**(HI,xnγ) 1991Fa06**

| Type | Author | History Citation | Literature Cutoff Date |
|---|---|---|---|
| Full Evaluation | V. S. Shirley | NDS 75,377 (1995) | 1-Oct-1993 |

The level scheme and all data are from $^{160}$Gd($^{18}$O,5nγ) (1991Fa06), except where noted; E($^{18}$O)=88 MeV, pulsed beam; enriched foil targets (96%); measured Eγ, Iγ (Compton suppressed high-purity germanium detector, low energy photon spect, Compton suppressed detector array), γγ coin, γ(t), γ-ray angular distributions (10° intervals from 30° to 90°); determined $T_{1/2}$ limit for long-lived isomers receiving more than 1% feeding (≈60 μs); interpreted rotational structure, level configurations.

Data from $^{171}$Yb(α,2nγ) (1973Hu04,1980Wa23) and $^{164}$Dy($^{13}$C,4nγ), $^{168}$Er($^{9}$Be,4nγ) (1979Dr02) are included in this data set.

Other: 1971Bi13.

## $^{173}$Hf Levels

See $^{173}$Hf Adopted Levels for magnetic moments determined in $^{171}$Yb(α,2nγ) (1980Wa23).

| E(level) | Jπ† | E(level) | Jπ† | $T_{1/2}$ | E(level) | Jπ† |
|---|---|---|---|---|---|---|
| 0.0[&] | 1/2⁻ | 1497.0[b] 6 | 25/2⁺ | | 3027.1[b] 7 | 35/2⁺ |
| 69.2[&] 3 | 3/2⁻ | 1520?[c] 1 | (19/2⁺) | | 3069.4[g] 9 | (31/2⁻) |
| 81.3[&] 3 | 5/2⁻ | 1699.4[e] 6 | 19/2⁺ | ≤5[‡] ns | 3094.0[a] 5 | 33/2⁻ |
| 106.6[a] 4 | 5/2⁻ | 1721.3[a] 5 | 23/2⁻ | | 3104.5[d] 5 | (33/2⁻) |
| 196.5[a] 4 | 7/2⁻ | 1796.0[&] 6 | 23/2⁻ | | 3158.2[f] 8 | 33/2⁻ |
| 196.7[b] 5 | 7/2⁺ | 1812.3[d] 5 | (21/2⁻) | | 3250.4[b] 8 | 37/2⁺ |
| 241.7[&] 3 | 7/2⁻ | 1816.2[e] 7 | 21/2⁺ | | 3318.8[e] 8 | 33/2⁺ |
| 254.3[b] 5 | 9/2⁺ | 1821.3[b] 6 | 27/2⁺ | | 3345.8[g] 9 | (33/2⁻) |
| 261.8[&] 3 | 9/2⁻ | 1831.9[&] 5 | 25/2⁻ | | 3381.7[a] 7 | 35/2⁻ |
| 311.4[a] 4 | 9/2⁻ | 1981.0[f] 7 | 23/2⁻ | 19.5[#] ns 6 | 3473.7[f] 8 | 35/2⁻ |
| 334.9[b] 5 | 11/2⁺ | 1988.6[a] 5 | 25/2⁻ | | 3625.1[&] 8 | 35/2⁻ |
| 434.2[b] 6 | 13/2⁺ | 2005.4[e] 7 | 23/2⁺ | | 3639.3[&] 6 | 37/2⁻ |
| 450.4[a] 4 | 11/2⁻ | 2013.2[b] 7 | 29/2⁺ | | 3641.1[g] 9 | (35/2⁻) |
| 508.1[&] 4 | 11/2⁻ | 2144.2[f] 8 | 25/2⁻ | | 3641.9[e] 8 | 35/2⁺ |
| 535.5[&] 4 | 13/2⁻ | 2190.3[d] 5 | (25/2⁻) | | 3660.3[d] 6 | (37/2⁻) |
| 566.3[b] 6 | 15/2⁺ | 2222.0[e] 7 | 25/2⁺ | | 3684.8[a] 6 | 37/2⁻ |
| 612.7[a] 5 | 13/2⁻ | 2262.6[a] 6 | 27/2⁻ | | 3700.8[b] 8 | 39/2⁺ |
| 703.1[b] 6 | 17/2⁺ | 2353.1[f] 8 | 27/2⁻ | | 3810.0[f] 8 | 37/2⁻ |
| 796.5[a] 5 | 15/2⁻ | 2357.5[&] 7 | 27/2⁻ | | 3953.4[b] 8 | 41/2⁺ |
| 861.7[&] 4 | 15/2⁻ | 2392.0[&] 6 | 29/2⁻ | | 3957.9[g] 9 | (37/2⁻) |
| 894.5[&] 5 | 17/2⁻ | 2396.7[b] 7 | 31/2⁺ | | 3975.6[a] 8 | 39/2⁻ |
| 894.9[b] 6 | 19/2⁺ | 2463.7[e] 7 | 27/2⁺ | | 3981.4[e] 8 | 37/2⁺ |
| 1001.6[a] 5 | 17/2⁻ | 2538.6[a] 5 | 29/2⁻ | | 4165.0[f] 8 | 39/2⁻ |
| 1058.8[b] 6 | 21/2⁺ | 2595.0[f] 8 | 29/2⁻ | | 4255.7[&] 6 | 41/2⁻ |
| 1077.2[c] 6 | (13/2⁺) | 2600.5[b] 7 | 33/2⁺ | | 4297.8[g] 9 | (39/2⁻) |
| 1207.3[c] 6 | (15/2⁺) | 2616.9[d] 5 | (29/2⁻) | | 4313.3[a] 6 | 41/2⁻ |
| 1224.8[a] 5 | 19/2⁻ | 2728.1[e] 7 | 29/2⁺ | | 4324.1[&] 8 | 39/2⁻ |
| 1294.0[&] 5 | 19/2⁻ | 2813.6[g] 8 | (29/2⁻) | ≤3.5[@] ns | 4341.4[e] 8 | 39/2⁺ |
| 1316.4[b] 6 | 23/2⁺ | 2817.3[a] 7 | 31/2⁻ | | 4413.5[b] 8 | 43/2⁺ |
| 1329.9[&] 5 | 21/2⁻ | 2864.4[f] 8 | 31/2⁻ | | 4615.2[a] 9 | 43/2⁻ |
| 1354.1[c] 6 | (17/2⁺) | 2969.2[&] 7 | 31/2⁻ | | 4660[g] 2 | (41/2⁻) |
| 1466.3[a] 5 | 21/2⁻ | 3000.8[&] 6 | 33/2⁻ | | 4702.4[b] 9 | 45/2⁺ |
| 1472.7[d] 5 | (17/2⁻) | 3013.9[e] 7 | 31/2⁺ | | 4715[e] 2 | 41/2⁺ |

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**(HI,xnγ) 1991Fa06 (continued)**

$^{173}$Hf Levels (continued)

| E(level) | Jπ† | E(level) | Jπ† | E(level) | Jπ† |
|---|---|---|---|---|---|
| 4929.7[&] *7* | 45/2− | 5311.8[a] *9* | 47/2− | 6069.2[a] *10* | 51/2− |
| 4984[a] *1* | 45/2− | 5492.6[b] *9* | 49/2+ | 6329.0[b] *10* | 53/2+ |
| 5069[&] *2* | (43/2−) | 5664[&] *1* | (49/2−) | 6825.2[b] *10* | 55/2+ |
| 5165.6[b] *9* | 47/2+ | 5969.1[b] *9* | 51/2+ | 6884[a] *2* | 55/2− |
| | | | | 7203[b] *2* | 57/2+ |

† From γ-ray multipolarities, coincidence data, and complete analysis of rotational structure (authors′ values). See $^{173}$Hf Adopted Levels levels for evaluator′s assignments.
‡ γ(t) in $^{160}$Gd($^{18}$O,5nγ) (1991Fa06). Other value:≤6.5 ns (γγ(t), nγ(t) in $^{164}$Dy($^{13}$C,4nγ), $^{168}$Er($^{9}$Be,4nγ) (1979Dr02)). Other: 1980Wa23.
# From time spectra in integral perturbed angular distribution measurements ($^{171}$Yb(α,2nγ) (1980Wa23)). Other value: 20 ns *2* (γγ(t), nγ(t) in $^{164}$Dy($^{13}$C,4nγ), $^{168}$Er($^{9}$Be,4nγ) (1979Dr02)).
@ γ(t) in $^{160}$Gd($^{18}$O,5nγ) (1991Fa06).
& 1/2[521] band member.
a 5/2[512] band member.
b 7/2[633] (mixed $i_{13/2}$ neutron) band member.
c $K^{\pi}=13/2^{+}$ band member.
d Member of yrare extension of 1/2[521] band.
e $K^{\pi}=19/2^{+}$ band member.
f $K^{\pi}=23/2^{-}$ band member.
g $K^{\pi}=29/2^{-}$ band member.

γ($^{173}$Hf)

| $E_\gamma$† | $I_\gamma$‡ | $E_i$(level) | $J_i^\pi$ | $E_f$ | $J_f^\pi$ | Mult.# | δ@ | Comments |
|---|---|---|---|---|---|---|---|---|
| 37.4 *3* | | 106.6 | 5/2− | 69.2 | 3/2− | | | |
| 57.7 *3* | 550 *50* | 254.3 | 9/2+ | 196.7 | 7/2+ | | | |
| 69.3 *3* | 12 *5* | 69.2 | 3/2− | 0.0 | 1/2− | | | |
| 80.6 *3* | 284 *17* | 334.9 | 11/2+ | 254.3 | 9/2+ | | | |
| 81.2 *3* | 148 *30* | 81.3 | 5/2− | 0.0 | 1/2− | | | |
| 89.9 *3* | 187 *5* | 196.5 | 7/2− | 106.6 | 5/2− | | | |
| 90.1 *3* | 2267 *25* | 196.7 | 7/2+ | 106.6 | 5/2− | E1 | | Mult.: from α=1.43 *9*, as deduced from conversion-corrected intensity balance at 106.6 level. α(E1 theory)=1.47. |
| 99.2 *3* | 362 *15* | 434.2 | 13/2+ | 334.9 | 11/2+ | M1+E2 | −0.49 *3* | |
| 114.9 *3* | 164 *30* | 311.4 | 9/2− | 196.5 | 7/2− | (M1)[&] | | |
| 116.8 *3* | 189 *8* | 1816.2 | 21/2+ | 1699.4 | 19/2+ | M1+E2 | | |
| 130.2 *3* | 13 *5* | 1207.3 | (15/2+) | 1077.2 | (13/2+) | | | |
| 131.9 *3* | 388 *18* | 566.3 | 15/2+ | 434.2 | 13/2+ | M1+E2[&] | −0.21[a] *+29−19* | |
| 136.6 *3* | 299 *17* | 703.1 | 17/2+ | 566.3 | 15/2+ | M1+E2[&] | −0.25[a] *+23−16* | |
| 138.1 *3* | 105 *12* | 334.9 | 11/2+ | 196.7 | 7/2+ | | | |
| 139.0 *3* | 107 *30* | 450.4 | 11/2− | 311.4 | 9/2− | M1+E2[&] | +0.09[a] *2* | |
| 146.8 *3* | 20 *18* | 1354.1 | (17/2+) | 1207.3 | (15/2+) | | | |
| 160.2 *3* | 23 *5* | 241.7 | 7/2− | 81.3 | 5/2− | | | |
| 162.3 *3* | 72 *10* | 612.7 | 13/2− | 450.4 | 11/2− | M1+E2[&] | −0.05[a] *11* | |
| 163.3 *3* | 176 *11* | 2144.2 | 25/2− | 1981.0 | 23/2− | | | |

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**(HI,xnγ) 1991Fa06 (continued)**

γ($^{173}$Hf) (continued)

| $E_\gamma$[†] | $I_\gamma$[‡] | $E_i$(level) | $J_i^\pi$ | $E_f$ | $J_f^\pi$ | Mult.[#] | δ[@] | Comments |
|---|---|---|---|---|---|---|---|---|
| 164.0 *3* | 130 *11* | 1058.8 | 21/2$^+$ | 894.9 | 19/2$^+$ | M1+E2[&] | +0.17[a] *+12−11* | |
| 164.8 *3* | 353 *22* | 1981.0 | 23/2$^-$ | 1816.2 | 21/2$^+$ | E1 | | Mult.: only E1 is consistent with intensity balance at 1816.2 level. |
| 166[c] *1* | ≤5 | 1520? | (19/2$^+$) | 1354.1 | (17/2$^+$) | | | |
| 172.6 *3* | 300 *30* | 241.7 | 7/2$^-$ | 69.2 | 3/2$^-$ | | | |
| 180.0 *3* | 292 *20* | 434.2 | 13/2$^+$ | 254.3 | 9/2$^+$ | (E2) | | |
| 180.4 *3* | 35 *20* | 1497.0 | 25/2$^+$ | 1316.4 | 23/2$^+$ | | | |
| 180.5 *3* | 530 *4* | 261.8 | 9/2$^-$ | 81.3 | 5/2$^-$ | (E2)[&] | | |
| 183.8 *3* | 76 *10* | 796.5 | 15/2$^-$ | 612.7 | 13/2$^-$ | | | |
| 189.2 *3* | 118 *8* | 2005.4 | 23/2$^+$ | 1816.2 | 21/2$^+$ | | | |
| 191.7 *3* | 244 *21* | 894.9 | 19/2$^+$ | 703.1 | 17/2$^+$ | M1+E2[&] | −0.9[a] *+10−5* | |
| 192.0 *3* | 16 *12* | 2013.2 | 29/2$^+$ | 1821.3 | 27/2$^+$ | | | |
| 203.7 *3* | 10 *9* | 2600.5 | 33/2$^+$ | 2396.7 | 31/2$^+$ | | | |
| 204.8 *3* | 83 *20* | 311.4 | 9/2$^-$ | 106.6 | 5/2$^-$ | (E2) | | |
| 205.1 *3* | 52 *20* | 1001.6 | 17/2$^-$ | 796.5 | 15/2$^-$ | | | |
| 209.1 *3* | 190 *24* | 2353.1 | 27/2$^-$ | 2144.2 | 25/2$^-$ | | | |
| 216.6 *3* | 98 *9* | 2222.0 | 25/2$^+$ | 2005.4 | 23/2$^+$ | | | |
| 223.2 *3* | 32 *10* | 1224.8 | 19/2$^-$ | 1001.6 | 17/2$^-$ | M1+E2 | −0.20 *8* | |
| 231.5 *3* | 574 *27* | 566.3 | 15/2$^+$ | 334.9 | 11/2$^+$ | E2 | | |
| 241.5 *3* | 30 *10* | 1466.3 | 21/2$^-$ | 1224.8 | 19/2$^-$ | | | |
| 241.7 *3* | 70 *20* | 2463.7 | 27/2$^+$ | 2222.0 | 25/2$^+$ | | | |
| 242.0 *3* | 108 *20* | 2595.0 | 29/2$^-$ | 2353.1 | 27/2$^-$ | (M1+E2) | +0.25 *4* | |
| 246.3 *3* | 21 *5* | 508.1 | 11/2$^-$ | 261.8 | 9/2$^-$ | | | |
| 253.9 *3* | 111 *35* | 450.4 | 11/2$^-$ | 196.7 | 7/2$^+$ | | | |
| 255 *1* | 19 *10* | 1721.3 | 23/2$^-$ | 1466.3 | 21/2$^-$ | | | |
| 255.8 *3* | 85 *9* | 3069.4 | (31/2$^-$) | 2813.6 | (29/2$^-$) | | | |
| 257.5 *3* | 131 *16* | 1316.4 | 23/2$^+$ | 1058.8 | 21/2$^+$ | | | |
| 264.4 *3* | 60 *10* | 2728.1 | 29/2$^+$ | 2463.7 | 27/2$^+$ | | | |
| 266.4 *3* | 256 *5* | 508.1 | 11/2$^-$ | 241.7 | 7/2$^-$ | E2 | | |
| 267 *1* | 10 *6* | 1988.6 | 25/2$^-$ | 1721.3 | 23/2$^-$ | | | |
| 269.0 *3* | 973 *6* | 703.1 | 17/2$^+$ | 434.2 | 13/2$^+$ | (E2) | | |
| 269.2 *3* | 100 *20* | 2864.4 | 31/2$^-$ | 2595.0 | 29/2$^-$ | | | |
| 273.8 *3* | 534 *6* | 535.5 | 13/2$^-$ | 261.8 | 9/2$^-$ | E2 | | |
| 274 *1* | 8 *5* | 2262.6 | 27/2$^-$ | 1988.6 | 25/2$^-$ | | | |
| 276.4 *3* | 58 *10* | 3345.8 | (33/2$^-$) | 3069.4 | (31/2$^-$) | | | |
| 277[c] *1* | ≤5 | 1354.1 | (17/2$^+$) | 1077.2 | (13/2$^+$) | | | |
| 285.7 *3* | 35 *6* | 3013.9 | 31/2$^+$ | 2728.1 | 29/2$^+$ | | | |
| 293.8 *3* | 71 *20* | 3158.2 | 33/2$^-$ | 2864.4 | 31/2$^-$ | | | |
| 295.3 *3* | 35 *10* | 3641.1 | (35/2$^-$) | 3345.8 | (33/2$^-$) | | | |
| 301.3 *3* | 137 *4* | 612.7 | 13/2$^-$ | 311.4 | 9/2$^-$ | (E2)[&] | | |
| 304.8 *3* | 27 *7* | 3318.8 | 33/2$^+$ | 3013.9 | 31/2$^+$ | | | |
| 306[c] *1* | ≤5 | 2005.4 | 23/2$^+$ | 1699.4 | 19/2$^+$ | | | |
| 315.5 *3* | 46 *15* | 3473.7 | 35/2$^-$ | 3158.2 | 33/2$^-$ | | | |
| 316.8 *3* | 29 *10* | 3957.9 | (37/2$^-$) | 3641.1 | (35/2$^-$) | | | |
| 323.1 *3* | 35 *16* | 3641.9 | 35/2$^+$ | 3318.8 | 33/2$^+$ | | | |
| 324.2 *3* | 65 *20* | 1821.3 | 27/2$^+$ | 1497.0 | 25/2$^+$ | | | |
| 326 *1* | 72 *5* | 861.7 | 15/2$^-$ | 535.5 | 13/2$^-$ | | | |
| 328.7 *3* | 734 *44* | 894.9 | 19/2$^+$ | 566.3 | 15/2$^+$ | E2 | | |
| 336.3 *3* | 33 *10* | 3810.0 | 37/2$^-$ | 3473.7 | 35/2$^-$ | | | |
| 339.6 *3* | 18 *6* | 3981.4 | 37/2$^+$ | 3641.9 | 35/2$^+$ | | | |
| 339.7 *3* | 16 *2* | 1812.3 | (21/2$^-$) | 1472.7 | (17/2$^-$) | | | |
| 339.9 *3* | 6 *2* | 4297.8 | (39/2$^-$) | 3957.9 | (37/2$^-$) | | | |
| 345.2 *3* | 61 *10* | 1699.4 | 19/2$^+$ | 1354.1 | (17/2$^+$) | | | |
| 346.1 *3* | 225 *4* | 796.5 | 15/2$^-$ | 450.4 | 11/2$^-$ | (E2) | | |

Continued on next page (footnotes at end of table)

**(HI,xnγ) 1991Fa06 (continued)**

γ($^{173}$Hf) (continued)

| $E_\gamma$ [†] | $I_\gamma$ [‡] | $E_i$(level) | $J_i^\pi$ | $E_f$ | $J_f^\pi$ | Mult.[#] |
|---|---|---|---|---|---|---|
| 353.6 *3* | 201 *4* | 861.7 | 15/2$^-$ | 508.1 | 11/2$^-$ | E2 |
| 355.0 *3* | 21 *10* | 4165.0 | 39/2$^-$ | 3810.0 | 37/2$^-$ | |
| 355.7 *3* | 1000 *6* | 1058.8 | 21/2$^+$ | 703.1 | 17/2$^+$ | E2 |
| 358.5 *3* | 10 *4* | 2190.3 | (25/2$^-$) | 1831.9 | 25/2$^-$ | |
| 359.0 *3* | 538 *5* | 894.5 | 17/2$^-$ | 535.5 | 13/2$^-$ | E2 |
| 360.0 *3* | 21 *6* | 4341.4 | 39/2$^+$ | 3981.4 | 37/2$^+$ | |
| 362[c] *1* | ≤5 | 4660 | (41/2$^-$) | 4297.8 | (39/2$^-$) | |
| 372.0 *3* | 15 *6* | 2353.1 | 27/2$^-$ | 1981.0 | 23/2$^-$ | |
| 378.0 *3* | 33 *3* | 2190.3 | (25/2$^-$) | 1812.3 | (21/2$^-$) | |
| 383.0 *3* | 9 *6* | 1699.4 | 19/2$^+$ | 1316.4 | 23/2$^+$ | |
| 383.5 *3* | 24 *10* | 2396.7 | 31/2$^+$ | 2013.2 | 29/2$^+$ | |
| 388.9 *3* | 198 *4* | 1001.6 | 17/2$^-$ | 612.7 | 13/2$^-$ | E2 |
| 400 *1* | ≤5 | 1294.0 | 19/2$^-$ | 894.5 | 17/2$^-$ | |
| 405.8 *3* | 18 *6* | 2222.0 | 25/2$^+$ | 1816.2 | 21/2$^+$ | |
| 421.5 *3* | 673 *35* | 1316.4 | 23/2$^+$ | 894.9 | 19/2$^+$ | E2 |
| 426.6[b] *3* | 38[b] *3* | 2616.9 | (29/2$^-$) | 2190.3 | (25/2$^-$) | |
| 426.6[b] *3* | 20[b] *10* | 3027.1 | 35/2$^+$ | 2600.5 | 33/2$^+$ | |
| 428.3 *3* | 206 *3* | 1224.8 | 19/2$^-$ | 796.5 | 15/2$^-$ | E2 |
| 432.2 *3* | 195 *3* | 1294.0 | 19/2$^-$ | 861.7 | 15/2$^-$ | E2 |
| 435.4 *3* | 387 *5* | 1329.9 | 21/2$^-$ | 894.5 | 17/2$^-$ | E2 |
| 438.3 *3* | 842 *5* | 1497.0 | 25/2$^+$ | 1058.8 | 21/2$^+$ | E2 |
| 450.8 *3* | 24 *4* | 2595.0 | 29/2$^-$ | 2144.2 | 25/2$^-$ | |
| 458.4 *3* | 54 *9* | 2463.7 | 27/2$^+$ | 2005.4 | 23/2$^+$ | |
| 459.2 *3* | 23 *4* | 1354.1 | (17/2$^+$) | 894.9 | 19/2$^+$ | |
| 460.5 *3* | 132 *11* | 2813.6 | (29/2$^-$) | 2353.1 | 27/2$^-$ | E2 |
| 464.7 *3* | 194 *4* | 1466.3 | 21/2$^-$ | 1001.6 | 17/2$^-$ | E2 |
| 482.4 *3* | 17 *3* | 1812.3 | (21/2$^-$) | 1329.9 | 21/2$^-$ | |
| 487.6 *3* | 25 *3* | 3104.5 | (33/2$^-$) | 2616.9 | (29/2$^-$) | |
| 492.2 *3* | 12 *2* | 1699.4 | 19/2$^+$ | 1207.3 | (15/2$^+$) | |
| 496.5 *3* | 164 *4* | 1721.3 | 23/2$^-$ | 1224.8 | 19/2$^-$ | E2 |
| 502.0[b] *3* | 175[b] *11* | 1796.0 | 23/2$^-$ | 1294.0 | 19/2$^-$ | (E2) |
| 502.0[b] *3* | 16[b] *7* | 1831.9 | 25/2$^-$ | 1329.9 | 21/2$^-$ | (E2) |
| 504.2 *3* | ≤5 | 1207.3 | (15/2$^+$) | 703.1 | 17/2$^+$ | |
| 504.9 *3* | 570 *40* | 1821.3 | 27/2$^+$ | 1316.4 | 23/2$^+$ | E2 |
| 506.1 *3* | 52 *9* | 2728.1 | 29/2$^+$ | 2222.0 | 25/2$^+$ | |
| 511.0 *3* | ≤5 | 1077.2 | (13/2$^+$) | 566.3 | 15/2$^+$ | |
| 511.3 *3* | 32 *5* | 2864.4 | 31/2$^-$ | 2353.1 | 27/2$^-$ | |
| 516.2 *3* | 717 *43* | 2013.2 | 29/2$^+$ | 1497.0 | 25/2$^+$ | E2 |
| 522.3 *3* | 149 *4* | 1988.6 | 25/2$^-$ | 1466.3 | 21/2$^-$ | E2 |
| 532.2 *3* | 17 *4* | 3345.8 | (33/2$^-$) | 2813.6 | (29/2$^-$) | |
| 535[c] *1* | ≤5 | 3639.3 | 37/2$^-$ | 3104.5 | (33/2$^-$) | |
| 541.3 *3* | 137 *4* | 2262.6 | 27/2$^-$ | 1721.3 | 23/2$^-$ | E2 |
| 545.3 *3* | 15 *6* | 3639.3 | 37/2$^-$ | 3094.0 | 33/2$^-$ | E2 |
| 550.0 *3* | 140 *4* | 2538.6 | 29/2$^-$ | 1988.6 | 25/2$^-$ | |
| 550.3 *3* | 71 *9* | 3013.9 | 31/2$^+$ | 2463.7 | 27/2$^+$ | |
| 554.7 *3* | 121 *20* | 2817.3 | 31/2$^-$ | 2262.6 | 27/2$^-$ | (E2) |
| 555.4 *3* | 82 *17* | 3094.0 | 33/2$^-$ | 2538.6 | 29/2$^-$ | |
| 560.1 *3* | 198 *9* | 2392.0 | 29/2$^-$ | 1831.9 | 25/2$^-$ | (E2) |
| 561.5 *3* | 135 *6* | 2357.5 | 27/2$^-$ | 1796.0 | 23/2$^-$ | |
| 563.3 *3* | 32 *5* | 3158.2 | 33/2$^-$ | 2595.0 | 29/2$^-$ | |
| 564.4 *3* | 71 *11* | 3381.7 | 35/2$^-$ | 2817.3 | 31/2$^-$ | |
| 565.8 *3* | 40 *9* | 3104.5 | (33/2$^-$) | 2538.6 | 29/2$^-$ | |
| 571.7 *3* | 23 *4* | 3641.1 | (35/2$^-$) | 3069.4 | (31/2$^-$) | |
| 575.3 *3* | 437 *49* | 2396.7 | 31/2$^+$ | 1821.3 | 27/2$^+$ | E2 |

Continued on next page (footnotes at end of table)

**(HI,xnγ) 1991Fa06 (continued)**

γ($^{173}$Hf) (continued)

| $E_\gamma$[†] | $I_\gamma$[‡] | $E_i$(level) | $J_i^\pi$ | $E_f$ | $J_f^\pi$ | Mult.[#] |
|---|---|---|---|---|---|---|
| 578.2 *3* | 13 *2* | 1472.7 | (17/2$^-$) | 894.5 | 17/2$^-$ | |
| 580.3 *3* | 12 *4* | 3684.8 | 37/2$^-$ | 3104.5 | (33/2$^-$) | |
| 587.4 *3* | 527 *52* | 2600.5 | 33/2$^+$ | 2013.2 | 29/2$^+$ | E2 |
| 590.7 *3* | 39 *13* | 3318.8 | 33/2$^+$ | 2728.1 | 29/2$^+$ | |
| 590.8 *3* | 17 *5* | 3684.8 | 37/2$^-$ | 3094.0 | 33/2$^-$ | (E2) |
| 593.9 *3* | 62 *17* | 3975.6 | 39/2$^-$ | 3381.7 | 35/2$^-$ | |
| 595.4 *3* | 20 *4* | 4255.7 | 41/2$^-$ | 3660.3 | (37/2$^-$) | |
| 608.8 *3* | 198 *9* | 3000.8 | 33/2$^-$ | 2392.0 | 29/2$^-$ | (E2) |
| 609.3 *3* | 35 *6* | 3473.7 | 35/2$^-$ | 2864.4 | 31/2$^-$ | |
| 611.7 *3* | 92 *10* | 2969.2 | 31/2$^-$ | 2357.5 | 27/2$^-$ | |
| 612.1[c] *3* | ≤5 | 3957.9 | (37/2$^-$) | 3345.8 | (33/2$^-$) | |
| 616.4 *3* | 52 *16* | 4255.7 | 41/2$^-$ | 3639.3 | 37/2$^-$ | |
| 628.1 *3* | 50 *12* | 3641.9 | 35/2$^+$ | 3013.9 | 31/2$^+$ | |
| 628.5 *3* | 17 *15* | 4313.3 | 41/2$^-$ | 3684.8 | 37/2$^-$ | |
| 630.4 *3* | 292 *46* | 3027.1 | 35/2$^+$ | 2396.7 | 31/2$^+$ | E2 |
| 638.4 *3* | 80 *10* | 3639.3 | 37/2$^-$ | 3000.8 | 33/2$^-$ | |
| 639.6 *3* | 31 *6* | 4615.2 | 43/2$^-$ | 3975.6 | 39/2$^-$ | |
| 640.5 *3* | 123 *35* | 1699.4 | 19/2$^+$ | 1058.8 | 21/2$^+$ | |
| 641[c] *1* | ≤5 | 1207.3 | (15/2$^+$) | 566.3 | 15/2$^+$ | |
| 643[c] *1* | ≤5 | 1077.2 | (13/2$^+$) | 434.2 | 13/2$^+$ | |
| 649.9 *3* | 335 *47* | 3250.4 | 37/2$^+$ | 2600.5 | 33/2$^+$ | E2 |
| 651.0 *3* | 11 *5* | 1354.1 | (17/2$^+$) | 703.1 | 17/2$^+$ | |
| 651.8 *3* | 24 *5* | 3810.0 | 37/2$^-$ | 3158.2 | 33/2$^-$ | |
| 655.9 *3* | 54 *8* | 3625.1 | 35/2$^-$ | 2969.2 | 31/2$^-$ | |
| 659.4 *3* | 81 *10* | 3660.3 | (37/2$^-$) | 3000.8 | 33/2$^-$ | |
| 662.5 *3* | 28 *12* | 3981.4 | 37/2$^+$ | 3318.8 | 33/2$^+$ | |
| 671 *1* | ≤5 | 4984 | 45/2$^-$ | 4313.3 | 41/2$^-$ | |
| 673.7 *3* | 199 *27* | 3700.8 | 39/2$^+$ | 3027.1 | 35/2$^+$ | E2 |
| 674.0 *3* | 27 *10* | 4929.7 | 45/2$^-$ | 4255.7 | 41/2$^-$ | |
| 691.3[c] *3* | 24 *7* | 4165.0 | 39/2$^-$ | 3473.7 | 35/2$^-$ | |
| 696.6 *3* | 25 *10* | 5311.8 | 47/2$^-$ | 4615.2 | 43/2$^-$ | |
| 699.0 *3* | 34 *14* | 4324.1 | 39/2$^-$ | 3625.1 | 35/2$^-$ | |
| 699.5 *3* | 10 *5* | 4341.4 | 39/2$^+$ | 3641.9 | 35/2$^+$ | |
| 703.0 *3* | 188 *27* | 3953.4 | 41/2$^+$ | 3250.4 | 37/2$^+$ | |
| 712.7 *3* | 96 *23* | 4413.5 | 43/2$^+$ | 3700.8 | 39/2$^+$ | |
| 734[bc] *1* | ≤10[b] | 4715 | 41/2$^+$ | 3981.4 | 37/2$^+$ | |
| 734[bc] *1* | ≤5[b] | 5664 | (49/2$^-$) | 4929.7 | 45/2$^-$ | |
| 745[c] *1* | ≤5 | 5069 | (43/2$^-$) | 4324.1 | 39/2$^-$ | |
| 749.0 *3* | 81 *24* | 4702.4 | 45/2$^+$ | 3953.4 | 41/2$^+$ | |
| 752.1 *3* | 80 *25* | 5165.6 | 47/2$^+$ | 4413.5 | 43/2$^+$ | |
| 757.4 *3* | 13 *5* | 6069.2 | 51/2$^-$ | 5311.8 | 47/2$^-$ | |
| 790.2 *3* | 50 *19* | 5492.6 | 49/2$^+$ | 4702.4 | 45/2$^+$ | |
| 803.5 *3* | 60 *21* | 5969.1 | 51/2$^+$ | 5165.6 | 47/2$^+$ | |
| 804.6 *3* | 89 *24* | 1699.4 | 19/2$^+$ | 894.9 | 19/2$^+$ | |
| 815 *1* | 7 *3* | 6884 | 55/2$^-$ | 6069.2 | 51/2$^-$ | |
| 836.4 *3* | 39 *18* | 6329.0 | 53/2$^+$ | 5492.6 | 49/2$^+$ | |
| 856.1 *3* | 28 *18* | 6825.2 | 55/2$^+$ | 5969.1 | 51/2$^+$ | |
| 874 *1* | 21 *12* | 7203 | 57/2$^+$ | 6329.0 | 53/2$^+$ | |
| 996.2 *3* | 274 *21* | 1699.4 | 19/2$^+$ | 703.1 | 17/2$^+$ | E2 |
| 1132.3 *3* | 16 *7* | 1699.4 | 19/2$^+$ | 566.3 | 15/2$^+$ | |

[†] ΔE estimated by evaluator from precision of authors′ energies.

Continued on next page (footnotes at end of table)

**(HI,xnγ) 1991Fa06 (continued)**

γ($^{173}$Hf) (continued)

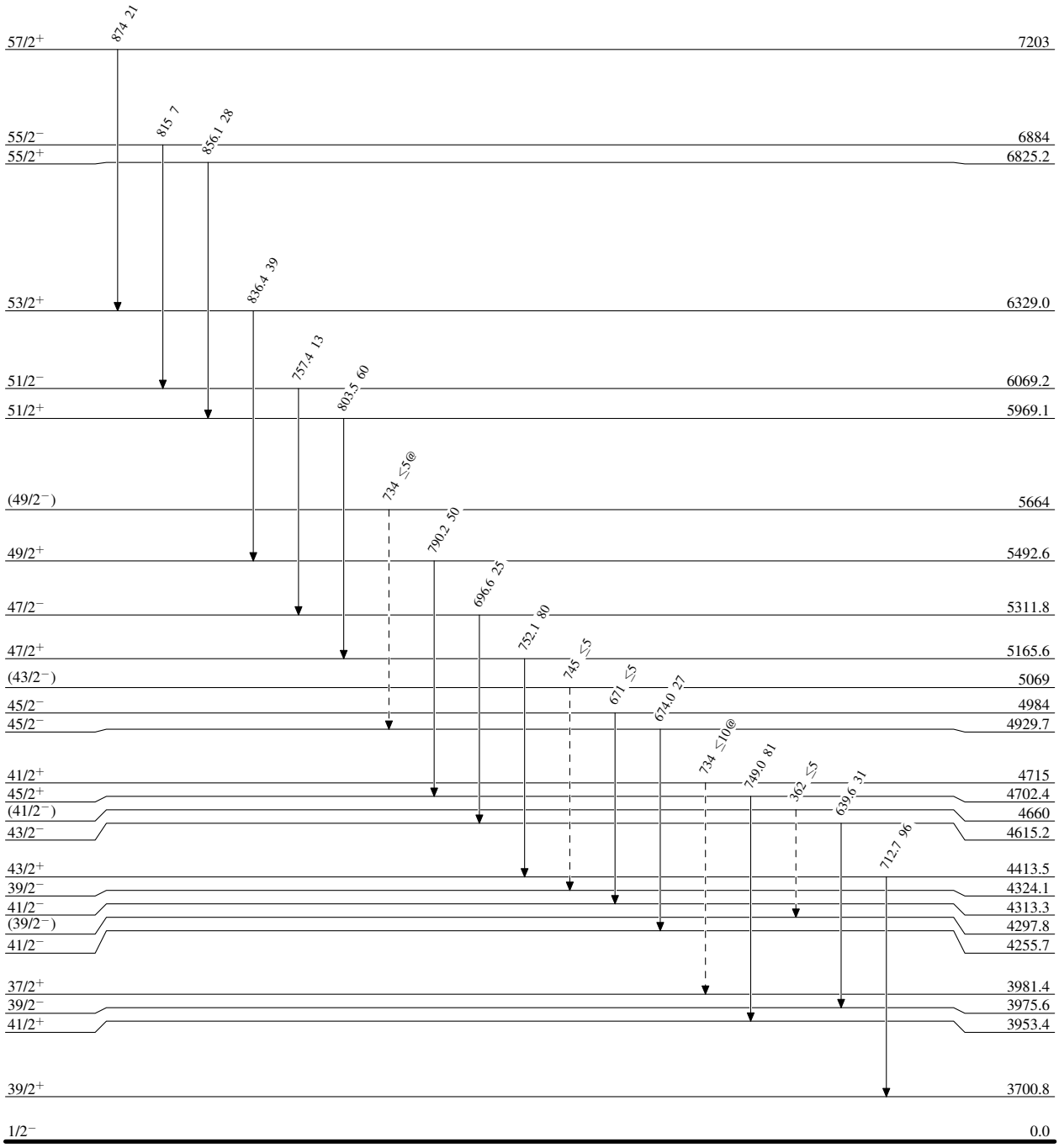
‡ Arbitrary units relative to Iγ(355.7γ)=1000 *6*.
# Inferred from γ-ray angular distributions (1991Fa06), except where noted; transitions with positive $A_2$ are assumed to be stretched E2, whereas those with negative $A_2$ that are placed relative to cascading E2 γ′s, are assumed to be M1+E2.
@ From γ-ray angular distributions (1991Fa06), except where noted.
& Inferred from γ-ray angular distributions in 1973Hu04.
a From analysis by 1976Kr21 of γ-ray angular-distribution data in 1973Hu04.
b Multiply placed with intensity suitably divided.
c Placement of transition in the level scheme is uncertain.

**(HI,xnγ) 1991Fa06**

## Level Scheme

Intensities: Relative Iγ for $^{160}$Gd($^{18}$O,5nγ), E($^{18}$O)=88 MeV
@ Multiply placed: intensity suitably divided

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



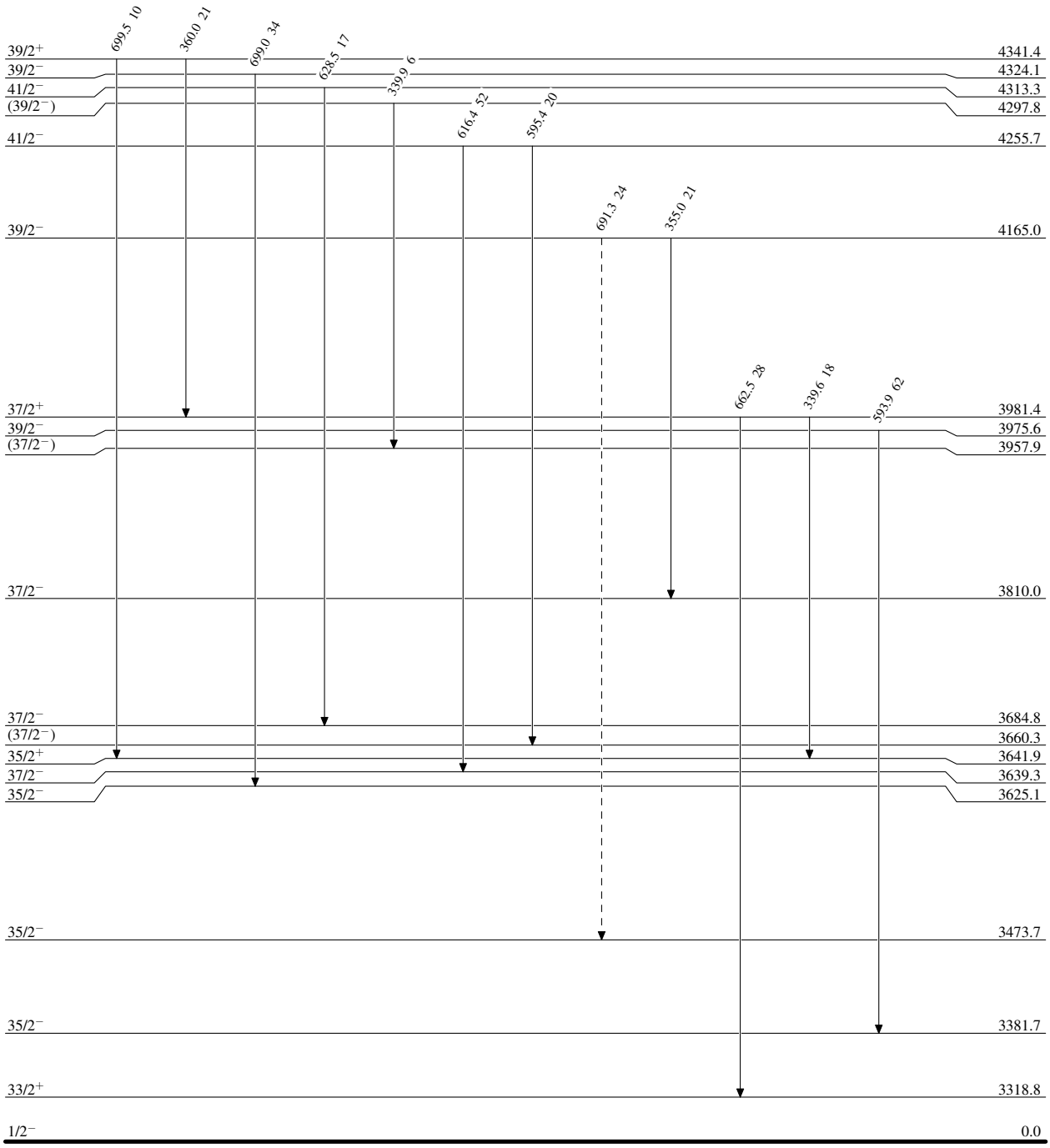

$^{173}_{72}Hf_{101}$

**(HI,xnγ) 1991Fa06**

## Level Scheme (continued)

Intensities: Relative Iγ for $^{160}$Gd($^{18}$O,5nγ), E($^{18}$O)=88 MeV
@ Multiply placed: intensity suitably divided

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



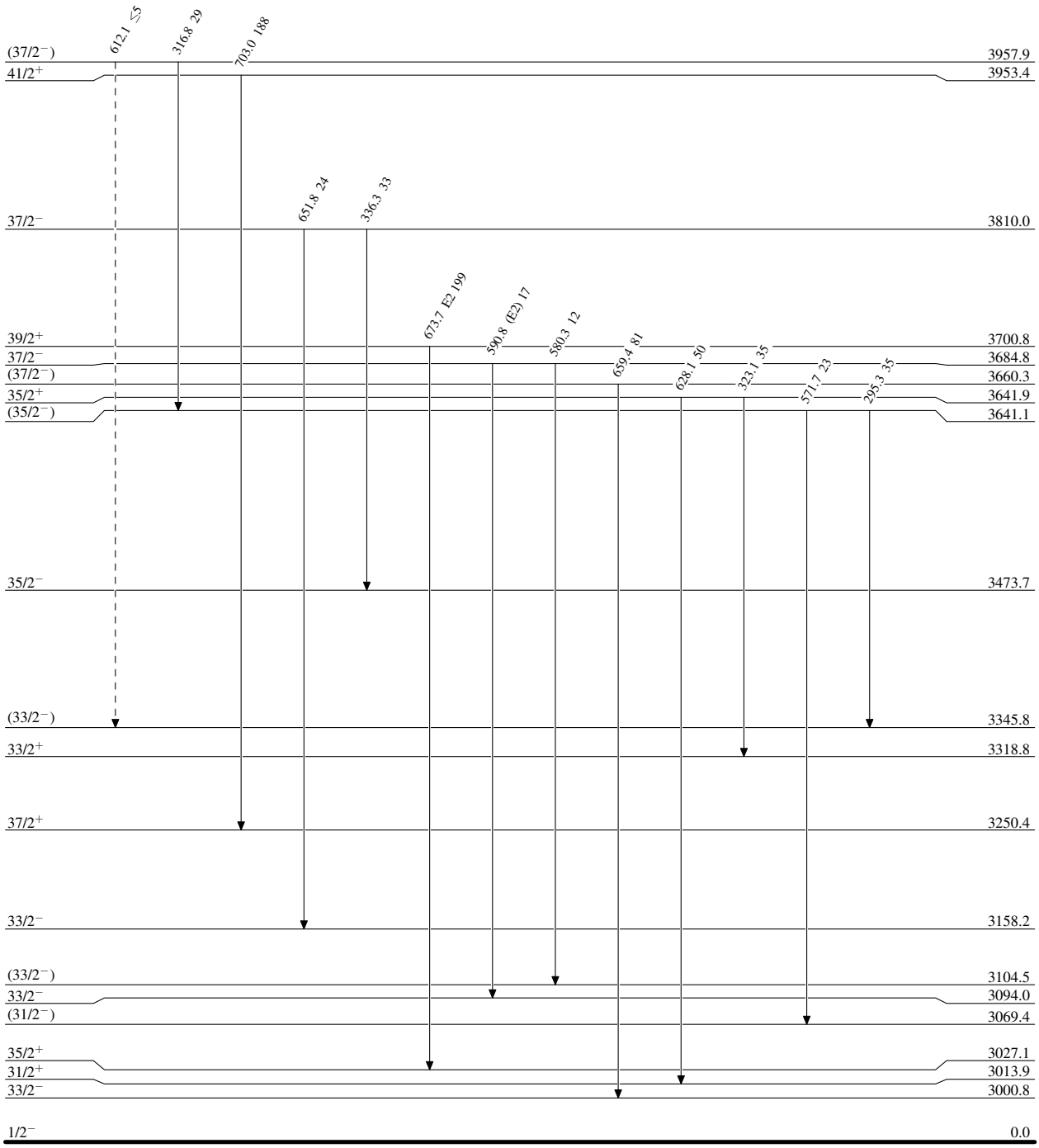

$^{173}_{72}Hf_{101}$

**(HI,xnγ) 1991Fa06**

## Level Scheme (continued)

Intensities: Relative Iγ for $^{160}$Gd($^{18}$O,5nγ), E($^{18}$O)=88 MeV
@ Multiply placed: intensity suitably divided

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



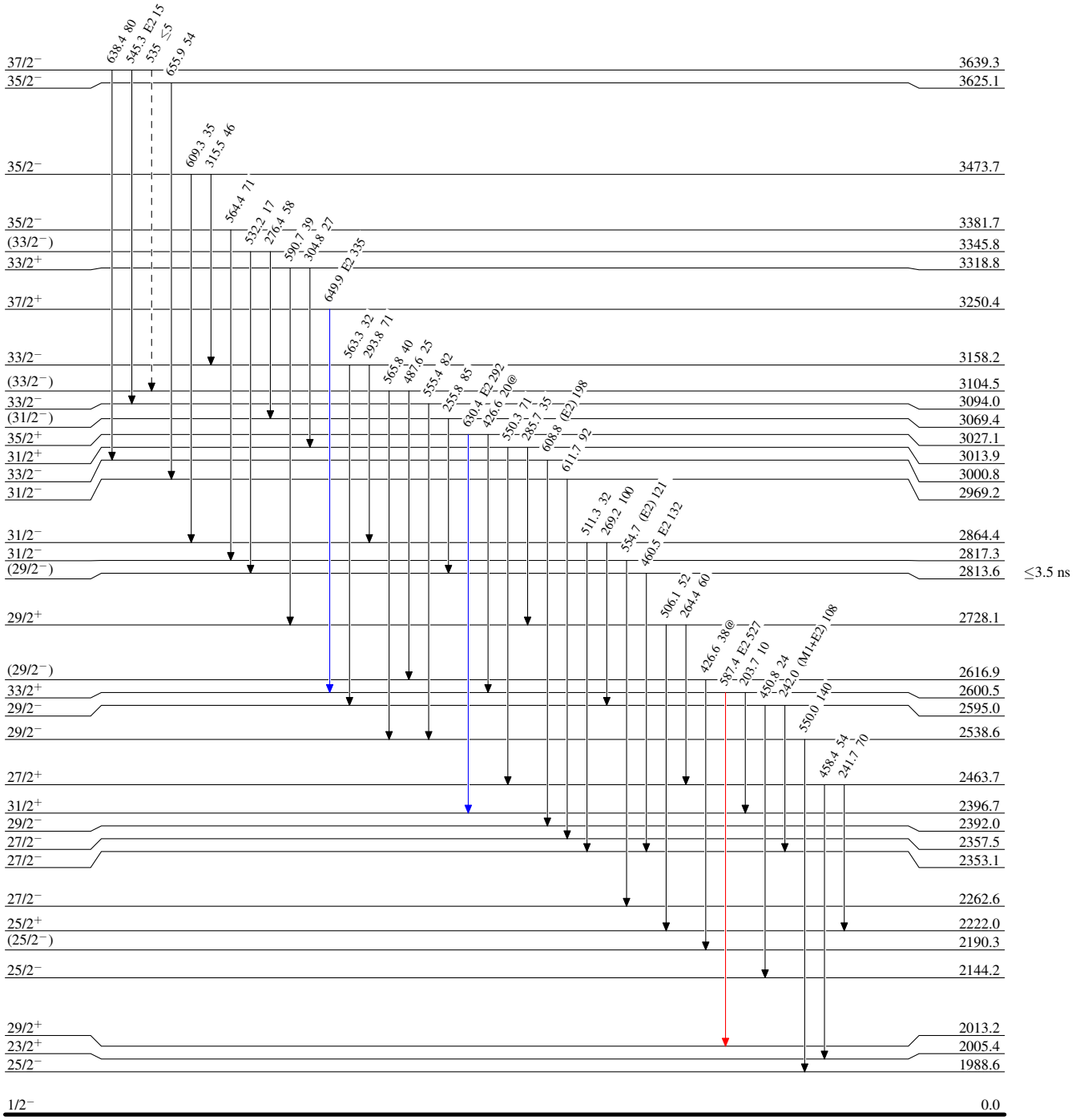

$^{173}_{72}Hf_{101}$

**(HI,xnγ) 1991Fa06**

## Level Scheme (continued)

Intensities: Relative Iγ for $^{160}$Gd($^{18}$O,5nγ), E($^{18}$O)=88 MeV
@ Multiply placed: intensity suitably divided

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



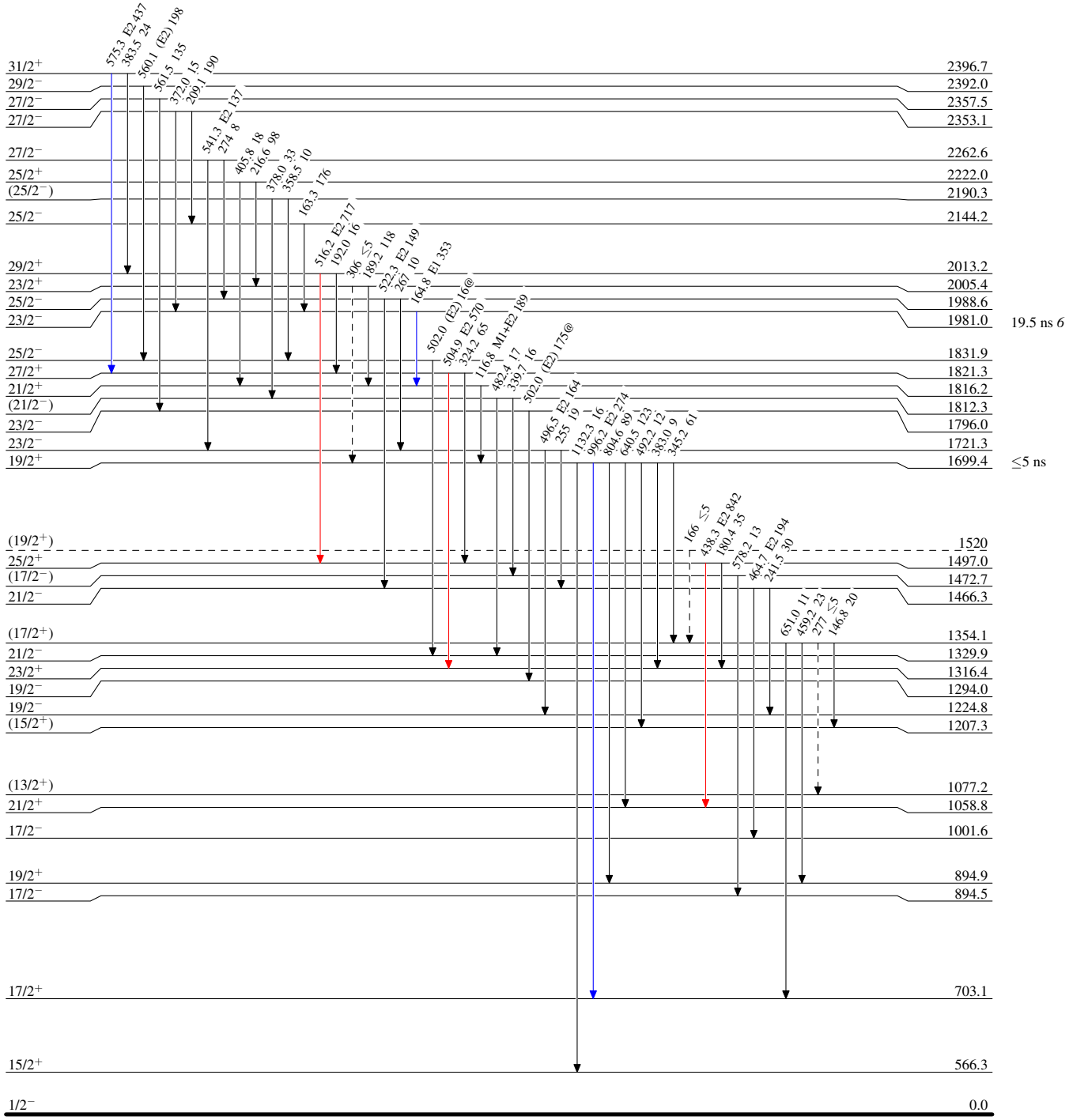

$^{173}_{72}Hf_{101}$

**(HI,xnγ) 1991Fa06**

## Level Scheme (continued)

Intensities: Relative Iγ for $^{160}$Gd($^{18}$O,5nγ), E($^{18}$O)=88 MeV
@ Multiply placed: intensity suitably divided

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



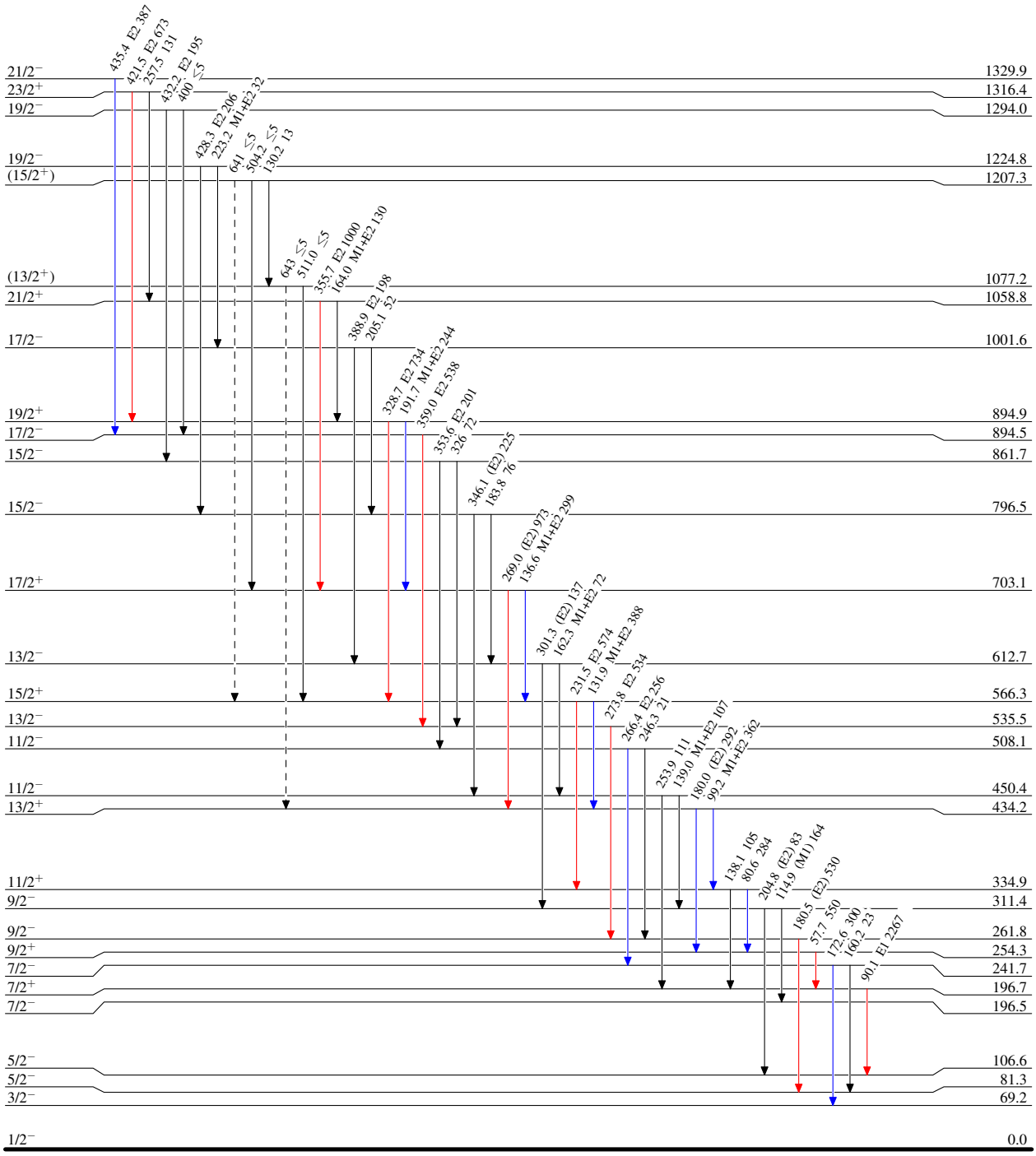

$^{173}_{72}Hf_{101}$

**(HI,xnγ) 1991Fa06**

## Level Scheme (continued)

Intensities: Relative Iγ for $^{160}$Gd($^{18}$O,5nγ), E($^{18}$O)=88 MeV
@ Multiply placed: intensity suitably divided

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



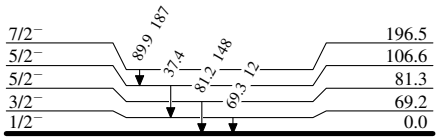

$^{173}_{72}Hf_{101}$

**(HI,xnγ) 1991Fa06**

## Level Scheme (continued)

Intensities: Relative Iγ for $^{160}$Gd($^{18}$O,5nγ), E($^{18}$O)=88 MeV
@ Multiply placed: intensity suitably divided

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




$^{173}_{72}Hf_{101}$