## Adopted Levels, Gammas

| Type | Author | History Citation | Literature Cutoff Date |
|---|---|---|---|
| Full Evaluation | Jean Blachot | NDS 108,2035 (2007) | 30-Mar-2007 |

Q($\beta^-$)=−4556 *9*; S(n)=9624 *11*; S(p)=2820 *6*; Q($\alpha$)=−470 *8* 2012Wa38
Note: Current evaluation has used the following Q record −4510 609578 882750 *90* −380 *120* 2003Au03.

### $^{104}$In Levels

Cross Reference (XREF) Flags

A $^{104}$Sn $\beta^+$ decay
B (HI,xn$\gamma$)
C $^{104}$In IT decay (15.7 s)

| E(level)† | Jπ‡ | $T_{1/2}$# | XREF | Comments |
|---|---|---|---|---|
| 0& | (6+) | 1.80 min *3* | ABC | %ε+%β+=100<br>μ=+4.44 *2* (2005St24); Q=+0.66 *11* (2005St24)<br>$T_{1/2}$: from 1995Sz01. Others: 1.8 min *2* (1989Va05), 1.8 min *2* (1978Hu06), 1.5 min *2* (1977Va06) and 1.7 min *3* (1976CoYX).<br>%β+: ratio: β+/(ε+β+)=0.44 *3* from coin method, 0.45 *1* from singles (1995Sz01).<br>Jπ: could be (5+,6+,7+) from the strong feeding to 6+ levels in $^{104}$In ε+β+ decay. Assumed to be (6+) to be consistent with the γ's decay with known mult from the 1+ levels, but if feeding to 3210, 8+ level is definite then Jπ>6+ would be required. However, J was measured as 5,6 by 1987Eb02. |
| 85.389& *10* | (7+) | | B | |
| 93.22 *10* | (5+) | | A | Jπ: M1 γ to (6+). |
| 93.48 *10* | (3+) | 15.7 s *5* | A C | %IT=80; %ε+%β+=20 (1989Va05)<br>$T_{1/2}$: from 1988Ba10. Other: 15.2 s *20* (1989Va05).<br>Jπ: M3 γ to (6+), γ from 1+. |
| 213.011 *10* | (7+) | 6.1 ps *3* | B | |
| 226.19 *13* | (2+) | | A | Jπ: M1 γ to (3+), γ's from 1+. |
| 241.34 *12* | (4+) | | A | Jπ: M1 γ to (5+), M1+E2 from (3+). |
| 396.06 *12* | (3+) | | A | Jπ: M1+E2 γ to (4+), γ's to (2+) and (3+). |
| 738.19 *18* | (2+) | | A | Jπ: M3 γ to (5+), γ's from 1+. |
| 933.63& *5* | (8+) | | B | |
| 1139.25 *23* | 1+ | | A | Jπ: log *ft*=3.6 from 0+ parent. |
| 1140.63 *6* | (7+) | | B | |
| 1344.25& *4* | (9+) | 3.5 ps *7* | B | |
| 1382.4 *5* | 1+ | | A | Jπ: log *ft*=4.7 from 0+ parent. |
| 1411.45 *4* | (9+) | | B | |
| 1441.6 *3* | 1+ | | A | Jπ: log *ft*=3.9 from 0+ parent. |
| 1499.7 | (1+) | | A | Jπ: Fed from 0+ parent. |
| 1571.18 *14* | (9+) | | B | |
| 1586.60& *4* | (10+) | 26.3 ps *14* | B | |
| 1633.3 *4* | 1+ | | A | Jπ: log *ft*=3.6 from 0+ parent. |
| 1651.0 *4* | 1+ | | A | Jπ: Fed from 0+ parent. |
| 1818.20@ *9* | (8−) | | B | |
| 1879.76 *5* | (11+) | | B | |
| 1928.61 *14* | (10+) | | B | |
| 1944.02& *5* | (11+) | 0.8 ps *3* | B | |
| 2004.71@ *8* | (9−) | | B | |
| 2031.20 *16* | (10+) | | B | |

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## Adopted Levels, Gammas (continued)

### $^{104}$In Levels (continued)

| E(level)[†] | J$^\pi$[‡] | T$_{1/2}$[#] | XREF | Comments |
|---|---|---|---|---|
| 2072.0 | (1$^+$) | | A | J$^\pi$: log *ft*=5.0 from 0$^+$ parent. |
| 2415.2 *5* | (11$^+$) | | B | |
| 2529.10[@] *10* | (10$^-$) | <3.4 ps | B | |
| 2696.17[&] *7* | (12$^+$) | 1.6 ps *2* | B | |
| 2868.98 *12* | (12$^+$) | | B | |
| 2985.00[&] *7* | (13$^+$) | | B | |
| 3061.61 *11* | (13$^+$) | | B | |
| 3102.64[@] *15* | (11$^-$) | <3.4 ps | B | |
| 3323.16 *12* | (13$^+$) | | B | |
| 3560.65[@] *15* | (12$^-$) | <3.4 ps | B | |
| 3566.20 *15* | (12$^-$) | 0.40 ps *6* | B | |
| 3817.17[@] *15* | (13$^-$) | <3.4 ps | B | |
| 3835.9 *3* | (12$^-$) | | B | |
| 3965.54 *18* | (13$^-$) | | B | |
| 4071.7 *4* | (13$^-$) | | B | |
| 4103.04[@] *15* | (14$^-$) | 0.60 ps *5* | B | |
| 4326.07 *19* | (14$^-$) | | B | |
| 4437.71[&] *16* | (14$^+$) | | B | |
| 4642.93[@] *16* | (15$^-$) | 0.7 ps *3* | B | |
| 5203.88[@] *17* | (16$^-$) | | B | |
| 5625.56[@] *20* | (17$^-$) | | B | |
| 6152.69[@] *23* | (18$^-$) | | B | |

[†] Level energy from least-squares adjustment.
[‡] Unless noted, $J^\pi$ are from $\gamma$ properties and band assignments.
[#] Unless noted, T$_{1/2}$ are from 1998Ka54 in (HI,xn$\gamma$).
[@] Band(A): negative parity band.
[&] Band(B): positive parity band.

### $\gamma$($^{104}$In)

| E$_i$(level) | J$_i^\pi$ | E$_\gamma$ | I$_\gamma$ | E$_f$ | J$_f^\pi$ | Mult. | $\alpha$[†] | Comments |
|---|---|---|---|---|---|---|---|---|
| 85.389 | (7$^+$) | 85.39 *1* | 100 | 0 | (6$^+$) | | | |
| 93.22 | (5$^+$) | 93.2 *1* | 100 | 0 | (6$^+$) | M1 | 0.629 | |
| 93.48 | (3$^+$) | 93.5 *1* | 100 | 0 | (6$^+$) | M3 | 62.6 | B(M3)(W.u.)=1.72 *8* |
| 213.011 | (7$^+$) | 127.73 *11* | 2.6 *6* | 85.389 | (7$^+$) | D | | |
| | | 213.01 *1* | 100.0 *5* | 0 | (6$^+$) | Q | | |
| 226.19 | (2$^+$) | 132.7 *1* | 100 | 93.48 | (3$^+$) | M1 | 0.23 | |
| 241.34 | (4$^+$) | 148.1 *1* | 100 | 93.22 | (5$^+$) | M1 | 0.17 | |
| 396.06 | (3$^+$) | 154.7 *1* | 100 *10* | 241.34 | (4$^+$) | M1+E2 | | |
| | | 169.9 *2* | 17 *4* | 226.19 | (2$^+$) | | | |
| | | 302.8 *2* | 91 *10* | 93.48 | (3$^+$) | | | |
| 738.19 | (2$^+$) | 342.3 *2* | 100 *10* | 396.06 | (3$^+$) | | | |
| | | 512 *1* | ≈55 | 226.19 | (2$^+$) | | | |
| | | 644.6 *3* | 86 *9* | 93.48 | (3$^+$) | | | |
| 933.63 | (8$^+$) | 720.57 *22* | 72 *5* | 213.011 | (7$^+$) | D | | |
| | | 848.32 *10* | 100 *3* | 85.389 | (7$^+$) | D | | |
| 1139.25 | 1$^+$ | 401.2 *2* | 39 *5* | 738.19 | (2$^+$) | | | |
| | | 912.6 *4* | 100 *10* | 226.19 | (2$^+$) | | | |

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## Adopted Levels, Gammas (continued)

### γ($^{104}$In) (continued)

| $E_i$(level) | $J_i^\pi$ | $E_\gamma$ | $I_\gamma$ | $E_f$ | $J_f^\pi$ | Mult. |
|---|---|---|---|---|---|---|
| 1139.25 | $1^+$ | 1045 *1* | <3.3 | 93.48 | $(3^+)$ | |
| 1140.63 | $(7^+)$ | 927.55 *13* | 100 *10* | 213.011 | $(7^+)$ | D |
| | | 1055.28 *11* | 83 *7* | 85.389 | $(7^+)$ | D |
| | | 1140.6 *3* | 34 *6* | 0 | $(6^+)$ | Q |
| 1344.25 | $(9^+)$ | 203.64 *6* | 38 *2* | 1140.63 | $(7^+)$ | |
| | | 410.87 *17* | 17 *2* | 933.63 | $(8^+)$ | D |
| | | 1131.40 *17* | 29 *4* | 213.011 | $(7^+)$ | Q |
| | | 1258.80 *6* | 100 *4* | 85.389 | $(7^+)$ | Q |
| 1382.4 | $1^+$ | 1156.3[#] *1* | 100 | 226.19 | $(2^+)$ | |
| 1411.45 | $(9^+)$ | 477.81 *2* | 100 *2* | 933.63 | $(8^+)$ | D |
| | | 1198.44 *9* | 36 *2* | 213.011 | $(7^+)$ | Q |
| | | 1326.19 *12* | 18.1 *16* | 85.389 | $(7^+)$ | Q |
| 1441.6 | $1^+$ | 703.5 *3* | 93 *10* | 738.19 | $(2^+)$ | |
| | | 1215.3 *5* | 100 *10* | 226.19 | $(2^+)$ | |
| 1499.7 | $(1^+)$ | 1273.5 | 4.2 | 226.19 | $(2^+)$ | |
| 1571.18 | $(9^+)$ | 637.2 *3* | 100 | 933.63 | $(8^+)$ | D |
| 1586.60 | $(10^+)$ | 175.15 *1* | 100 *3* | 1411.45 | $(9^+)$ | D |
| | | 242.34 *3* | 28.6 *11* | 1344.25 | $(9^+)$ | D |
| | | 653.01 *9* | 16.0 *14* | 933.63 | $(8^+)$ | Q |
| 1633.3 | $1^+$ | 894.9 *4* | 55 *10* | 738.19 | $(2^+)$ | |
| | | 1407.3 *5* | 100 *15* | 226.19 | $(2^+)$ | |
| 1651.0 | $1^+$ | 912.6 | 100 | 738.19 | $(2^+)$ | |
| | | 1425.4 | 33 | 226.19 | $(2^+)$ | |
| 1818.20 | $(8^-)$ | 1605.2 *3* | 39 *8* | 213.011 | $(7^+)$ | D |
| | | 1732.72 *16* | 100 *10* | 85.389 | $(7^+)$ | D |
| 1879.76 | $(11^+)$ | 293.14 *3* | 100 | 1586.60 | $(10^+)$ | D |
| 1928.61 | $(10^+)$ | 357.43[‡] *2* | 100[‡] *3* | 1571.18 | $(9^+)$ | D |
| | | 584.71 *16* | 12.7 *16* | 1344.25 | $(9^+)$ | D |
| 1944.02 | $(11^+)$ | 357.43[‡] *2* | 100[‡] | 1586.60 | $(10^+)$ | D |
| 2004.71 | $(9^-)$ | 186.50 *6* | 90 *6* | 1818.20 | $(8^-)$ | D |
| | | 864.06 *8* | 100 *7* | 1140.63 | $(7^+)$ | |
| | | 1071.05 *19* | 38 *6* | 933.63 | $(8^+)$ | D |
| 2031.20 | $(10^+)$ | 619.75 *15* | 100 | 1411.45 | $(9^+)$ | D |
| 2072.0 | $(1^+)$ | 1845.8 | 100 | 226.19 | $(2^+)$ | |
| 2415.2 | $(11^+)$ | 486.5 *3* | 100 *6* | 1928.61 | $(10^+)$ | D |
| | | 828.3 *3* | 22 *5* | 1586.60 | $(10^+)$ | D |
| 2529.10 | $(10^-)$ | 524.5 *3* | 100 *3* | 2004.71 | $(9^-)$ | D |
| | | 1184.72 *10* | 33 *3* | 1344.25 | $(9^+)$ | D |
| 2696.17 | $(12^+)$ | 752.15 *6* | 100 *5* | 1944.02 | $(11^+)$ | D |
| | | 816.16 *13* | 55 *5* | 1879.76 | $(11^+)$ | D |
| 2868.98 | $(12^+)$ | 453.9[‡] *2* | 27[‡] *5* | 2415.2 | $(11^+)$ | D |
| | | 925.11 *13* | 100 *9* | 1944.02 | $(11^+)$ | D |
| 2985.00 | $(13^+)$ | 288.77 *5* | 79 *4* | 2696.17 | $(12^+)$ | D |
| | | 1041.09 *7* | 100 *6* | 1944.02 | $(11^+)$ | Q |
| 3061.61 | $(13^+)$ | 365.45 *9* | 100 | 2696.17 | $(12^+)$ | D |
| 3102.64 | $(11^-)$ | 572.8 *3* | 100 *4* | 2529.10 | $(10^-)$ | D |
| | | 1097.3 *3* | 39 *3* | 2004.71 | $(9^-)$ | Q |
| 3323.16 | $(13^+)$ | 453.9[‡] *2* | 47[‡] *9* | 2868.98 | $(12^+)$ | D |
| | | 627.09 *12* | 100 *9* | 2696.17 | $(12^+)$ | D |
| 3560.65 | $(12^-)$ | 457.6 *8* | 100 *7* | 3102.64 | $(11^-)$ | D |
| | | 1031.3 *3* | 28 *5* | 2529.10 | $(10^-)$ | Q |
| | | 1615.3 *6* | 27 *5* | 1944.02 | $(11^+)$ | D |
| 3566.20 | $(12^-)$ | 463.53 *4* | 100 *4* | 3102.64 | $(11^-)$ | D |
| | | 1150.0 *3* | 99 *9* | 2415.2 | $(11^+)$ | D |

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## Adopted Levels, Gammas (continued)

### $\gamma(^{104}In)$ (continued)

| $E_i$(level) | $J_i^\pi$ | $E_\gamma$ | $I_\gamma$ | $E_f$ | $J_f^\pi$ | Mult. |
|---|---|---|---|---|---|---|
| 3566.20 | $(12^-)$ | 1621.2 *4* | 17 *2* | 1944.02 | $(11^+)$ | D |
| | | 1685.6 *4* | 36 *3* | 1879.76 | $(11^+)$ | D |
| 3817.17 | $(13^-)$ | 250.81 *8* | 100 *3* | 3566.20 | $(12^-)$ | D |
| | | 256.60 *5* | 23.6 *12* | 3560.65 | $(12^-)$ | D |
| | | 946.7 *5* | 11.7 *16* | 2868.98 | $(12^+)$ | D |
| 3835.9 | $(12^-)$ | 1891.9 *3* | 100 | 1944.02 | $(11^+)$ | D |
| 3965.54 | $(13^-)$ | 399.34 *19* | 75 *13* | 3566.20 | $(12^-)$ | D |
| | | 404.89 *13* | 100 *12* | 3560.65 | $(12^-)$ | D |
| 4071.7 | $(13^-)$ | 235.78 *13* | 100 | 3835.9 | $(12^-)$ | D |
| 4103.04 | $(14^-)$ | 285.87 *2* | 100 | 3817.17 | $(13^-)$ | D |
| 4326.07 | $(14^-)$ | 360.53 *7* | 100 | 3965.54 | $(13^-)$ | D |
| 4437.71 | $(14^+)$ | 1376.2 *3* | 57 *12* | 3061.61 | $(13^+)$ | D |
| | | 1452.67 *16* | 100 *12* | 2985.00 | $(13^+)$ | D |
| 4642.93 | $(15^-)$ | 539.89 *5* | 100 | 4103.04 | $(14^-)$ | D |
| 5203.88 | $(16^-)$ | 560.95 *6* | 100 | 4642.93 | $(15^-)$ | D |
| 5625.56 | $(17^-)$ | 421.67 *10* | 100 | 5203.88 | $(16^-)$ | D |
| 6152.69 | $(18^-)$ | 527.13 *11* | 100 | 5625.56 | $(17^-)$ | D |

† Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on $\gamma$-ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.

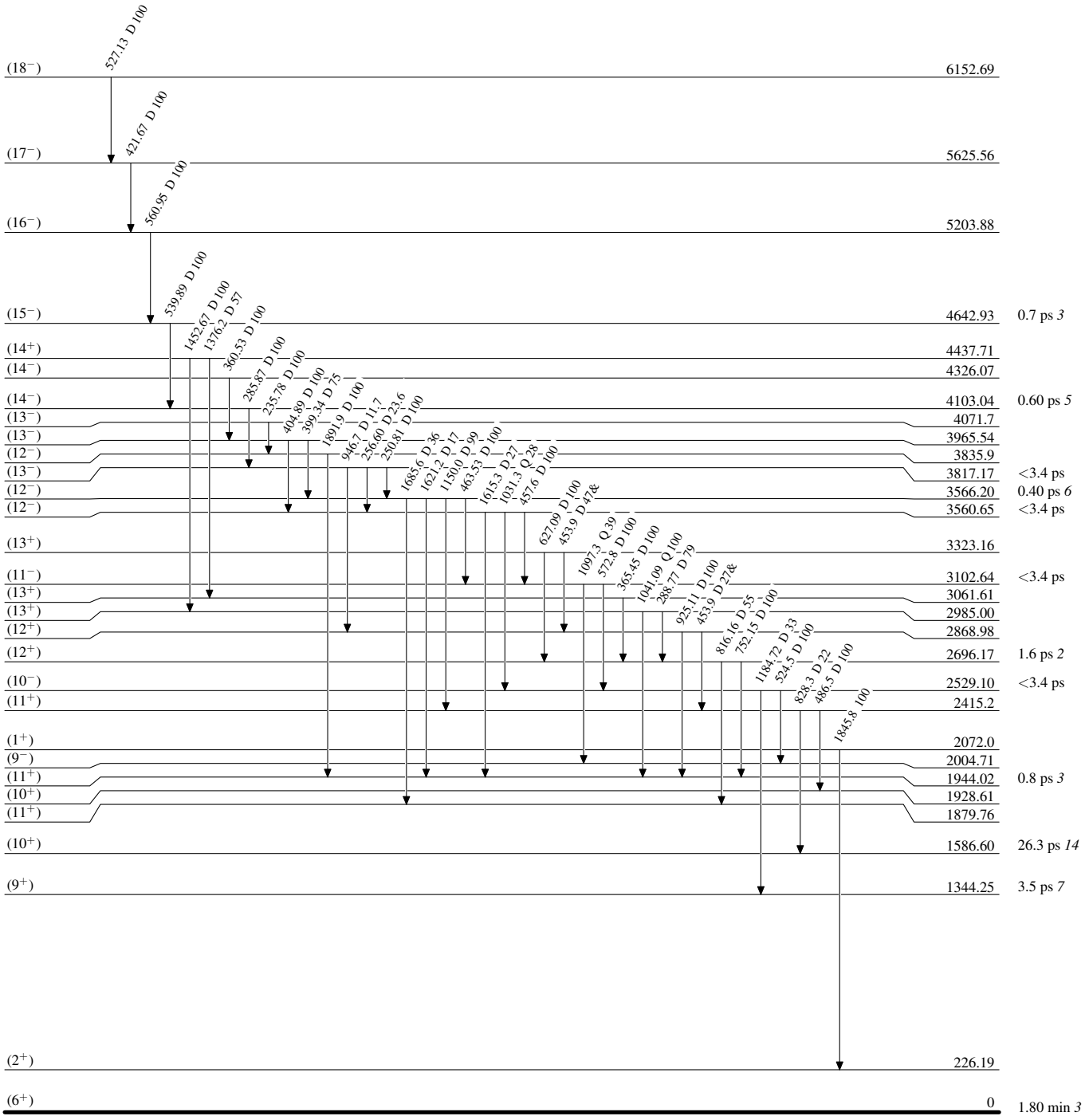
‡ Multiply placed with undivided intensity.

# Placement of transition in the level scheme is uncertain.

## Adopted Levels, Gammas

### Level Scheme

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given




$^{104}_{49}In_{55}$

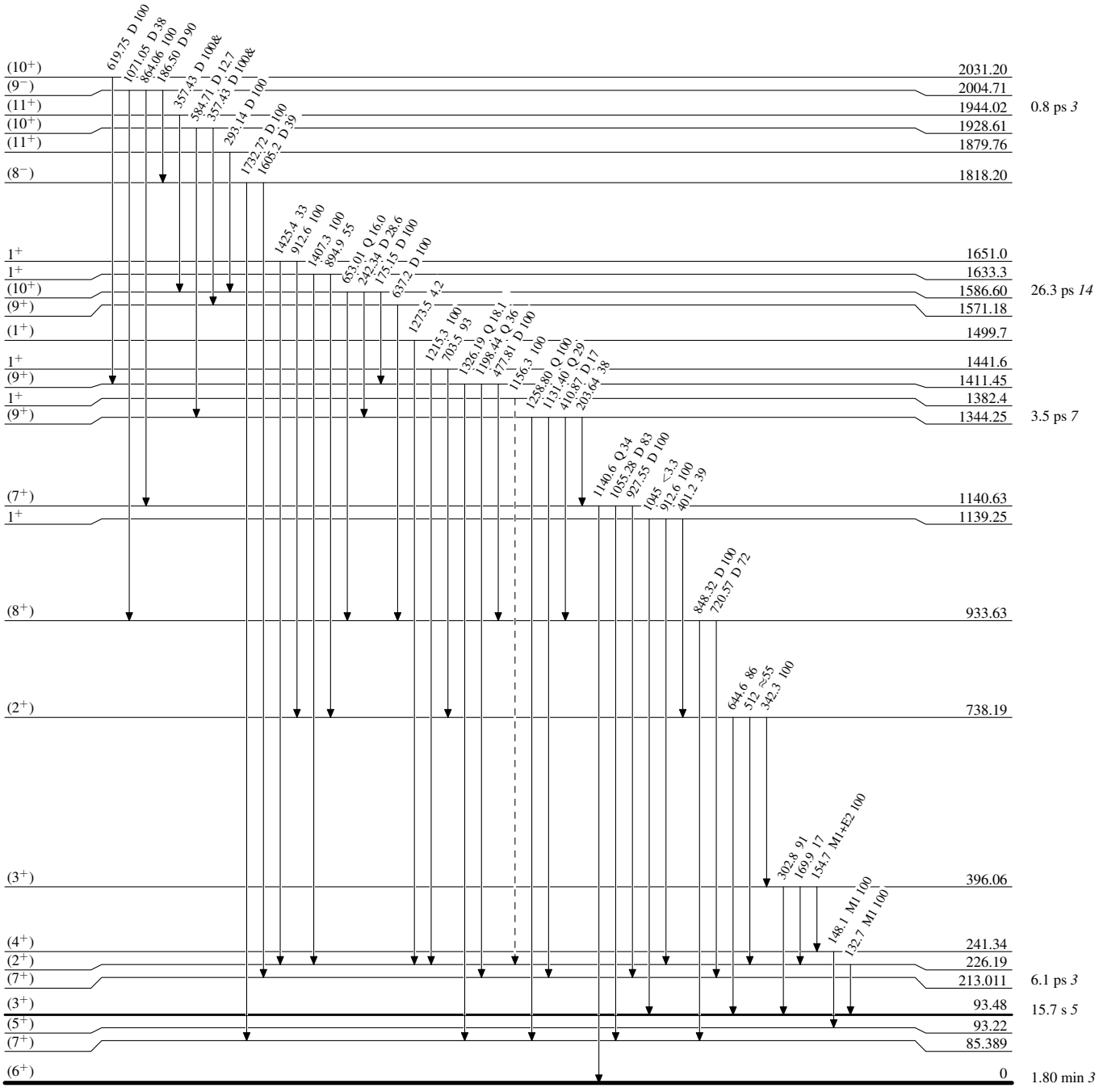
## Adopted Levels, Gammas

Legend

### Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given

$\gamma$ Decay (Uncertain)

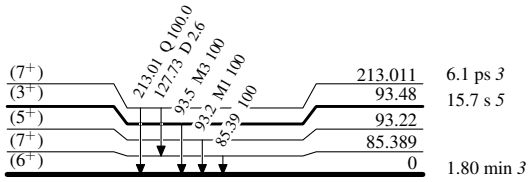



$^{104}_{49}In_{55}$

## Adopted Levels, Gammas

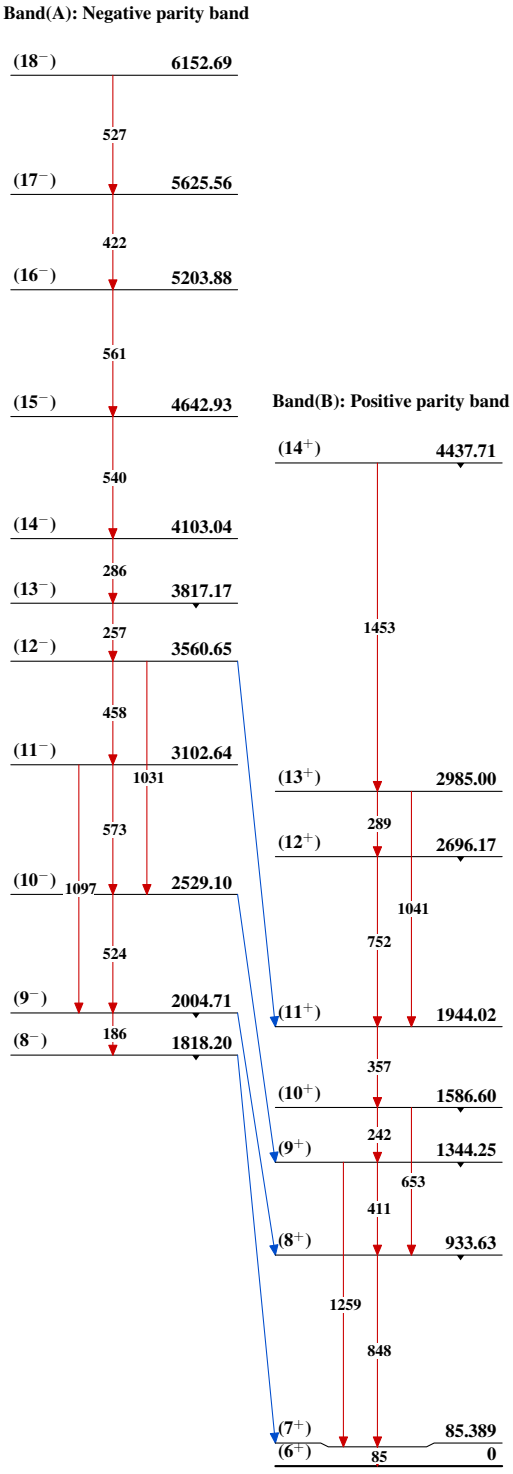
### Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given




$^{104}_{49}In_{55}$

## Adopted Levels, Gammas




$^{104}_{49}In_{55}$