^{165}Ho(n,n′γ) 1981Ku17

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh and Jun Chen	NDS 194,460 (2024)	31-Oct-2022

1981Ku17: E=reactor neutrons. Measured Eγ, Iγ.
Others:
1978AhZX: Compilation and evaluation of (n,n′γ) data.
1972Bb11: E=400-1900 keV. Measured Eγ, Iγ at threshold energies.
1972An13: E=2.7 MeV. Measured γ(θ) and cross sections, but γ(θ) coefficients and values of cross sections are not listed in the paper.

^{165}Ho Levels

E(level)‡	Jπ†	E(level)‡	Jπ†	E(level)‡	Jπ†
0.0	7/2⁻	702 *3*	5/2⁻	1094.3 *5*	(13/2⁺)
94.700 *3*	9/2⁻	715.330 *9*	7/2⁺	1129.6	(5/2⁺)
209.804 *8*	11/2⁻	730.1 *3*	(9/2⁻)	1140.36 *4*	7/2⁺
345.0 *1*	13/2⁻	744.0 *3*	9/2⁺	1186.60 *5*	9/2⁺
361.671 *8*	3/2⁺	790.8	3/2⁻	1195.7 *4*	
419.6	5/2⁺	802.3 *2*	9/2⁻	1236	
429.4	1/2⁺	820 *1*	(13/2⁻)	1247.7 *6*	(9/2⁺)
449.3	3/2⁺	820.108 *12*	(9/2⁺)	1314.0 *7*	(11/2⁺)
491.044 *11*	7/2⁺	842.2 *3*	(11/2⁻)	1338.3 *20*	
499.0 *2*	15/2⁻	863.3 *6*	19/2⁻	1376.0 *15*	(11/2⁺)
515.472 *9*	3/2⁻	945.7 *8*	(11/2⁺)	1409.8 *8*	(5/2,7/2,9/2)
539.009 *10*	5/2⁺	955.6 *2*	(7/2⁻)	1416.4 *10*	(5/2⁻)
566.83 *9*	(5/2)⁻	968.9 *3*	(15/2⁻)	1479.7 *10*	(9/2⁻)
589.798 *14*	7/2⁺	973.7 *5*	(13/2⁻)	1483.2 *10*	7/2⁻
601.3 *2*	9/2⁺	995.092 *8*	5/2⁺	1534	
638.1 *2*	(7/2)⁻	1038.7	(1/2⁺)	1547 *2*	
672.7 *2*	17/2⁻	1055.76 *18*	5/2⁺	1573.9 *10*	(9/2⁻)
680.1	(1/2)⁻	1066.7	(3/2⁺)	1591.7 *10*	11/2⁻
688.7 *2*	(11/2⁻)	1079.625 *13*	7/2⁺		

† From the Adopted Levels.
‡ Values from 1981Ku17.

γ(^{165}Ho)

Eγ†	Iγ†	Ei(level)	Jiπ	Ef	Jfπ
(29.7)		449.3	3/2⁺	419.6	5/2⁺
(57.8)		419.6	5/2⁺	361.671	3/2⁺
(67.7)		429.4	1/2⁺	361.671	3/2⁺
(87.6)		449.3	3/2⁺	361.671	3/2⁺
94.73 *10*	43 *3*	94.700	9/2⁻	0.0	7/2⁻
115.10 *10*	22 *2*	209.804	11/2⁻	94.700	9/2⁻
119.3 *3*	2.0 *6*	539.009	5/2⁺	419.6	5/2⁺
129.6 *3*	2.0 *6*	491.044	7/2⁺	361.671	3/2⁺
135.4 *3*	10 *1*	345.0	13/2⁻	209.804	11/2⁻
153.9 *2*	4.6 *5*	499.0	15/2⁻	345.0	13/2⁻
[x]159.1 *5*	1.5 *4*				
[x]166.7 *3*	1.2 *4*				
170.1 *2*	4.5 *4*	589.798	7/2⁺	419.6	5/2⁺
174.1 *2*	2.5 *5*	672.7	17/2⁻	499.0	15/2⁻
181.8 *2*	3.0 *4*	601.3	9/2⁺	419.6	5/2⁺

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^{165}Ho(n,n′γ) 1981Ku17 (continued)

γ(^{165}Ho) (continued)

E_γ †	I_γ †	E_i(level)	J_i^π	E_f	J_f^π
190.6 *5*	0.8 *4*	863.3	$19/2^-$	672.7	$17/2^-$
201.1 *3*	1.7 *4*	802.3	$9/2^-$	601.3	$9/2^+$
205.0‡ *3*	≤2.0	566.83	$(5/2)^-$	361.671	$3/2^+$
205.0‡ *3*	2.0 *4*	744.0	$9/2^+$	539.009	$5/2^+$
209.8 *2*	2.5 *4*	209.804	$11/2^-$	0.0	$7/2^-$
212.5 *2*	≤7.3	802.3	$9/2^-$	589.798	$7/2^+$
225.5 *3*	1.5 *5*	955.6	$(7/2^-)$	730.1	$(9/2^-)$
228.0 *3*	0.7 *4*	589.798	$7/2^+$	361.671	$3/2^+$
x237.3‡ *3*	3.0 *10*				
250.1‡	≤9.0	345.0	$13/2^-$	94.700	$9/2^-$
251.9‡	≤9	680.1	$(1/2)^-$	429.4	$1/2^+$
251.9‡		702	$5/2^-$	449.3	$3/2^+$
251.9‡	≤9	790.8	$3/2^-$	539.009	$5/2^+$
253.3[a]	≤9.0	955.6	$(7/2^-)$	702	$5/2^-$
x268.9 *3*	2.1 *5*				
x269.4 *3*					
280.0 *3*	2.0 *5*	995.092	$5/2^+$	715.330	$7/2^+$
x285.3 *4*	2.0 *5*				
289.2 *3*	2.2 *5*	499.0	$15/2^-$	209.804	$11/2^-$
311.2 *3*	1.8 *4*	802.3	$9/2^-$	491.044	$7/2^+$
328.1 *5*	0.8 *4*	672.7	$17/2^-$	345.0	$13/2^-$
342.0[a]	0.8 *4*	790.8	$3/2^-$	449.3	$3/2^+$
361.80 *10*	100 *1*	361.671	$3/2^+$	0.0	$7/2^-$
361.8		790.8	$3/2^-$	429.4	$1/2^+$
416.6 *3*	3.1 *9*	955.6	$(7/2^-)$	539.009	$5/2^+$
428.7 *5*	0.9 *5*	638.1	$(7/2)^-$	209.804	$11/2^-$
451.8 *5*	1.2 *5*	1195.7		744.0	$9/2^+$
472.3 *3*	6.6 *6*	566.83	$(5/2)^-$	94.700	$9/2^-$
496.8 *5*	0.6 *4*	842.2	$(11/2^-)$	345.0	$13/2^-$
515.1 *2*	6.0 *2*	515.472	$3/2^-$	0.0	$7/2^-$
520.5 *4*	1.4 *3*	730.1	$(9/2^-)$	209.804	$11/2^-$
537.2[a]	1.0 *3*	955.6	$(7/2^-)$	419.6	$5/2^+$
543.5‡ *4*	≤5.5	638.1	$(7/2)^-$	94.700	$9/2^-$
557.4 *6*	0.4 *3*	1195.7		638.1	$(7/2)^-$
566.8‡ *2*	≤10	566.83	$(5/2)^-$	0.0	$7/2^-$
574.8&	6.8&	995.092	$5/2^+$	419.6	$5/2^+$
x600.8 *5*	1.2 *5*				
609.0‡ *8*	≤3.0	820	$(13/2^-)$	209.804	$11/2^-$
609.0‡ *8*	≤3.0	820.108	$(9/2^+)$	209.804	$11/2^-$
619.7‡ *8*	≤1.6	715.330	$7/2^+$	94.700	$9/2^-$
623.9‡ *6*	≤1.6	968.9	$(15/2^-)$	345.0	$13/2^-$
632.5 *6*	2.1 *4*	842.2	$(11/2^-)$	209.804	$11/2^-$
632.5 *6*	≤2.1	995.092	$5/2^+$	361.671	$3/2^+$
635.3 *5*	3.0 *4*	730.1	$(9/2^-)$	94.700	$9/2^-$
637.9 *6*	2.1 *4*	638.1	$(7/2)^-$	0.0	$7/2^-$
646.7‡ *6*	≤1.5	1066.7	$(3/2^+)$	419.6	$5/2^+$
x653.0 *6*	0.7 *3*				
660.0 *8*	≤1.8	1079.625	$7/2^+$	419.6	$5/2^+$
677.2 *6*	0.8 *4*	1038.7	$(1/2^+)$	361.671	$3/2^+$
688.8 *2*	8.0 *6*	688.7	$(11/2^-)$	0.0	$7/2^-$
699.9 *5*	1.0 *6*	1129.6	$(5/2^+)$	429.4	$1/2^+$

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^{165}Ho(n,n′γ) 1981Ku17 (continued)

γ(^{165}Ho) (continued)

E_γ †	I_γ †	E_i(level)	J_i^π	E_f	J_f^π
x707.3 5	1.5 6				
x711.9 5	0.7 4				
715.2 2	≤6.6	715.330	7/2+	0.0	7/2−
725.2‡ 2	≤4.8	820	(13/2−)	94.700	9/2−
725.2‡ 2	≤4.8	820.108	(9/2+)	94.700	9/2−
730.0 6	0.8 4	730.1	(9/2−)	0.0	7/2−
736.1 6	1.8 4	945.7	(11/2+)	209.804	11/2−
747.7 6	0.9 3	842.2	(11/2−)	94.700	9/2−
747.7 6	0.9 3	1094.3	(13/2+)	345.0	13/2−
759.1‡ 5	≤0.7	968.9	(15/2−)	209.804	11/2−
763.9 5	0.4 3	973.7	(13/2−)	209.804	11/2−
769.7&	1.6&	1591.7	11/2−	820.108	(9/2+)
x779.7 5	0.9 3				
x786.9@ 10	0.48@ 15				
788# 1	5.2#	1236		449.3	3/2+
819.5‡ 5	≤2.0	820.108	(9/2+)	0.0	7/2−
850.8 5	1.8 4	945.7	(11/2+)	94.700	9/2−
876		1236		361.671	3/2+
884.4 6	0.9 3	1094.3	(13/2+)	209.804	11/2−
x910.4@ 8	0.36@ 15				
x917.0‡ 8	1.0 4				
x926.8@ 12	0.27@ 13				
x939.9 6	1.0 4				
x980.9 6	1.0 4				
1045.5& 8	0.8&	1140.36	7/2+	94.700	9/2−
1054.9 6	1.4 4	1055.76	5/2+	0.0	7/2−
1079.8 6	2.0 5	1079.625	7/2+	0.0	7/2−
1092.6& 8	0.82&	1186.60	9/2+	94.700	9/2−
x1116.4 8	0.6 3				
1139.3 8	≤2.7	1140.36	7/2+	0.0	7/2−
1153.3 6	1.7 4	1247.7	(9/2+)	94.700	9/2−
1164.8 10	0.8 3	1376.0	(11/2+)	209.804	11/2−
1185.6 10	1.1 4	1186.60	9/2+	0.0	7/2−
1219.1 10	0.8 4	1314.0	(11/2+)	94.700	9/2−
1243.5# 20	5.6#	1338.3		94.700	9/2−
x1278.3 10	1.7 4				
x1315.5# 20	1.6#				
1324# 2	2.3#	1534		209.804	11/2−
1338.3# 20	1.6#	1338.3		0.0	7/2−
1364.2 10	1.2 3	1573.9	(9/2−)	209.804	11/2−
x1380.2# 20	7.3#				
1388&	0.6&	1483.2	7/2−	94.700	9/2−
1409.8@ 8	0.76@ 15	1409.8	(5/2,7/2,9/2)	0.0	7/2−
1416.4 10	0.9 3	1416.4	(5/2−)	0.0	7/2−
x1422.6# 20	0.6#				
1439# 2	0.4#	1534		94.700	9/2−
1479.7 10	1.3 4	1479.7	(9/2−)	0.0	7/2−
1497&	1.3&	1591.7	11/2−	94.700	9/2−
x1516# 2	1.1#				

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^{165}Ho(n,n′γ) 1981Ku17 (continued)

γ(^{165}Ho) (continued)

E_γ †	I_γ †	E_i(level)	E_f	J^π_f
[x]1527# 2	0.7#			
1547# 2	0.8#	1547	0.0	7/2⁻

† From 1981Ku17. Relative Iγ normalized to Iγ(361γ)=100.
‡ Complex line.
# From 1972Bb11; Iγ normalized to Iγ(361γ)=100 at E(n)≥1800 keV.
@ From 1978AhZX.
& From 1972Bb11.
a Placement of transition in the level scheme is uncertain.
x γ ray not placed in level scheme.

^{165}Ho(n,n′γ) 1981Ku17

Level Scheme

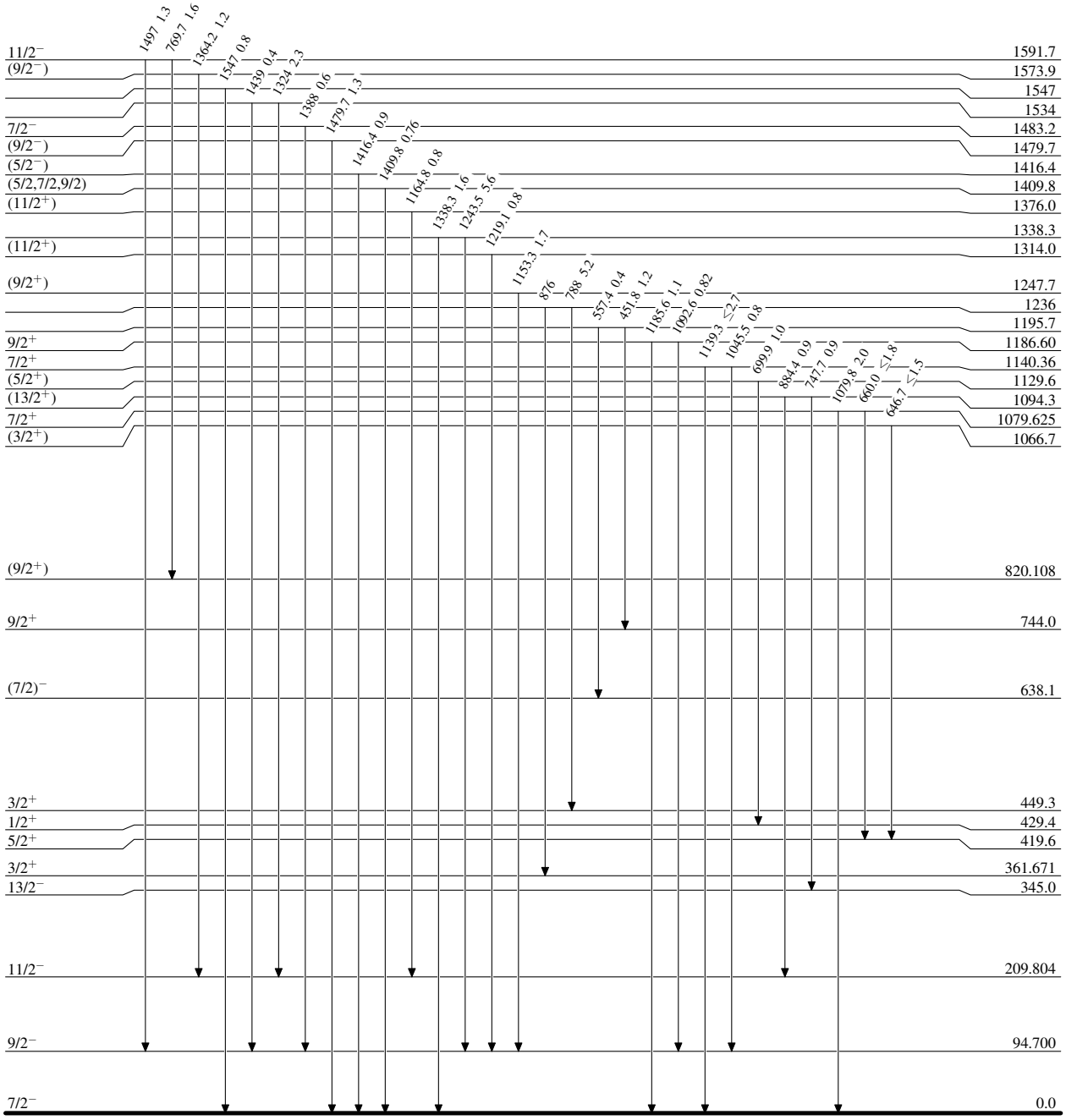
Intensities: Relative I_γ

Legend

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

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

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



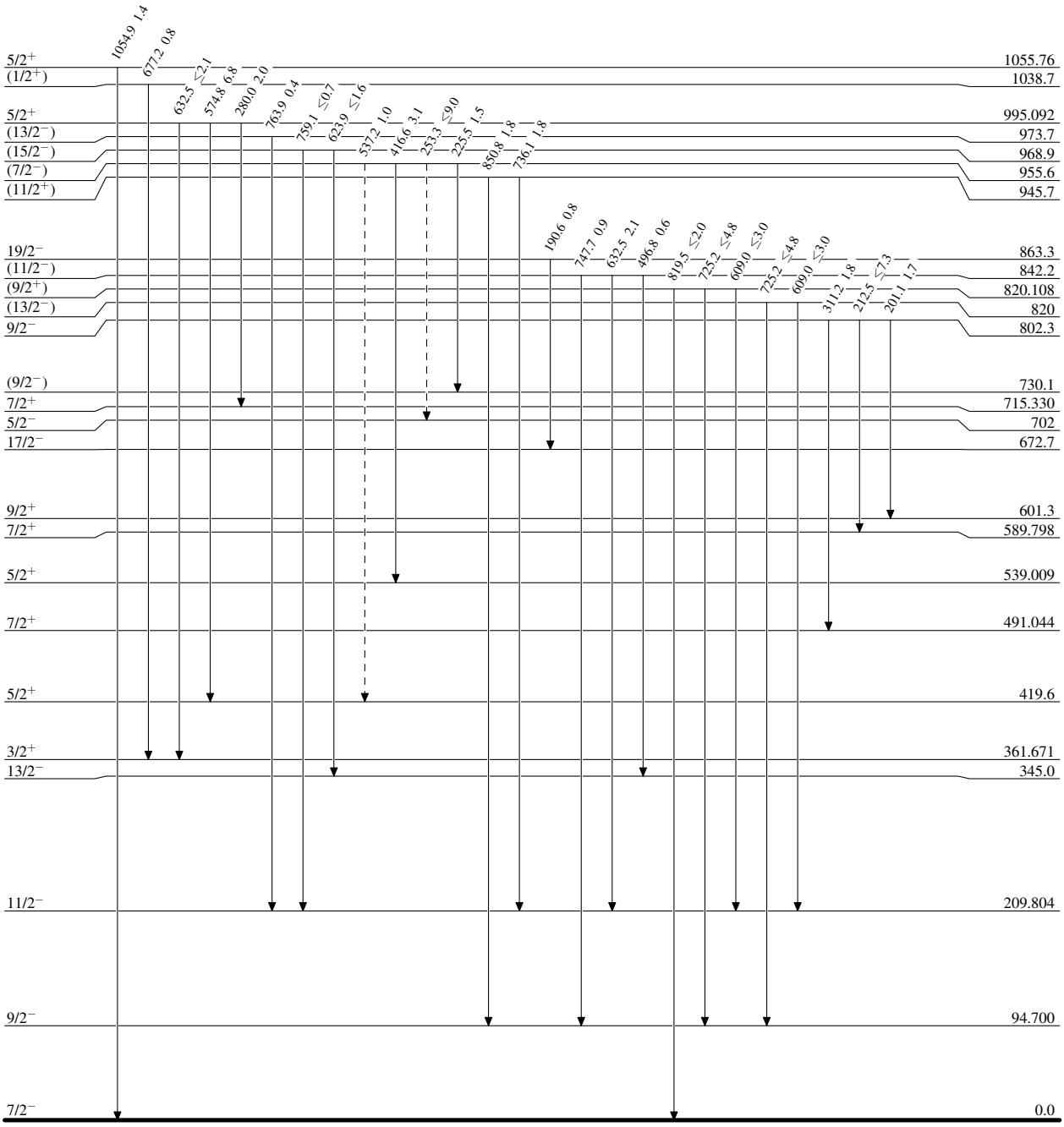
$^{165}_{67}Ho_{98}$

^{165}Ho(n,n′γ) 1981Ku17

Level Scheme (continued)

Intensities: Relative I_γ

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



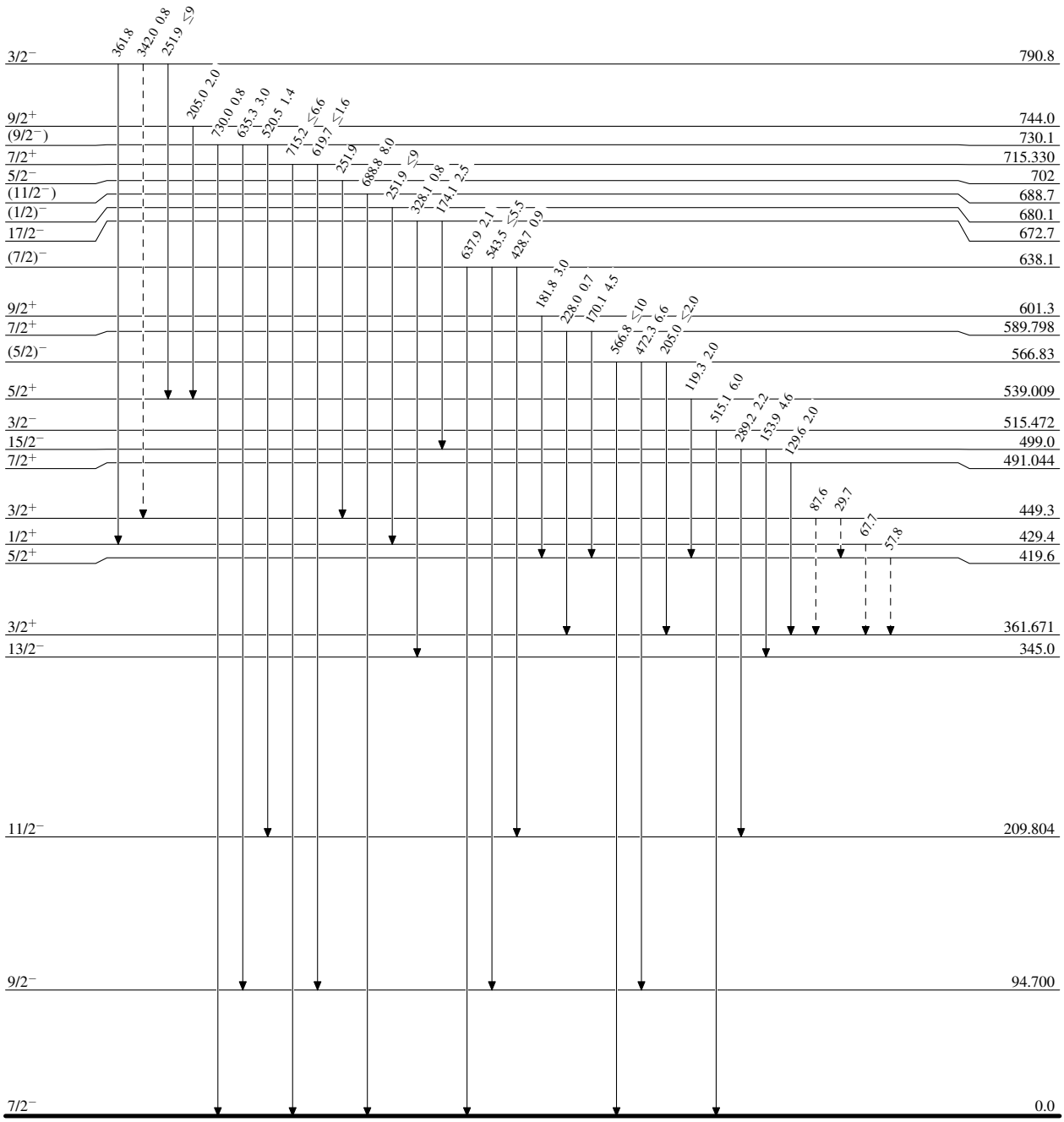
$^{165}_{67}Ho_{98}$

^{165}Ho(n,n′γ) 1981Ku17

Level Scheme (continued)

Intensities: Relative I_γ

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

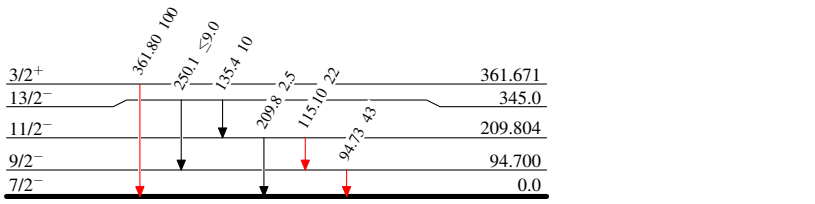


$^{165}_{67}Ho_{98}$

^{165}Ho(n,n′γ) 1981Ku17

Level Scheme (continued)

Intensities: Relative I_γ



$^{165}_{67}Ho_{98}$