

$^{165}\text{Ho}(\text{d},\text{p})$ 2000Pr03,1965St06

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	Coral M. Baglin	NDS 109, 1103 (2008)	1-Mar-2008

Target $J^\pi=7/2^-$.

2000Pr03: E(d)=17 MeV; Q3d spectrograph with proportional chamber (cathode strip readout) and scin, FWHM $\approx$ 5 keV;
 $\theta(\text{lab})=15^\circ, 30^\circ, 45^\circ$; E(level) $\leq$ 1.8 MeV; DWBA and Nilsson model calculations.

1965St06: E(d)=11, 12 MeV; metal and oxide Ho targets; magnetic spectrograph with nuclear emulsions, typical FWHM=8-13 keV,
 $\theta(\text{lab})=35^\circ, 45^\circ, 60^\circ, 65^\circ, 90^\circ$ and 95° ; measured E(p), I(p). Detailed report of (d,p) data summarized In 1967Mo05.

 ^{166}Ho Levels

E(level) [†]	J ^π [#]	I(P) (45°) [‡]	Comments
6.21 ^{&} 25	7 ⁻	6.1 8	
54.3 [@] 4	2 ⁻	3.3 7	
82.6 [@] 11	1 ⁻		
138.02 ^{&} 16	8 ⁻	20.7 18	
171.42 [@] 26	3 ⁻	5.2 8	other E: 167.6 20 (1965St06).
180.62 [@] 19	4 ⁻	9.8 9	
190.87 ^a 8	3 ⁺	126 4	
260.67 ^a 11	4 ⁺	80 7	
264.65 ^b 27	5 ⁺	23 6	I(p): poorly resolved from 261-keV peak.
287.5 ^{&} 5	9 ⁻	13 3	
295.42 ^c 11	6 ⁺	69 4	
329.83 [@] 24	5 ⁻	23 3	
348.28 ^a 10	5 ⁺	65 4	
372.1 ^d 4	4 ⁺	213 4	
378.90 20		77 3	E(level): possible doublet.
384.23 16		12.4 18	
423.58 ^c 20	7 ⁺	70 4	
426.04 ^g 20	1 ⁺	35 4	
430.5 ^f 5	2 ⁺	15.6 18	
453.77 ^a 10	6 ⁺	28 2	other E: 457 2 (1965St06).
464.50 ^g 13	2 ⁺	54 3	
470.88 ^d 25	5 ⁺	72 3	
476.5 ^{&} 4	3 ⁻	12 2	
482.2 ^f 6	3 ⁺	4.6 14	
514.42 ^b 15	7 ⁺	48 3	
522.1 ^g 4	3 ⁺	80 3	
529.01 ^l 24	6 ⁻	11 2	
547.96 ^f 5	4 ⁺	38 2	
558.55 ⁱ 9	4 ⁺	62 3	
562.6 ^{&} 4	4 ⁻		
567.92 ^e 21	1 ⁺	10.9 11	
576.5 ^a 4	7 ⁺	6.2 9	
588.13 ^d 8	6 ⁺	42 3	
592.52 ^h 18	3 ⁺	35 1	
598.36 ^g 22	4 ⁺	64 3	
604.88 ^e 12	2 ⁺	15 2	other E: 610 2 (1965St06).
634.91 ^f 19	5 ⁺	22 2	

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$^{165}\text{Ho}(\text{d,p})$ 2000Pr03,1965St06 (continued) ^{166}Ho Levels (continued)

E(level) [†]	J ^π [#]	I(P) (45°) [‡]	Comments
644.0 ^{<i>l</i>} 4	7 ⁻	7.5 13	
655.13 ^{<i>i</i>} 11	5 ⁺	46 2	
662.5 ^{<i>e</i>} 5	3 ⁺	15 2	
671.31 ^{<i>h</i>} 24	4 ⁺	13 1	
694.1 ^{<i>g</i>} 3	5 ⁺	23 3	
722.95 ^{<i>d</i>} 18	7 ⁺	10.3 12	
737.21 ^{<i>e</i>} 18	4 ⁺	20 1	
769.72 10		18 1	
807.01 ^{<i>g</i>} 16	6 ⁺	6.9 12	
814.86 ^{<i>k</i>} 27	3 ⁺	99 5	
819.06 20		17 2	
824.6 4			
831.44 ^{<i>e</i>} 23	5 ⁺	5.9 11	
837.9 3		3.5 10	
848.46 ^{<i>m</i>} 16	7 ⁺	7.7 9	
884.0 ^{<i>h</i>} 6	6 ⁺	3.6 8	
890.64 ^{<i>k</i>} 17	4 ⁺	82 3	
895.5 6		10.5 18	
904.64 ^{<i>n</i>} 13	2 ⁺	23 1	
911.4 ^{<i>j</i>} 3	6 ⁺	4.7 8	
925.21 16		22 1	
961.23 ^{<i>n</i>} 16	3 ⁺	11.6 12	
978.55 24		20 2	
985.74 ^{<i>k</i>} 18	5 ⁺	38 2	
1003.8 6		1.8 8	
1009.8 4		3.8 9	
1030.3 ^{<i>n</i>} 2	4 ⁺	8.8 10	
1038.4 3		12.3 11	
1055.4 4		9.9 10	
1088.6 7		2.3 7	other E: 1080 2 (1965St06).
1098.6 ^{<i>k</i>} 7	6 ⁺	8.2 10	
1114.7 8		3.3 8	
1130.4 10		6.5 6	
1138.4 10		8.3 6	
1148.5 11		6.0 8	other E: 1154 3 (1965St06).
1161.1 11		1.9 5	
1168.4 11		4.7 6	
1174.0 11		14.7 9	
1190.1 14		4.9 5	
1202.3 13		10.7 7	
1209.6 14		2.5 5	
1216.6 14		4.1 5	
1226.9 15		2.9 6	other E: 1221 2 (1965St06).
1240.4 15		8.4 9	
1245.1 16		7.2 9	
1264.9 18			
1271.2 17		19.0 11	
1280.7 18		17.3 11	
1290.9 18		16.7 12	
1297.1 19		15.5 12	
1303.7 19		7.5 11	
1326.9 21			
1334.5 21		15 2	

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$^{165}\text{Ho}(\text{d,p})$ [2000Pr03](#), [1965St06](#) (continued) ^{166}Ho Levels (continued)

E(level) [†]	I(P) (45°) [‡]	Comments
1341.7 21	13 2	
1350.2 22	13.8 12	
1358.8 22	29 2	other E: 1361 1 (1965St06).
1367.1 23	45 2	
1376.6 22	17 2	
1382.6 24	9.3 12	
1388.4 25	10.4 11	
1397.2 25	3.0 7	
1417 3	17.6 9	
1426 3	38.5 13	
1432 3	24.3 12	
1440 3	15.0 9	
1445 3	3.8 7	
1458 3	3.9 6	
1465 3	5.2 6	
1471 3	3.5 6	
1487 3	4.8 6	
1499 3	7.3 6	
1508 3	8.6 11	
1513 3	31 2	other E: 1518 1 (1965St06).
1528 3	12.0 11	
1533 3	14 2	
1537 1	10 2	E(level): from 1965St06 ; 1537 3 In 2000Pr03 .
1547 3	2.3 9	
1559 1	10 1	E(level): from 1965St06 ; 1558 3 In 2000Pr03 .
1569 4	4.7 7	
1577 4	10 1	
1593 4	3.8 8	
1601 4	8 2	
1605 4	5 2	other E: 1604 1 (1965St06).
1615 4	8 1	
1623 2	10 1	E(level): from 1965St06 ; 1623 4 In 2000Pr03 .
1636 4	9 1	
1642 1	6 1	E(level): from 1965St06 ; 1643 4 In 2000Pr03 .
1654 4	8 1	
1677 4	5 1	
1686 4	4 1	
1692 4	38 2	
1697	12 1	E(level): reported energy (1687 4) appears to Be a misprint since it is listed out of numerical order. 1697 seems a reasonable possibility.
1702 4	5 1	
1717 4	10 1	
1723 5	8 1	
1731 5	20 1	
1745 5	27 2	
1753 5	16 1	
1759 5	14 10	
1765 5	54 20	
1779 5	22 3	
1784 5	21 3	
1788 5	35 3	

[†] From [2000Pr03](#), except As noted. [1965St06](#) reported additional levels At 308 3, 401 2 ?, 942 3, 1105 1, 1122 2, 1312 1, 1661 1; since they were not confirmed In [2000Pr03](#), either they do not belong In ^{166}Ho or are unresolved doublets.

$^{165}\text{Ho(d,p)} \quad 2000\text{Pr03,1965St06 (continued)}$ $^{166}\text{Ho Levels (continued)}$

- [‡] Relative proton intensity At 45°. see 2000Pr03 for relative proton intensities At 15° and 30°.
- [#] From 2000Pr03, based on band structure deduced from comparison between the experimental cross section and theoretical cross sections calculated for available low-lying Nilsson orbitals and the DWBA.
- [@] Band(A): $K^\pi=0^-$, $(\pi 7/2[523])-(\nu 7/2[633])$ band. J^π established by cross section fingerprint for J=1 through 5 members of this configuration.
- [&] Band(B): $K^\pi=7^-$, $(\pi 7/2[523])+(\nu 7/2[633])$ band. J^π established by cross section fingerprint for J=7 through 9 members of this configuration.
- ^a Band(C): $K^\pi=3^+$, $(\pi 7/2[523])-(\nu 1/2[521])$ band. J^π established by cross section fingerprint for J=3 through 7 members of this configuration.
- ^b Band(D): $K^\pi=5^+$ band. Configuration: $(\pi 3/2[411])+(\nu 7/2[633])+(\pi 7/2[523])+(\nu 3/2[521])$.
- ^c Band(E): $K^\pi=6^+$, $(\pi 7/2[523])+(\nu 5/2[512])$ band.
- ^d Band(F): $K^\pi=4^+$, $(\pi 7/2[523])+(\nu 1/2[521])$ band. J^π established by cross section fingerprint for J=4 through 6 members of this configuration.
- ^e Band(G): $K^\pi=1^+$, $(\pi 7/2[523])-(\nu 5/2[523])$ band. J^π established by cross section fingerprint for J=1 through 5 members of this configuration.
- ^f Band(H): $K^\pi=2^+$ band. $(\pi 3/2[411])-(\nu 7/2[633])+(\pi 7/2[523])-(\nu 3/2[521])$ band.
- ^g Band(I): $K^\pi=1^+$, $(\pi 7/2[523])-(\nu 5/2[512])$ band. J^π established by cross section fingerprint for J=1 through 6 members of this configuration.
- ^h Band(J): $K^\pi=3^+$, $(\pi 1/2[411])-(\nu 7/2[633])$ band.
- ⁱ Band(K): $K^\pi=4^+$, $(\pi 7/2[523])+(\nu 1/2[510])$ band.
- ^j Band(L): $K^\pi=4^+$, $(\pi 1/2[411])+(\nu 7/2[633])$ band.
- ^k Band(M): $K^\pi=3^+$, $(\pi 7/2[523])-(\nu 1/2[510])$ band.
- ^l Band(N): $K^\pi=5^-$, $(\pi 7/2[523])+(\nu 7/2[633])$ -Q₂₂ band.
- ^m Band(O): $K^\pi=6^+$, $(\pi 7/2[523])+(\nu 5/2[523])$ band.
- ⁿ Band(P): $K^\pi=2^+$, $(\pi 7/2[523])-(\nu 3/2[521])$ band.

$^{165}\text{Ho}(\text{d,p})$ 2000Pr03,1965St06 (continued)

		Band(L): $K^\pi=4^+$, (π 1/2[411])+(ν 7/2[633]) band	
		6 ⁺	911.4
		Band(J): $K^\pi=3^+$, (π 1/2[411])-(ν 7/2[633]) band	
		6 ⁺	884.0
		Band(G): $K^\pi=1^+$, (π 7/2[523])-(ν 5/2[523]) band	
5 ⁺	831.44	Band(I): $K^\pi=1^+$, (π 7/2[523])-(ν 5/2[512]) band	
		6 ⁺	807.01
4 ⁺	737.21		
		5 ⁺	694.1
		Band(K): $K^\pi=4^+$, (π 7/2[523])+(ν 1/2[510]) band	
3 ⁺	662.5	4 ⁺	671.31
Band(H): $K^\pi=2^+$ band		5 ⁺	655.13
		5 ⁺	634.91
2 ⁺	604.88	4 ⁺	598.36
		3 ⁺	592.52
1 ⁺	567.92		
		4 ⁺	558.55
		4 ⁺	547.96
		3 ⁺	522.1
		3 ⁺	482.2
		2 ⁺	464.50
2 ⁺	430.5	1 ⁺	426.04

$^{165}\text{Ho(d,p)}$ 2000Pr03,1965St06 (continued)

Band(M): $K^\pi=3^+$, (π
7/2[523])-(ν 1/2[510])
band

6^+ 1098.6

Band(P): $K^\pi=2^+$, (π
7/2[523])-(ν 3/2[521])
band

4^+ 1030.3

5^+ 985.74

3^+ 961.23

2^+ 904.64

4^+ 890.64

Band(O): $K^\pi=6^+$, (π
7/2[523])+(ν 5/2[523])
band

7^+ 848.46

3^+ 814.86

Band(N): $K^\pi=5^-$, (π
7/2[523])+(ν
7/2[633])-(Q_{22} band

7^- 644.0

6^- 529.01