## $^{109}$Ag(p,nγ) 1988Vi03,1994Ju05

History

| Type | Author | Citation | Literature Cutoff Date |
|---|---|---|---|
| Full Evaluation | S. Kumar(a), J. Chen(b) and F. G. Kondev | NDS 137, 1 (2016) | 31-May-2016 |

1988Vi03: E(p)=6.8 MeV. Detectors: two HPGe. Measured: Eγ, Iγ, γγ. 1988Vi03 also report data for $^{109}$In ε decay. Data from the two measurements share the same γ-ray energies.

1994Ju05: E(p)=12-17.4 MeV, Jyvaskyla MC-20 cyclotron. Target: 7.6 mg/cm$^2$ thick self support $^{109}$Ag (98.9 % enriched). Detectors: Two Compton suppressed Ge. Measured: Eγ,γ, γγ, γ(θ), excitation functions. 1994Ju05 also report data for $^{96}$Zr($^{18}$O,5nγ) and $^{100}$Mo($^{13}$C,4nγ).

Others: 1992Si05, 1988Ch35, 1983Ch34, 1982Av07, 1969Be37, 1966Mc06.

Level scheme and placements of γ-ray transitions are from 1988Vi03 and 1994Ju05, unless otherwise noted.

### $^{109}$Cd Levels

| E(level)† | Jπ@ | $T_{1/2}$& | Comments |
|---|---|---|---|
| 0.0 | 5/2$^+$ | | |
| 59.56 *8* | 1/2$^+$ | | |
| 203.36 *5* | 7/2$^+$ | 36 ps *+6−1* | $T_{1/2}$: from microwave modulation of beam and lens spectrometer (1969Be37). |
| 347.48 *6* | 5/2$^+$ | | Jπ: 3/2 from γ(θ) in 1994Ju05, 5/2$^+$ in 1992Si05 and 1983Ch34. |
| 426.41 *6* | 5/2$^+$ | | Jπ: 3/2$^+$ in 1983Ch34. |
| 463.06 *11* | 11/2$^-$ | | |
| 623.86 *7* | 7/2$^+$ | 41 fs *+25−15* | Jπ: 5/2$^+$ in 1983Ch34.<br>$T_{1/2}$: using 623.2γ in 1988Ch35. |
| 673.34 *9* | 3/2$^+$ | 55 fs *+15−12* | Jπ: 5/2$^+$ in 1994Ju05.<br>$T_{1/2}$: using 613.6γ(t) in 1982Av07. |
| 721.76 *7* | 5/2$^+$ | 76 fs *+21−13* | Jπ: from 1992Si05 only, J=3/2 is ruled out based on 721.8γ(θ) using the $\chi^2$ fits method.<br>$T_{1/2}$: Weighted average of 104 fs *+49−28* (using 721γ) and 69 fs *+21−17* (using 518γ) in 1982Av07. |
| 821.89 *7* | 9/2$^+$ | 90 fs *+49−28* | $T_{1/2}$: using 822γ in 1982Av07. |
| 891.22 *8* | 3/2$^+$,5/2$^+$ | 36 fs *+8−6* | Jπ: 5/2$^+$ from 1992Si05.<br>$T_{1/2}$: weighted average of 47 fs *+15−11* (using 891γ) and 31 fs *+10−7* (using 831γ) in 1982Av07. |
| 929.42 *8* | 5/2$^+$ | | |
| 985.3 *5* | 15/2$^-$ | | |
| 997.40 *8* | 7/2$^+$ | 64 fs *+20−12* | Jπ: 9/2$^+$ in 1992Si05.<br>$T_{1/2}$: weighted average of 76 fs *35-21* (using 794γ(t)) and 59 fs *+24−14* in 1982Av07. |
| 1066.03 *11* | 11/2$^+$ | | |
| 1105.80 *8* | (9/2$^+$) | 73 fs *+38−24* | $T_{1/2}$: using 1106γ in 1982Av07. |
| 1121.18 *8* | (1/2$^+$,3/2,5/2$^+$) | | |
| 1134.9?‡ *5* | 7/2$^+$ | 61 fs *+32−18* | E(level): not confirmed in 1988Vi03.<br>Jπ: from 1992Si05 based on measured 929.5γ(θ).<br>$T_{1/2}$: weighted average of 83 fs *+55−28* (using 932γ in 1982Av07) and 49 fs *+38−26* (using 932γ in 1988Ch35). |
| 1173.45 *14* | 3/2$^+$,5/2$^+$ | | |
| 1219.06 *18* | | | |
| 1318.19 *12* | 3/2$^+$,5/2$^+$ | | |
| 1352.18 *8* | (7/2)$^+$ | | |
| 1388.55 *13* | (7/2$^+$,9/2$^+$) | | |
| 1417.92 *18* | 1/2$^+$ | | |
| 1425.3 *4* | (13/2$^-$) | | |
| 1458.71 *15* | | | |
| 1475.81 *11* | (7/2,9/2)$^+$ | | |
| 1479.74 *20* | | | |
| 1539.36 *16* | (7/2$^+$,9/2$^+$) | | |

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## $^{109}$Ag(p,nγ) 1988Vi03,1994Ju05 (continued)

### $^{109}$Cd Levels (continued)

| E(level)[†] | Jπ[@] | E(level)[†] | Jπ[@] | E(level)[†] | Jπ[@] | E(level)[†] |
|---|---|---|---|---|---|---|
| 1563.0[#] *3* | 11/2(+) | 1787.37 *10* | | 1989.0 *3* | | 2198.91 *17* |
| 1580.65 *18* | | 1813.39 *12* | | 2033.77 *17* | | 2234.20 *22* |
| 1593.3 *3* | | 1853.9[#] *4* | (13/2+) | 2046.4 *3* | | 2271.3 *5* |
| 1622.29 *10* | (7/2)+ | 1869.20 *19* | | 2064.65 *9* | | 2282.45 *25* |
| 1633.52 *23* | | 1937.5 *3* | | 2111.62 *19* | | 2325.7 *4* |
| 1729.95 *19* | | 1943.97 *20* | | 2141.7[#] *6* | 15/2+ | 2372.3 *4* |
| 1772.80 *11* | (7/2,9/2)+ | 1956.0 *6* | | 2166.19 *17* | | 2391.84 *24* |

[†] From a least-squares fit to γ-ray energies.
[‡] Seen in 1988Ch35,1992Si05,1982Av07.
[#] Only seen in 1994Ju05.
[@] From Adopted Levels, unless otherwise noted.
[&] From 1982Av07 and 1988Ch35 (Doppler shift attenuation technique), unless otherwise stated.

### γ($^{109}$Cd)

| Eγ[†‡] | Iγ[‡] | Ei(level) | Jiπ | Ef | Jfπ | Mult.[a] | Comments |
|---|---|---|---|---|---|---|---|
| 59.6[&] *5* | | 59.56 | 1/2+ | 0.0 | 5/2+ | | |
| 169.3 *3* | 0.3 *1* | 891.22 | 3/2+,5/2+ | 721.76 | 5/2+ | | |
| 203.3 *1* | 100 | 203.36 | 7/2+ | 0.0 | 5/2+ | M1 | Eγ: other: 203.3 *1* (1994Ju05), 203.4 *2* (1988Ch35), 203.4 *3* (1983Ch34), 203.2 *3* (1969Be37). Mult.: from Adopted Gammas. $A_2/A_0$=−0.10 *4*, $A_4/A_0$=−0.02 *5* (1994Ju05). |
| 207.6 *1* | 2.9 *2* | 929.42 | 5/2+ | 721.76 | 5/2+ | | |
| 223.0 *1* | 2.5 *2* | 426.41 | 5/2+ | 203.36 | 7/2+ | | Eγ: other: 222.9 *5* (1994Ju05). Iγ: other: 0.25 *4* (1994Ju05). |
| 243.8[@] *5* | | 1066.03 | 11/2+ | 821.89 | 9/2+ | (M1) | |
| 259.7 *1* | 23.8 *9* | 463.06 | 11/2− | 203.36 | 7/2+ | M2 | Eγ: others: 259.6 *1* (1994Ju05), 259.9 *2* (1988Ch35), 259.7 *3* (1983Ch34), 259.5 *3* (1969Be37). Iγ: others: 36.0 *10* (1994Ju05), 15.7 *17* (1988Ch35), 20.7 (1983Ch34). Mult.: from measured $\alpha_K(260\gamma)/\alpha_K(203\gamma)$=2.06 *23* in 1969Be37. |
| 288.1 *1* | 31.8 *20* | 347.48 | 5/2+ | 59.56 | 1/2+ | E2 | Eγ: others: 287.5 *1* (1994Ju05), 287.9 *2* (1988Ch35), 287.9 *3* (1983Ch34). Iγ: others: 7.2 *2* (1994Ju05), 32.5 *33* (1988Ch35), 42.9 (1983Ch34). $A_2/A_0$=+0.03 *3*, $A_4/A_0$=−0.06 *4* (1994Ju05). |
| 305.6 *3* | 0.8 *1* | 929.42 | 5/2+ | 623.86 | 7/2+ | | |
| 324.4 *3* | 1.3 *1* | 997.40 | 7/2+ | 673.34 | 3/2+ | | Eγ: other: 324.1 *5* (1994Ju05). Iγ: other: 0.9 *1* (1994Ju05). |
| 326.3 *2* | 8.0 *4* | 673.34 | 3/2+ | 347.48 | 5/2+ | | Eγ: others: 325.5 *1* (1994Ju05), 325.7 *2* (1988Ch35). Iγ: others: 2.3 *5* (1994Ju05), 9.5 *11* (1988Ch35). |
| 347.5 *1* | 44.7 *20* | 347.48 | 5/2+ | 0.0 | 5/2+ | M1,E2 | Eγ: others: 347.4 *1* (1994Ju05), 347.6 *2* (1988Ch35), 347.5 *3* (1983Ch34). Iγ: others: 9.2 *1* (1994Ju05), 49 *5* (1988Ch35), 58.3 (1983Ch34). $A_2/A_0$=+0.01 *2*, $A_4/A_0$=−0.06 *4* (1994Ju05). |
| 374.3 *4* | 0.5 *1* | 721.76 | 5/2+ | 347.48 | 5/2+ | | |
| 420.6 *1* | 5.3 *4* | 623.86 | 7/2+ | 203.36 | 7/2+ | (M1) | Eγ: other: 420.5 *1* (1994Ju05). |

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## $^{109}$Ag(p,nγ) 1988Vi03,1994Ju05 (continued)

### γ($^{109}$Cd) (continued)

| $E_\gamma$ [†‡] | $I_\gamma$ [‡] | $E_i$(level) | $J_i^\pi$ | $E_f$ | $J_f^\pi$ | Mult.[a] | Comments |
|---|---|---|---|---|---|---|---|
| | | | | | | | $I_\gamma$: other: 2.3 *1* (1994Ju05).<br>$A_2/A_0$=+0.22 *1*, $A_4/A_0$=+0.06 *2* (1994Ju05). |
| 426.3 *1* | 50 *3* | 426.41 | 5/2$^+$ | 0.0 | 5/2$^+$ | M1,E2 | $E_\gamma$: others: 426.2 *1* (1994Ju05), 426.4 *2* (1988Ch35), 426.4 *3* (1983Ch34).<br>$I_\gamma$: others: 12.2 *3* (1994Ju05), 55 *6* (1988Ch35), 51 (1983Ch34).<br>$A_2/A_0$=+0.10 *4*, $A_4/A_0$=+0.01 *5* (1994Ju05). |
| 457.5[@] *5* | 0.4[@] *2* | 1563.0 | 11/2$^{(+)}$ | 1105.80 | (9/2$^+$) | | |
| 464.8 *2* | 1.0 *1* | 891.22 | 3/2$^+$,5/2$^+$ | 426.41 | 5/2$^+$ | | |
| 470.4 *2* | 0.9 *1* | 673.34 | 3/2$^+$ | 203.36 | 7/2$^+$ | | |
| 482.2 *2* | 1.2 *1* | 1105.80 | (9/2$^+$) | 623.86 | 7/2$^+$ | (M1+E2) | $E_\gamma$: other: 482.0 *5* (1994Ju05).<br>$I_\gamma$: other: 1.1 *2* (1994Ju05).<br>$A_2/A_0$=−0.31 *5*, $A_4/A_0$=+0.11 *6* (1994Ju05). |
| 497.2 *2* | 1.1 *1* | 1219.06 | | 721.76 | 5/2$^+$ | | |
| 503.4 *3* | 1.1 *1* | 929.42 | 5/2$^+$ | 426.41 | 5/2$^+$ | | |
| 518.2 *5* | 0.2 *1* | 721.76 | 5/2$^+$ | 203.36 | 7/2$^+$ | | $E_\gamma$: other: 518.0 *2* (1982Av07). |
| 522.2 *4* | 1.4 *1* | 985.3 | 15/2$^-$ | 463.06 | 11/2$^-$ | E2 | |
| 526.6 *5* | 0.11 *6* | 1417.92 | 1/2$^+$ | 891.22 | 3/2$^+$,5/2$^+$ | | |
| 530.1 *3* | 1.1 *1* | 1352.18 | (7/2)$^+$ | 821.89 | 9/2$^+$ | | |
| 549.4 *2* | 1.9 *1* | 1173.45 | 3/2$^+$,5/2$^+$ | 623.86 | 7/2$^+$ | | |
| 571.2 *3* | 0.9 *1* | 997.40 | 7/2$^+$ | 426.41 | 5/2$^+$ | | $E_\gamma$: other: 571.4 *2* (1982Av07). |
| 582.1 *3* | 1.9 *1* | 929.42 | 5/2$^+$ | 347.48 | 5/2$^+$ | | |
| 584.6 *3* | 2.1 *2* | 1475.81 | (7/2,9/2)$^+$ | 891.22 | 3/2$^+$,5/2$^+$ | | |
| 596.4 *1* | 6.6 *4* | 1318.19 | 3/2$^+$,5/2$^+$ | 721.76 | 5/2$^+$ | | $E_\gamma$: other: 596.2 *5* (1988Ch35).<br>$I_\gamma$: other: 17.7 *20* (1988Ch25). |
| 613.6 *1* | 31.9 *20* | 673.34 | 3/2$^+$ | 59.56 | 1/2$^+$ | M1 | $E_\gamma$: others: 614.2 *1* (1994Ju05), 614.0 *5* (1988Ch35), 613.6 *2* (1982Av07), 614.0 *3* (1983Ch34).<br>$I_\gamma$: others: 6.3 *4* (1994Ju05), 40 *4* (1988Ch35), 41.5 (1983Ch34).<br>$A_2/A_0$=+0.09 *2*, $A_4/A_0$=−0.06 *6* (1994Ju05). |
| 618.4 *1* | 9.4 *6* | 821.89 | 9/2$^+$ | 203.36 | 7/2$^+$ | M1 | $E_\gamma$: others: 619.3 *1* (1994Ju05), 619.2 *5* (1988Ch35), 619.4 *5* (1983Ch34).<br>$I_\gamma$: others: 6.8 *3* (1994Ju05), 8.1 *13* (1988Ch35), 10.5 (1983Ch34).<br>$A_2/A_0$=−0.67 *3*, $A_4/A_0$=−0.10 *5* (1994Ju05). |
| 623.8 *1* | 30.8 *20* | 623.86 | 7/2$^+$ | 0.0 | 5/2$^+$ | M1 | $E_\gamma$: others: 623.8 1 (1994Ju05), 623.2 *5* (1988Ch35), 623.9 5 (1983Ch34).<br>$I_\gamma$: others: 12.1 *3* (1994Ju05), 33 *4* (1988Ch35), 34.1 (1983Ch34).<br>$A_2/A_0$=−0.41 *3*, $A_4/A_0$=−0.08 *4* (1994Ju05). |
| 650.0 *1* | 9.8 *7* | 997.40 | 7/2$^+$ | 347.48 | 5/2$^+$ | (M1) | $E_\gamma$: others: 649.9 *1* (1994Ju05), 649.8 *5* (1988Ch35), 650.2 *5* (1983Ch34).<br>$I_\gamma$: others: 4.9 *2* (1994Ju05), 10.1 *14* (1988Ch35), 7.2 (1983Ch34).<br>Mult.: Q from $A_2/A_0$=+0.18 *4*, $A_4/A_0$=−0.06 *6* (1994Ju05), $T_{1/2}$ rules out M2. |
| 653.6 *3* | 1.6 *1* | 1475.81 | (7/2,9/2)$^+$ | 821.89 | 9/2$^+$ | | |
| 678.8 *3* | 0.7 *1* | 1352.18 | (7/2)$^+$ | 673.34 | 3/2$^+$ | | $E_\gamma$: 1994Ju05 place a 679.5γ from 1106 level. |
| 679.5[@] *5* | 0.65[@] *6* | 1105.80 | (9/2$^+$) | 426.41 | 5/2$^+$ | | $E_\gamma$: 1988Vi03 place a 678.8γ from 1352 level. |

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## $^{109}$Ag(p,nγ) 1988Vi03,1994Ju05 (continued)

### γ($^{109}$Cd) (continued)

| $E_\gamma$[†‡] | $I_\gamma$[‡] | $E_i$(level) | $J_i^\pi$ | $E_f$ | $J_f^\pi$ | Mult.[a] | Comments |
|---|---|---|---|---|---|---|---|
| 694.8 *1* | 5.1 *3* | 1121.18 | (1/2$^+$,3/2,5/2$^+$) | 426.41 | 5/2$^+$ | | |
| x705.7#b *5* | 41# *4* | | | | | | Additional information 1. |
| 721.8 *1* | 20.2 *10* | 721.76 | 5/2$^+$ | 0.0 | 5/2$^+$ | | $E_\gamma$: others: 721.7 *5* (1988Ch35), 721.2 *2* (1982Av07), 721.8 *5* (1983Ch34). $I_\gamma$: other: 29 *3* (1988Ch35), 27.9 (1983Ch34). |
| 728.3 *4* | 0.7 *1* | 1352.18 | (7/2)$^+$ | 623.86 | 7/2$^+$ | | |
| 740.5@ *5* | 1.0@ *1* | 1563.0 | 11/2$^{(+)}$ | 821.89 | 9/2$^+$ | D+Q | Mult.: from $A_2/A_0$=−0.74 *8*, $A_4/A_0$=+0.06 *12* (1994Ju05). |
| 746.9 *4* | 0.8 *1* | 1173.45 | 3/2$^+$,5/2$^+$ | 426.41 | 5/2$^+$ | | |
| 754.0 *6* | 0.22 *8* | 1475.81 | (7/2,9/2)$^+$ | 721.76 | 5/2$^+$ | | |
| 758.6 *6* | 0.41 *8* | 1479.74 | | 721.76 | 5/2$^+$ | | |
| 764.5 *4* | 0.8 *1* | 1388.55 | (7/2$^+$,9/2$^+$) | 623.86 | 7/2$^+$ | | |
| 773.7 *1* | 2.0 *2* | 1121.18 | (1/2$^+$,3/2,5/2$^+$) | 347.48 | 5/2$^+$ | | |
| 788.0@ *5* | 1.6@ *4* | 1853.9 | (13/2$^+$) | 1066.03 | 11/2$^+$ | (M1) | |
| 793.9 *1* | 1.9 *2* | 997.40 | 7/2$^+$ | 203.36 | 7/2$^+$ | | $E_\gamma$: others: 794.0 *5* (1994Ju05), 794.2 *2* (1982Av07), 794.3 *5* (1983Ch34). $I_\gamma$: other: 0.8 *2* (1994Ju05), 2.3 (1983Ch34). |
| 800.4 *6* | 0.30 *6* | 1622.29 | (7/2)$^+$ | 821.89 | 9/2$^+$ | | |
| 821.9 *1* | 6.8 *6* | 821.89 | 9/2$^+$ | 0.0 | 5/2$^+$ | E2 | $E_\gamma$: others: 822.5 *1* (1994Ju05), 821.0 *3* (1982Av07), 821.9 *5* (1983Ch34). $I_\gamma$: other: 2.0 *2* (1994Ju05), 13.5 (1983Ch34). Mult.: Q from $A_2/A_0$=+0.24 *4*, $A_4/A_0$=+0.03 *6* (1994Ju05), M2 is ruled out by $T_{1/2}$. |
| 826.2 *2* | 2.4 *2* | 1173.45 | 3/2$^+$,5/2$^+$ | 347.48 | 5/2$^+$ | | |
| 831.7 *1* | 13.1 *1* | 891.22 | 3/2$^+$,5/2$^+$ | 59.56 | 1/2$^+$ | | $E_\gamma$: other: 831.0 *3* (1982Av07). 1988Ch35 report a γ ray at Eγ=833.1 *2* with Iγ=28 *3* and 1983Ch34 report Eγ=833.1 *5* with Iγ=31.7. |
| 834.9 *2* | 6.9 *2* | 1458.71 | | 623.86 | 7/2$^+$ | | |
| x843.7 *6* | 0.4 *1* | | | | | | |
| 851.9 *5* | | 1475.81 | (7/2,9/2)$^+$ | 623.86 | 7/2$^+$ | | |
| 862.7 *1* | 3.0 *2* | 1066.03 | 11/2$^+$ | 203.36 | 7/2$^+$ | E2 | $E_\gamma$: other: 863.1 *1* in 1994Ju05. $I_\gamma$: other: 6.9 *3* (1994Ju05). Mult.: Q from $A_2/A_0$=+0.27 *6*, $A_4/A_0$=−0.01 *8* (1994Ju05). |
| 871.8 *3* | 0.7 *1* | 1219.06 | | 347.48 | 5/2$^+$ | | |
| 891.2 *1* | 10.1 *6* | 891.22 | 3/2$^+$,5/2$^+$ | 0.0 | 5/2$^+$ | | $E_\gamma$: others: 891.7 *5* (1988Ch35), 890.6 *3* (1982Av07), 891.6 *5* (1983Ch34). $I_\gamma$: other: 13.5 *17* (1988Ch35), 15.5 (1983Ch34). |
| 901.8 *2* | 1.8 *2* | 1105.80 | (9/2$^+$) | 203.36 | 7/2$^+$ | (M1+E2) | $E_\gamma$: other: 902.6 0.5 (1994Ju05). $I_\gamma$: other: 1.4 *2* (1994Ju05). $A_2/A_0$=+0.33 *12*, $A_4/A_0$=+0.1 *2* (1994Ju05). |
| 907.2 *2* | 1.9 *2* | 1580.65 | | 673.34 | 3/2$^+$ | | |
| x910.7#b *5* | 7.5# *13* | | | | | | |
| 925.3 *4* | 0.4 *1* | 1352.18 | (7/2)$^+$ | 426.41 | 5/2$^+$ | | |
| 929.4 *1* | 6.1 *5* | 929.42 | 5/2$^+$ | 0.0 | 5/2$^+$ | | |
| 931.5# *5* | 13.1# *16* | 1134.9? | 7/2$^+$ | 203.36 | 7/2$^+$ | | $E_\gamma$: others: 931.7 *3* (1982Av07), 930.5 *5* (1983Ch34). $I_\gamma$: other: 10.2 (1983Ch34). |

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## $^{109}$Ag(p,nγ) 1988Vi03,1994Ju05 (continued)

### γ($^{109}$Cd) (continued)

| $E_\gamma$[†‡] | $I_\gamma$[‡] | $E_i$(level) | $J_i^\pi$ | $E_f$ | $J_f^\pi$ | Mult.[a] | Comments |
|---|---|---|---|---|---|---|---|
| 939.6[@] 5 | 1.5[@] 2 | 1563.0 | 11/2(+) | 623.86 | 7/2+ | Q | Mult.: from $A_2/A_0$=+0.23 8, $A_4/A_0$=−0.15 11 (1994Ju05). |
| 948.9 2 | 0.4 1 | 1622.29 | (7/2)+ | 673.34 | 3/2+ | | |
| 959.0[@b] 5 | 1.5[@] 2 | 2064.65 | | 1105.80 | (9/2+) | | $E_\gamma$: placed by 1994Ju05. 1988Vi03 place a 960.1γ from 1633.5 level. |
| 960.1 6 | 0.4 1 | 1633.52 | | 673.34 | 3/2+ | | |
| 962.2 3 | 1.1 1 | 1388.55 | (7/2+,9/2+) | 426.41 | 5/2+ | | |
| 962.2 3 | 1.1 1 | 1425.3 | (13/2−) | 463.06 | 11/2− | | |
| [x]969.5 3 | 2.0 1 | | | | | | |
| 971.5 5 | 0.3 1 | 1318.19 | 3/2+,5/2+ | 347.48 | 5/2+ | | |
| 991.4 4 | 0.5 1 | 1417.92 | 1/2+ | 426.41 | 5/2+ | | |
| 998.4[b] 5 | 17.2 | 997.40 | 7/2+ | 0.0 | 5/2+ | | $E_\gamma$,$I_\gamma$: from 1983Ch34 only, also assigned to $^{107}$Cd. |
| 998.5 4 | 0.7 1 | 1622.29 | (7/2)+ | 623.86 | 7/2+ | | $E_\gamma$: Placed by evaluators. 1988Vi03 has seen this γ-ray in coincidence with 623.8γ but not placed it. 1983Ch34 report a γ ray at Eγ=998.4 5 with Iγ=17.2 and place it from 998 level and they also assign it to $^{107}$Cd. |
| 999.0[@b] 5 | 0.8[@] 3 | 2064.65 | | 1066.03 | 11/2+ | | $E_\gamma$: placed by 1994Ju05. A 998.5γ is seen by 1988Vi03 in coincidence with 623.8γ but not placed. $A_2$=−0.15 19 (1994Ju05). |
| 1005.0 6 | 0.15 5 | 1352.18 | (7/2)+ | 347.48 | 5/2+ | | |
| 1031.8[@] 5 | 1.0[@] 3 | 1853.9 | (13/2+) | 821.89 | 9/2+ | (E2) | |
| 1049.5 3 | 0.9 1 | 1475.81 | (7/2,9/2)+ | 426.41 | 5/2+ | | |
| 1061.5 2 | 3.7 4 | 1121.18 | (1/2+,3/2,5/2+) | 59.56 | 1/2+ | | |
| 1066.2 2 | 1.2 1 | 1787.37 | | 721.76 | 5/2+ | | |
| 1075.7[@] 5 | 0.9[@] 1 | 2141.7 | 15/2+ | 1066.03 | 11/2+ | E2 | $A_2/A_0$=+0.20 8, $A_4/A_0$=−0.04 12 (1994Ju05). |
| 1105.9 1 | 4.2 4 | 1105.80 | (9/2+) | 0.0 | 5/2+ | (E2) | $E_\gamma$: others: 1106.1 1 (1994Ju05), 1105.6 5 (1988Ch35), 1106.2 3 (1982Av07). $I_\gamma$: others: 2.5 2 (1994Ju05), 5.0 10 (1988Ch35). Q from $A_2/A_0$=+0.22 4, $A_4/A_0$=−0.03 5 (1994Ju05). |
| 1113.0 3 | 0.8 4 | 1539.36 | (7/2+,9/2+) | 426.41 | 5/2+ | | |
| 1128.4 3 | 0.9 1 | 1475.81 | (7/2,9/2)+ | 347.48 | 5/2+ | | |
| 1148.5 2 | 2.7 2 | 1352.18 | (7/2)+ | 203.36 | 7/2+ | | $E_\gamma$: other: 1148.2 5 (1983Ch34). $I_\gamma$: other: 2.1 (1983Ch34). |
| 1185.0 3 | 0.8 1 | 1388.55 | (7/2+,9/2+) | 203.36 | 7/2+ | | |
| 1195.6 2 | 1.2 1 | 1622.29 | (7/2)+ | 426.41 | 5/2+ | | |
| 1207.1 3 | 0.8 1 | 1633.52 | | 426.41 | 5/2+ | | |
| 1214.6 2 | 2.7 2 | 1417.92 | 1/2+ | 203.36 | 7/2+ | | |
| 1233.4 3 | 0.8 1 | 1580.65 | | 347.48 | 5/2+ | | |
| 1245.8 3 | 0.9 1 | 1593.3 | | 347.48 | 5/2+ | | |
| 1255.3 2 | 1.1 1 | 1458.71 | | 203.36 | 7/2+ | | |
| 1270.6 2 | 1.0 1 | 1943.97 | | 673.34 | 3/2+ | | |
| 1272.6 2 | 0.7 1 | 1475.81 | (7/2,9/2)+ | 203.36 | 7/2+ | | |
| 1276.3 2 | 1.1 1 | 1479.74 | | 203.36 | 7/2+ | | |
| 1336.1 4 | 0.7 1 | 1539.36 | (7/2+,9/2+) | 203.36 | 7/2+ | | |
| 1346.4 1 | 1.7 1 | 1772.80 | (7/2,9/2)+ | 426.41 | 5/2+ | | |
| 1352.3 1 | 1.7 2 | 1352.18 | (7/2)+ | 0.0 | 5/2+ | | |
| 1360.8 1 | 2.1 1 | 1787.37 | | 426.41 | 5/2+ | | |
| 1382.4 4 | 0.7 1 | 1729.95 | | 347.48 | 5/2+ | | |
| 1388.6 2 | 2.0 1 | 1388.55 | (7/2+,9/2+) | 0.0 | 5/2+ | | |

Continued on next page (footnotes at end of table)

## $^{109}$Ag(p,nγ) 1988Vi03,1994Ju05 (continued)

### γ($^{109}$Cd) (continued)

| $E_\gamma$ [†‡] | $I_\gamma$ [‡] | $E_i$(level) | $J_i^\pi$ | $E_f$ | $J_f^\pi$ |
|---|---|---|---|---|---|
| 1410.2 *6* | 0.25 *8* | 2033.77 | | 623.86 | $7/2^+$ |
| 1419.0 *1* | 1.8 *1* | 1622.29 | $(7/2)^+$ | 203.36 | $7/2^+$ |
| 1430.2 *4* | 0.7 *1* | 1633.52 | | 203.36 | $7/2^+$ |
| 1442.8 *4* | 0.7 *1* | 1869.20 | | 426.41 | $5/2^+$ |
| [x]1446.2 *7* | 0.4 *1* | | | | |
| 1465.9 *1* | 2.6 *2* | 1813.39 | | 347.48 | $5/2^+$ |
| 1475.7 *2* | 1.5 *1* | 1475.81 | $(7/2,9/2)^+$ | 0.0 | $5/2^+$ |
| 1493.2 *3* | 0.9 *1* | 2166.19 | | 673.34 | $3/2^+$ |
| 1511.0 *3* | 0.9 *1* | 1937.5 | | 426.41 | $5/2^+$ |
| 1521.7 *2* | 2.3 *1* | 1869.20 | | 347.48 | $5/2^+$ |
| 1526.6 *2* | 1.2 *1* | 1729.95 | | 203.36 | $7/2^+$ |
| 1539.3 *2* | 1.3 *1* | 1539.36 | $(7/2^+,9/2^+)$ | 0.0 | $5/2^+$ |
| 1569.5 *5* | 0.5 *1* | 1772.80 | $(7/2,9/2)^+$ | 203.36 | $7/2^+$ |
| 1607.3 *2* | 1.7 *1* | 2033.77 | | 426.41 | $5/2^+$ |
| [x]1622.5 *3* | 0.8 *1* | | | | |
| 1685.3 *4* | 0.6 *1* | 2111.62 | | 426.41 | $5/2^+$ |
| 1698.9 *3* | 0.9 *1* | 2046.4 | | 347.48 | $5/2^+$ |
| 1698.9 *3* | 0.9 *1* | 2372.3 | | 673.34 | $3/2^+$ |
| 1717.0 *1* | 2.0 *1* | 2064.65 | | 347.48 | $5/2^+$ |
| 1734.2 *5* | 0.51 *5* | 1937.5 | | 203.36 | $7/2^+$ |
| 1740.7 *5* | 0.52 *6* | 1943.97 | | 203.36 | $7/2^+$ |
| 1752.6 *6* | 0.40 *6* | 1956.0 | | 203.36 | $7/2^+$ |
| 1764.1 *2* | 2.0 *1* | 2111.62 | | 347.48 | $5/2^+$ |
| 1772.6 *3* | 0.8 *1* | 1772.80 | $(7/2,9/2)^+$ | 0.0 | $5/2^+$ |
| 1785.6 *3* | 0.7 *1* | 1989.0 | | 203.36 | $7/2^+$ |
| 1855.7 *4* | 0.6 *1* | 2282.45 | | 426.41 | $5/2^+$ |
| 1861.4 *1* | 2.0 *1* | 2064.65 | | 203.36 | $7/2^+$ |
| 1923.8 *5* | 0.42 *7* | 2271.3 | | 347.48 | $5/2^+$ |
| [x]1940.0 *8* | 0.08 *4* | | | | |
| 1995.5 *3* | 0.9 *1* | 2198.91 | | 203.36 | $7/2^+$ |
| 2031.0 *3* | 1.6 *1* | 2234.20 | | 203.36 | $7/2^+$ |
| 2033.8 *3* | 1.3 *1* | 2033.77 | | 0.0 | $5/2^+$ |
| 2044.0 *4* | 0.8 *1* | 2391.84 | | 347.48 | $5/2^+$ |
| 2079.3 *5* | 0.33 *9* | 2282.45 | | 203.36 | $7/2^+$ |
| 2122.4 *5* | 0.52 *9* | 2325.7 | | 203.36 | $7/2^+$ |
| 2166.0 *2* | 1.3 *1* | 2166.19 | | 0.0 | $5/2^+$ |
| 2198.9 *2* | 2.9 *2* | 2198.91 | | 0.0 | $5/2^+$ |
| 2234.0 *3* | 0.9 *1* | 2234.20 | | 0.0 | $5/2^+$ |
| 2282.6 *4* | 0.7 *1* | 2282.45 | | 0.0 | $5/2^+$ |
| 2325.7 *4* | 0.6 *2* | 2325.7 | | 0.0 | $5/2^+$ |
| [x]2371.2 *4* | 0.6 *2* | | | | |
| 2392.0 *3* | 0.7 *2* | 2391.84 | | 0.0 | $5/2^+$ |

† Additional information 2.
‡ From 1988Vi03, unless otherwise noted. γ-ray intensities are normalized to Iγ(203γ)=100. Data from other work are also available and given under comments but they are not as complete and/or precise as those in 1988Vi03.
# From 1988Ch35.
@ From 1994Ju05.
& From 1983Ch34.
[a] From Adopted Gammas, unless otherwise noted.
[b] Placement of transition in the level scheme is uncertain.
[x] γ ray not placed in level scheme.

## $^{109}$Ag(p,nγ) 1988Vi03,1994Ju05

Level Scheme

Intensities: Relative $I_\gamma$

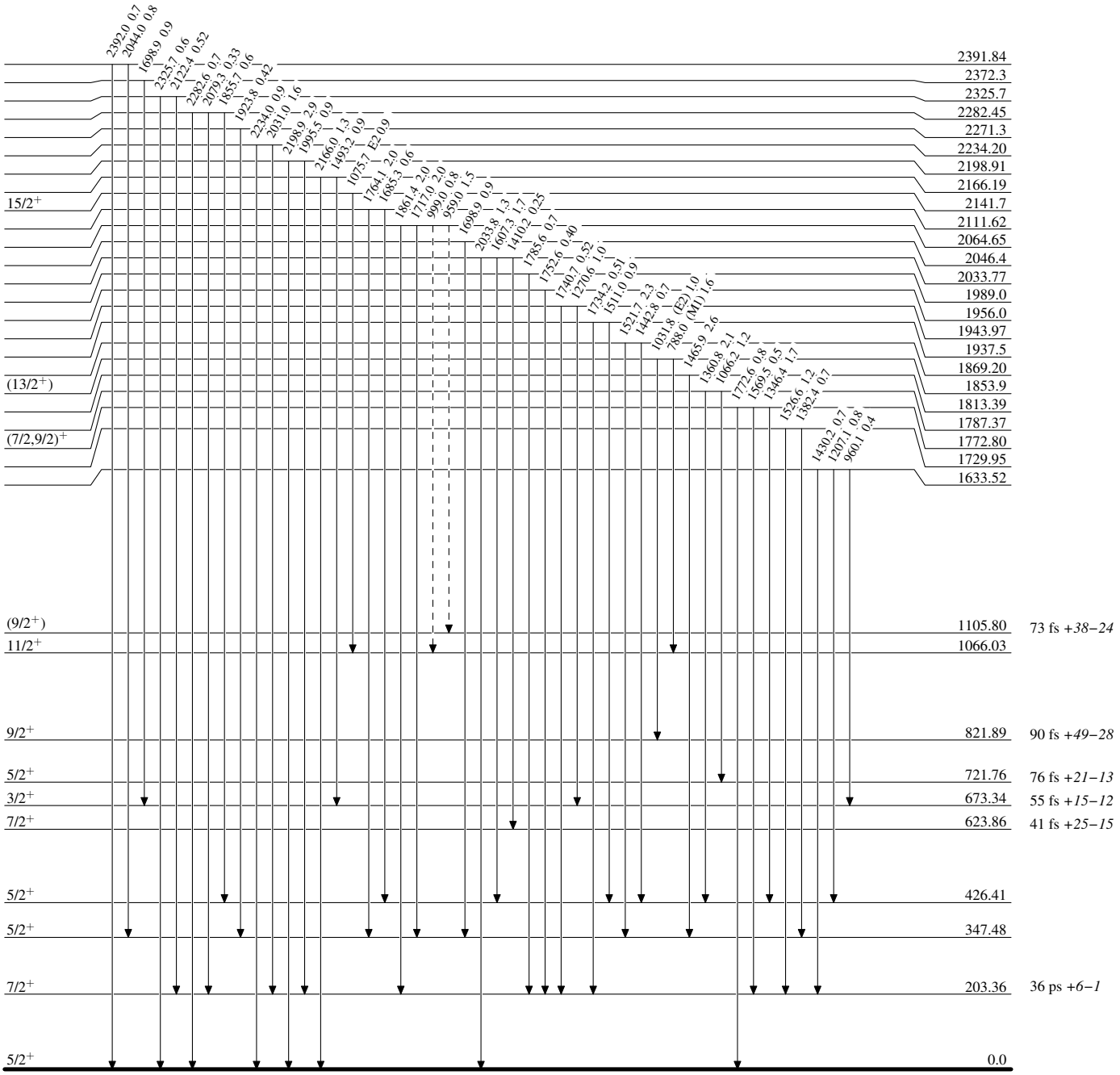
Legend

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

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

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

γ Decay (Uncertain)




$^{109}_{48}Cd_{61}$

## $^{109}$Ag(p,nγ) 1988Vi03,1994Ju05

### Level Scheme (continued)

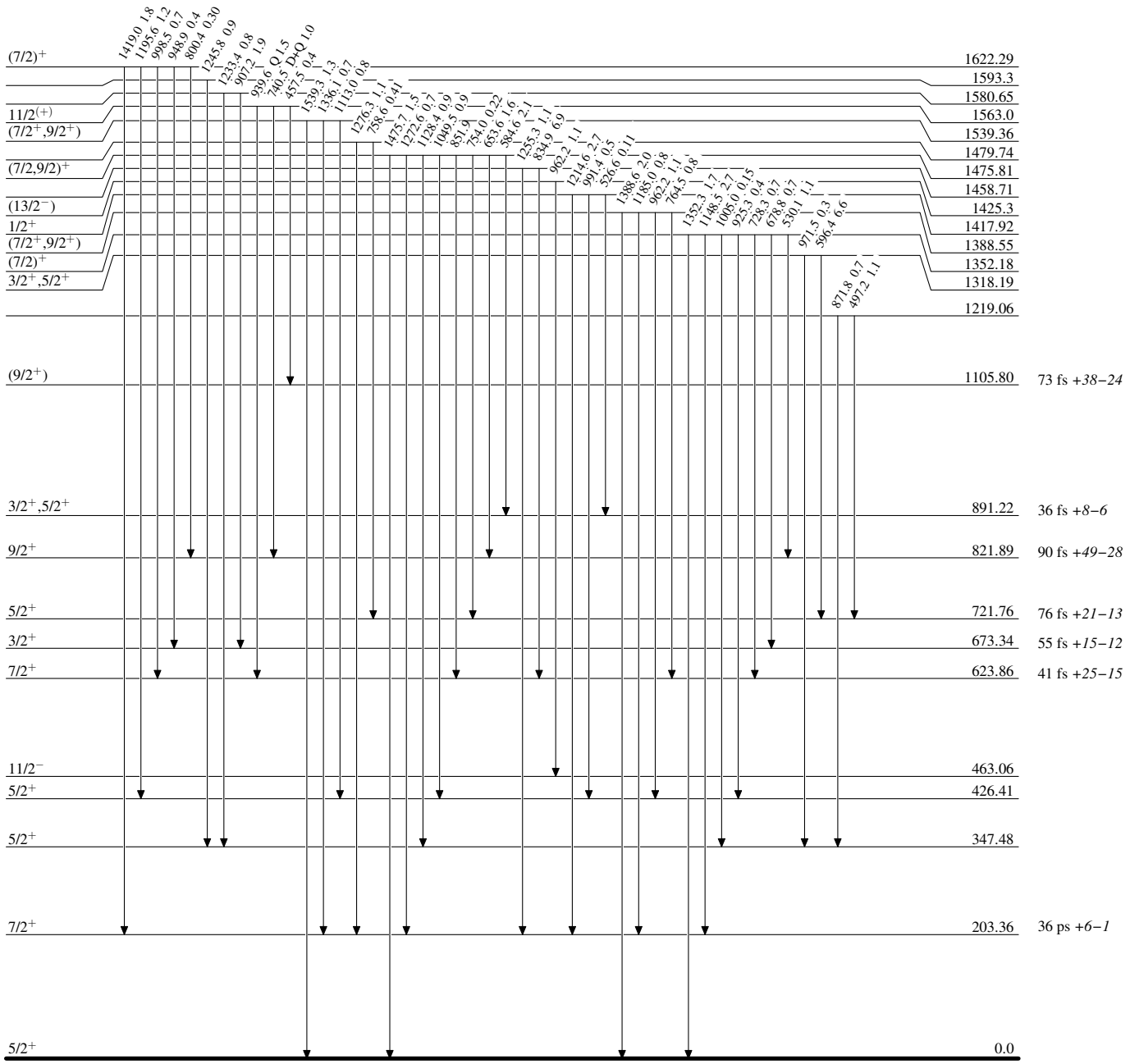
Intensities: Relative $I_\gamma$

Legend

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

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

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




$^{109}_{48}Cd_{61}$

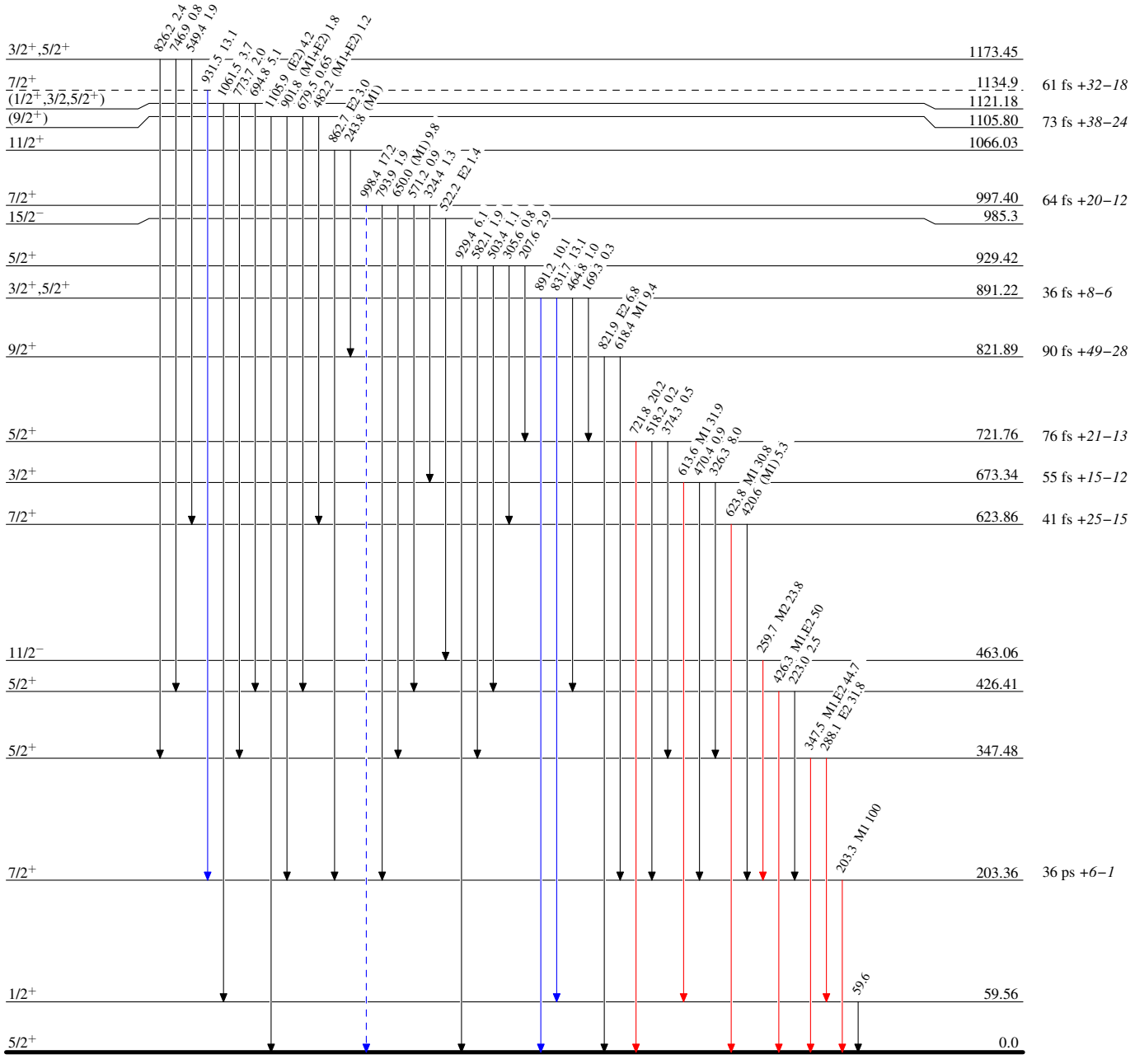
## $^{109}$Ag(p,nγ) 1988Vi03,1994Ju05

### Level Scheme (continued)

Intensities: Relative $I_\gamma$

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)




$^{109}_{48}Cd_{61}$