)=3.87\times10^{-7}$ *6*
									Mult.: A$_2$=−0.27 *9*; pol=−0.24 *14*.
689.2	30 *5*	1306.5	$(7/2^+)$	617.9	$7/2^+$				
696.2		2268.2	$(19/2)^-$	1572.27	$15/2^-$				E_γ,I_γ: from authors level scheme.
698.1	31 *5*	1899		1200.72	$5/2^+$				
702.00	102 *5*	1319.8	$11/2^+$	617.9	$7/2^+$	E2		0.00209	$\alpha(K)=0.00182$ *3*; $\alpha(L)=0.000217$ *3*; $\alpha(M)=3.98\times10^{-5}$ *6*
									$\alpha(N)=6.39\times10^{-6}$ *9*; $\alpha(O)=3.22\times10^{-7}$ *5*
									Mult.: A$_2$=+0.05 *3*; pol=+0.15 *10*.
707.64	310 *5*	1048.4	$11/2^+$	340.76	$7/2^+$	E2		0.00205	$\alpha(K)=0.00179$ *3*; $\alpha(L)=0.000212$ *3*; $\alpha(M)=3.89\times10^{-5}$ *6*
									$\alpha(N)=6.26\times10^{-6}$ *9*; $\alpha(O)=3.16\times10^{-7}$ *5*
									Mult.: A$_2$=+0.10 *2*; pol=+0.25 *6*.
719.89	1093 *5*	719.89	$9/2^+$	0	$5/2^+$	E2		0.00196	$\alpha(K)=0.001710$ *24*; $\alpha(L)=0.000203$ *3*; $\alpha(M)=3.72\times10^{-5}$ *6*
									$\alpha(N)=5.98\times10^{-6}$ *9*; $\alpha(O)=3.02\times10^{-7}$ *5*
									Mult.: A$_2$=+0.12 *1*; pol=+0.17 *2*.
729.15	26 *5*	1069.9	$11/2^-$	340.76	$7/2^+$				
734.15	189 *5*	734.15	$5/2^+$	0	$5/2^+$	M1+E2	−1.8 *1*	0.00187	$\alpha(K)=0.001636$ *23*; $\alpha(L)=0.000192$ *3*; $\alpha(M)=3.52\times10^{-5}$ *5*
									$\alpha(N)=5.67\times10^{-6}$ *8*; $\alpha(O)=2.91\times10^{-7}$ *4*
									Mult.: A$_2$=+0.05 *3*; pol=+0.04 *5*.
778.0	290 *15*	1497.84	$13/2^+$	719.89	$9/2^+$				
791.89	85 *5*	1861.0	$13/2^-$	1069.9	$11/2^-$	M1+E2	+0.18 *12*	1.60×10^{-3}	$\alpha(K)=0.001403$ *20*; $\alpha(L)=0.0001601$ *23*; $\alpha(M)=2.93\times10^{-5}$ *5*
									$\alpha(N)=4.76\times10^{-6}$ *7*; $\alpha(O)=2.55\times10^{-7}$ *4*
									Mult.: A$_2$=+0.35 *5*; pol=−0.7 *2*.
821.7	14 *3*	2394.0	$(17/2^-)$	1572.27	$15/2^-$	M1+E2	−1.2 *7*	0.00143 *4*	$\alpha(K)=0.00126$ *3*; $\alpha(L)=0.0001454$ *24*; $\alpha(M)=2.66\times10^{-5}$ *5*
									$\alpha(N)=4.30\times10^{-6}$ *8*; $\alpha(O)=2.25\times10^{-7}$ *8*
859.83	69 *5*	1200.72	$5/2^+$	340.76	$7/2^+$	M1+E2	−2.4 *8*	1.27×10^{-3} *2*	$\alpha(K)=0.001111$ *18*; $\alpha(L)=0.0001293$ *19*; $\alpha(M)=2.37\times10^{-5}$ *4*
									$\alpha(N)=3.82\times10^{-6}$ *6*; $\alpha(O)=1.98\times10^{-7}$ *4*
									Mult.: A$_2$=+0.18 *6*; pol=−0.9 *3*.
874.47	46 *5*	1944.38	$11/2^-$	1069.9	$11/2^-$	E2+M1	+1.4 *4*	1.23×10^{-3} *2*	$\alpha(K)=0.001081$ *19*; $\alpha(L)=0.0001250$ *19*; $\alpha(M)=2.29\times10^{-5}$ *4*
									$\alpha(N)=3.70\times10^{-6}$ *6*; $\alpha(O)=1.93\times10^{-7}$ *4*
									Mult.: A$_2$=−0.05 *9*; pol=+0.02 *26*.
899.0	33 *5*	1474.9	$(7/2,5/2)$	575.9	$5/2^+$				
904.0	30 *5*	2224	$(13/2^+,9/2^+)$	1319.8	$11/2^+$	D+(Q)	<+0.2		
904.0	43 *5*	2401.8	$(17/2)^+$	1497.84	$13/2^+$				

$^{98}\text{Mo}(^3\text{He},2n\gamma)$ **1986Wh04** (continued)

$\gamma(^{99}\text{Ru})$ (continued)

E_γ	I_γ	E_i(level)	J_i^π	E_f	J_f^π	Mult.	$\delta^\ddagger$	$\alpha^\dagger$	Comments
917.7	20 *4*	1966.1	13/2$^+$	1048.4	11/2$^+$	M1+E2	+0.4 *3*	1.14×10^{-3} *2*	α(K)=0.001003 *19*; α(L)=0.0001142 *19*; α(M)=2.09×10^{-5} *4* α(N)=3.39×10^{-6} *6*; α(O)=1.81×10^{-7} *4* Mult.: A$_2$=+0.26 *21*; pol=−0.62 *50*.
937.0	79 *8*	1277.76	7/2$^+$	340.76	7/2$^+$	M1+E2	−0.23 *15*	1.10×10^{-3} *2*	α(K)=0.000963 *15*; α(L)=0.0001095 *16*; α(M)=2.00×10^{-5} *3* α(N)=3.25×10^{-6} *5*; α(O)=1.75×10^{-7} *3*
940.0	8 *3*	1382.5	(1/2$^+$,3/2)	442.8	1/2$^+$				
965.28	34 *4*	1685.17	7/2$^+$	719.89	9/2$^+$	M1+E2	−0.45	1.02×10^{-3}	α(K)=0.000895 *13*; α(L)=0.0001018 *15*; α(M)=1.86×10^{-5} *3* α(N)=3.02×10^{-6} *5*; α(O)=1.617×10^{-7} *23* Mult.: A$_2$=+0.03 *14*; pol=−0.8 *3*.
972.3	41 *4*	2020.7	15/2$^+$	1048.4	11/2$^+$	E2		9.43×10^{-4}	α(K)=0.000826 *12*; α(L)=9.57×10^{-5} *14*; α(M)=1.753×10^{-5} *25* α(N)=2.83×10^{-6} *4*; α(O)=1.470×10^{-7} *21* Mult.: A$_2$=+0.23 *12*; pol=+0.8 *3*.
983.7	23 *7*	1306.5	(7/2$^+$)	322.28	3/2$^+$				Mult.: pol=+0.5 *5*.
991.5	16 *3*	1711.4		719.89	9/2$^+$				
1028.72	40	1118.4	(7/2$^+$)	89.76	3/2$^+$	(E2)		8.29×10^{-4}	α(K)=0.000727 *11*; α(L)=8.39×10^{-5} *12*; α(M)=1.537×10^{-5} *22* α(N)=2.48×10^{-6} *4*; α(O)=1.295×10^{-7} *19* Mult.: A$_2$=+0.18 *13*.
1064.0	13 *3*	2113		1048.4	11/2$^+$				
1118.4	50 *6*	1118.4	(7/2$^+$)	0	5/2$^+$	D			Mult.: A$_2$=−0.07 *7*.
1127.4	40 *5*	1847.3	(11/2$^+$)	719.89	9/2$^+$	M1+E2	−0.3 *1*	7.32×10^{-4}	α(K)=0.000643 *10*; α(L)=7.28×10^{-5} *11*; α(M)=1.332×10^{-5} *20* α(N)=2.16×10^{-6} *4*; α(O)=1.162×10^{-7} *18*; α(IPF)=1.125×10^{-6} *22* Mult.: A$_2$=−0.11 *8*; pol=−0.31 *30*.
1159.0	47 *5*	1499.72	9/2$^+$	340.76	7/2$^+$	E2+M1	−10 *1*	6.42×10^{-4}	α(K)=0.000560 *8*; α(L)=6.42×10^{-5} *9*; α(M)=1.175×10^{-5} *17* α(N)=1.90×10^{-6} *3*; α(O)=9.99×10^{-8} *14*; α(IPF)=3.19×10^{-6} *5* Mult.: A$_2$=−0.12 *11*; pol=−0.7 *3*.
1200.72	190 *5*	1200.72	5/2$^+$	0	5/2$^+$	M1+E2	−0.9 *1*	6.27×10^{-4} *10*	α(K)=0.000545 *8*; α(L)=6.19×10^{-5} *9*; α(M)=1.133×10^{-5} *17* α(N)=1.84×10^{-6} *3*; α(O)=9.80×10^{-8} *15*; α(IPF)=6.83×10^{-6} *13* Mult.: A$_2$=−0.15 *4*; pol=+0.11 *17*.
1243.0	29 *5*	1583.9	(7/2,5/2)	340.76	7/2$^+$				
1263.0	50 *5*	1262.8	(9/2$^+$)	0	5/2$^+$				Mult.: A$_2$=−0.17 *10*.
1290.78	104 *5*	1290.78	7/2$^-$	0	5/2$^+$	E1+(M2)	0.0	3.31×10^{-4}	α(K)=0.000209 *3*; α(L)=2.33×10^{-5} *4*; α(M)=4.25×10^{-6} *6* α(N)=6.89×10^{-7} *10*; α(O)=3.69×10^{-8} *6*; α(IPF)=9.42×10^{-5} *14* Mult.: A$_2$=−0.23 *10*; pol=−0.3 *6*.
1334.7	18 *2*	2383.1	9/2$^{(+)}$	1048.4	11/2$^+$				
1363.0	12 *3*	2411.8		1048.4	11/2$^+$				
1450.0	15 *5*	2168.5	(7/2)	719.89	9/2$^+$				

^{98}Mo(^{3}He,2nγ)   **1986Wh04 (continued)**

γ(^{99}Ru) (continued)

E_γ	I_γ	E_i(level)	J^π_i	E_f	J^π_f
1482.0	13 5	1823		340.76	7/2$^+$
1770	10 3	3354		1583.9	(7/2,5/2)

† Additional information 1.
‡ If No value given it was assumed δ=1.00 for E2/M1, δ=1.00 for E3/M2 and δ=0.10 for the other multipolarities.

^{98}Mo(^{3}He,2nγ)   1986Wh04

Level Scheme

Intensities: Relative I$_\gamma$

Legend

I$_\gamma$ < 2%×I$_\gamma^{max}$
I$_\gamma$ < 10%×I$_\gamma^{max}$
I$_\gamma$ > 10%×I$_\gamma^{max}$

$^{99}_{44}$Ru$_{55}$

From ENSDF

^{98}Mo(^{3}He,2nγ)   1986Wh04

Level Scheme (continued)

Intensities: Relative I$_\gamma$

Legend

I$_\gamma$ <   2%×I$_\gamma^{max}$
I$_\gamma$ < 10%×I$_\gamma^{max}$
I$_\gamma$ > 10%×I$_\gamma^{max}$

7/2⁻
7/2⁺
(9/2⁺)
5/2⁺

11/2⁺
11/2⁻
(7/2⁺)
5/2⁺
9/2⁺
5/2⁺
7/2⁺
5/2⁺
1/2⁺
7/2⁺
3/2⁺
3/2⁺
3/2⁺
5/2⁺

1290.78 E1+(M2) 104
937.0 M1+E2 79
659.8 M1+E2 25
1263.0 50
528.7 22
1200.72 M1+E2 190
859.83 M1+E2 69
466.66 35
1118.4 D 50
1028.72 (E2) 40
542.9 39
729.15 26
350.02 E1+(M2) 458
707.64 E2 310
328.50 M1+E2 36
734.15 M1+E2 189
644.64 62
719.89 E2 1093
379.13 M1+E2 29
617.91 M1+E2 410
528.15 60
277.15 30
575.90 M1+E2 96
486.14 M1+(E2) 160
352.73 M1 111
340.76 M1+(E2) 1000
322.28 M1+(E2) 230
89.76 310

1290.78
1277.16
1262.8
1200.72
1118.4
1069.9
1048.4
734.15
719.89
617.9
575.9
442.8
340.76
322.28
89.76
0