

$^{110}\text{Cd}(n,n'\gamma)$  1992De41,2001Co01

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**1992De41:** The experiments were performed at Tajura Center for Nuclear Research in Lybia and IR-8 reactor at the Kurchatov Institute of Atomic Energy using fast neutrons. 30 gram, 96.5% enriched in  $^{110}\text{Cd}$  target was used. A two-crystal Compton polarimeter was used for linear polarization measurements. Measured:  $E\gamma$ ,  $I\gamma$ ,  $\gamma(\theta)$  ( $\theta=90^\circ$ ,  $105^\circ$ ,  $115^\circ$ ,  $125^\circ$ ,  $135^\circ$  and  $150^\circ$ ),  $\gamma$ -linear polarization. Deduced:  $^{110}\text{Cd}$  levels,  $\delta$ , mult,  $J^\pi$ .

**2001Co01:** The neutrons were produced at the University of Kentucky accelerator laboratory ( $E_n=2.1$  MeV to 3.4 MeV in 0.1 MeV steps). Three ingot of cadmium metal target, enriched to 97.25% in  $^{110}\text{Cd}$  was used.  $\gamma$ -rays were detected using a Compton-suppressed HPGe detector. Measured:  $E\gamma$ ,  $I\gamma$ ,  $\gamma(\theta)$ ,  $T_{1/2}$ . Deduced:  $^{110}\text{Cd}$  levels,  $\delta$ , mult,  $J^\pi$ .

Others: [2001Co01](#), [1990Ar20](#), [1976De23](#).

 $^{110}\text{Cd}$  Levels

| E(level) <sup>†</sup> | $J^\pi$ <sup>‡</sup>               | $T_{1/2}$ <sup>@</sup> | Comments   |
|-----------------------|------------------------------------|------------------------|--|
| 0.0                   | 0 <sup>+</sup>                     |                        |  |
| 657.755 14            | 2 <sup>+</sup>                     |                        |  |
| 1473.088 24           | 0 <sup>+</sup>                     |                        |  |
| 1475.796 15           | 2 <sup>+</sup>                     |                        |  |
| 1542.444 21           | 4 <sup>+</sup>                     |                        |  |
| 1731.293 23           | 0 <sup>+</sup>                     |                        |  |
| 1783.512 15           | 2 <sup>+</sup>                     | 0.8 ps +3-2            |  |
| 2078.878 22           | 3 <sup>-</sup>                     | 0.46 ps +15-9          |  |
| 2078.884 22           | 0 <sup>+</sup>                     |                        |  |
| 2162.806 19           | 3 <sup>+</sup>                     | 0.8 ps +6-2            |  |
| 2220.082 24           | 4 <sup>+</sup>                     | 0.7 ps +3-2            |  |
| 2250.54 8             | 4 <sup>+</sup>                     | 0.6 ps +5-2            |  |
| 2287.417 24           | 2 <sup>+</sup>                     | 0.29 ps +7-5           |  |
| 2331.92 5             | 0 <sup>+</sup>                     |                        |  |
| 2355.787 24           | 2 <sup>+</sup>                     | 0.35 ps +12-7          |  |
| 2433.269 23           | 3 <sup>+</sup>                     |                        |  |
| 2477.56 10            | 2 <sup>+</sup> #                   |                        |  |
| 2480.00 5             | 6 <sup>+</sup>                     | 0.2 ps +8-1            |  |
| 2481.602 24           | (2 <sup>+</sup> )#                 | 0.46 ps +23-12         | $J^\pi$ : 1992De41 suggests 2 <sup>+</sup> ,(3 <sup>-</sup> ). 2001Co01 assigns (2 <sup>+</sup> ). |
| 2539.69 5             | 5 <sup>-</sup>                     | 0.6 ps +4-2            |  |
| 2561.29 8             | 4 <sup>+</sup>                     | 0.9 ps +8-3            |  |
| 2566.46 6             | 2 <sup>+</sup> ,3 <sup>+</sup>     |                        |  |
| 2633.20 5             | (2 <sup>+</sup> ,3 <sup>+</sup> )# | 0.139 ps +21-14        | $J^\pi$ : $J^\pi=4^+$ ,(3 <sup>+</sup> ) suggested by 1992De41.                                    |
| 2649.95 6             | 1 <sup>-</sup>                     | 0.028 ps 7             |  |
| 2659.88 8             | (5) <sup>-</sup>                   |                        |  |
| 2662.00 4             | 0 <sup>+</sup> #                   |                        |  |
| 2705.65 21            | 4 <sup>+</sup>                     |                        |  |
| 2707.45 7             | 4 <sup>+</sup>                     |                        |  |
| 2758.26 8             | 3 <sup>+</sup>                     | 0.23 ps +9-6           | $J^\pi$ : (2 <sup>+</sup> ,3 <sup>+</sup> ) in 2001Co01.   |
| 2787.30 5             | 2 <sup>+</sup>                     | 0.028 ps 7             |  |
| 2793.48 15            |                                    |                        | $J^\pi=(4^+)$ in 2001Co01.   |
| 2842.68 18            | 5 <sup>-</sup> #                   |                        |  |
| 2869.08 5             | 2 <sup>+</sup>                     |                        |  |
| 2876.9 5              |                                    |                        |  |
| 2879.10 21            | (7 <sup>-</sup> )                  |                        |  |
| 2896.07? 10           |                                    |                        |  |
| 2917.62 10            | 2 <sup>+</sup> ,3 <sup>-</sup>     |                        |  |
| 2926.75 9             | 5 <sup>+</sup>                     |                        |  |
| 2975.28 8             | 1 <sup>+</sup> ,2 <sup>+</sup>     |                        | $J^\pi$ : 2 <sup>+</sup> in 2001Co01.  |

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$^{110}\text{Cd}(n,n'\gamma)$  **1992De41,2001Co01** (continued) $^{110}\text{Cd}$  Levels (continued)

| E(level) <sup>†</sup> | $J^\pi$ <sup>‡</sup>                           | $T_{1/2}$ <sup>@</sup> | Comments                                      |
|-----------------------|--|------------------------|---|
| 2984.63 14            | 3 <sup>+</sup>                                 | 0.11 ps +20-5          | $J^\pi$ : 5 <sup>-</sup> in <b>2001Co01</b> . |
| 2993.64 17            | (0 <sup>+</sup> ) <sup>#</sup>                 |                        |   |
| 2994.07 9             | (3 <sup>+</sup> ,4 <sup>+</sup> ) <sup>#</sup> |                        |   |
| 3008.4? 7             |  |                        |   |
| 3042.86 8             | (2 <sup>+</sup> ) <sup>#</sup>                 |                        |   |
| 3063.94 17            |  |                        |   |
| 3078.22 23            | 1 <sup>+</sup> ,2 <sup>+</sup>                 |                        |   |
| 3101.99 20            | 1,2 <sup>+</sup>                               |                        |   |
| 3122.2 3              | 6 <sup>+</sup>                                 |                        |   |
| 3135.17 7             | 2 <sup>+</sup> ,3 <sup>+</sup>                 |                        |   |
| 3171.19 20            |  |                        |   |
| 3193.0 4              | 1,2,3  |                        |   |
| 3256.48 14            | 2,3 <sup>+</sup>                               |                        |   |
| 3277.79 14            |  |                        |   |
| 3298.13 20            |  |                        |   |
| 3314.31 18            | 1 <sup>+</sup> ,2 <sup>+</sup>                 |                        |   |
| 3340.82 14            |  |                        |   |
| 3359.06 20            |  |                        |   |
| 3366.8 4              |  |                        |   |
| 3403.7 8              | (1 <sup>-</sup> )                              |                        |   |
| 3427.5 3              |  |                        |   |
| 3449.6 3              |  |                        |   |
| 3466.1 5              | 1 <sup>+</sup> ,2 <sup>+</sup>                 |                        |   |
| 3475.6 4              | 1 <sup>+</sup> ,2 <sup>+</sup>                 |                        |   |
| 3493.1 4              |  |                        |   |
| 3598.0 7              |  |                        |   |
| 3772.8 10             |  |                        |   |

<sup>†</sup> From least-squares fit to E $\gamma$ 's.

<sup>‡</sup> From **1992De41**, deduced using multipolarity of  $\gamma$ -ray transitions by  $\gamma(\theta)$ ,  $\gamma$ -linear polarizations and from the  $\gamma$ -decay pattern, unless otherwise stated.

<sup>#</sup> From **2001Co01**, deduced using  $\gamma$ -ray multiplicities from  $\gamma(\theta)$  and from  $\gamma$ -decay pattern.

<sup>@</sup> From **2001Co01** using the DSAM technique.

 $\gamma(^{110}\text{Cd})$ 

| $E_i(\text{level})$ | $J_i^\pi$      | $E_\gamma$ <sup>†</sup> | $I_\gamma$ <sup>†</sup> | $E_f$    | $J_f^\pi$      | Mult. <sup>#</sup> | $\delta$ <sup>#</sup> | Comments  |
|---------------------|----------------|-------------------------|-------------------------|----------|----------------|--------------------|-----------------------|---|
| 657.755             | 2 <sup>+</sup> | 657.75 2                | 100                     | 0.0      | 0 <sup>+</sup> | E2                 |                       | Mult.: $A_2=+0.22$ 2, $A_4=-0.03$ 2.  |
| 1473.088            | 0 <sup>+</sup> | 815.33 2                | 3.76 15                 | 657.755  | 2 <sup>+</sup> | [E2]               |                       | Mult.: $A_2=-0.005$ 13, $A_4=+0.006$ 18.  |
| 1475.796            | 2 <sup>+</sup> | 818.02 2                | 10.1 3                  | 657.755  | 2 <sup>+</sup> | M1+E2              | -1.4 +10-4            | Mult.: $A_2=-0.194$ 15, $A_4=0.00$ 2.<br>$\delta$ : Others: -1.4 +4-10 ( <b>1990Ar20</b> ), 1.5 +3-4 ( <b>2001Co01</b> ). |
|                     |                | 1475.78 2               | 5.5 2                   | 0.0      | 0 <sup>+</sup> | E2                 |                       | $I_\gamma$ : 6.09 22 in <b>2001Co01</b> .<br>Mult.: $A_2=+0.28$ 2, $A_4=-0.03$ 2.   |
| 1542.444            | 4 <sup>+</sup> | 884.68 2                | 15.4 5                  | 657.755  | 2 <sup>+</sup> | E2                 |                       | Mult.: $A_2=+0.33$ 2, $A_4=-0.05$ 2.  |
| 1731.293            | 0 <sup>+</sup> | 255.51 7                | 0.24 2                  | 1475.796 | 2 <sup>+</sup> |                    |                       | $I_\gamma$ : 0.15 1 in <b>2001Co01</b> .  |
|                     |                | 1073.53 2               | 1.57 10                 | 657.755  | 2 <sup>+</sup> |                    |                       |   |
| 1783.512            | 2 <sup>+</sup> | 310.4 6                 | 0.016 8                 | 1473.088 | 0 <sup>+</sup> |                    |                       |   |
|                     |                | 1125.78 2               | 5.6 3                   | 657.755  | 2 <sup>+</sup> | M1+E2              | +0.33 8               | Mult.: $A_2=+0.36$ 2, $A_4=+0.02$ 4.<br>$\delta$ : From $\gamma(\theta)$ in <b>1990Ar20</b> . Others: +0.33               |

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$^{110}\text{Cd}(n,n'\gamma)$  **1992De41,2001Co01 (continued)** $\gamma(^{110}\text{Cd})$  (continued)

| $E_i(\text{level})$ | $J_i^\pi$      | $E_\gamma^\dagger$                    | $I_\gamma^\dagger$                | $E_f$                            | $J_f^\pi$  | Mult. #                            | $\delta^\#$ | Comments  |
|---------------------|----------------|---------------------------------------|-----------------------------------|----------------------------------|--|------------------------------------|-------------|---|
| 1783.512            | 2 <sup>+</sup> | 1783.50 2                             | 1.51 7                            | 0.0                              | 0 <sup>+</sup>                                     | E2                                 |             | +7-4 (1992De41), 0.3 2 or 1.7 3 (1976De23), +0.13 +3-2 (2001Co01).<br>I <sub>γ</sub> : 1.78 2 in 2001Co01.<br>Mult.: A <sub>2</sub> =+0.29 3, A <sub>4</sub> =-0.07 4.  |
| 2078.878            | 3 <sup>-</sup> | 295.45 4<br>602.92 10                 | <0.63<br>0.70 5                   | 1783.512<br>1475.796             | 2 <sup>+</sup><br>2 <sup>+</sup>                   | E1                                 |             | I <sub>γ</sub> : ≈0.16 in 2001Co01.<br>I <sub>γ</sub> : ≈0.63 in 2001Co01.<br>Mult.: A <sub>2</sub> =-0.20 5, A <sub>4</sub> =-0.01 5.<br>δ: 0.04 2 (2001Co01).<br>Mult.: A <sub>2</sub> =-0.166 16, A <sub>4</sub> =+0.02 2.<br>δ: +0.05 5 (1976De23), 0.003 +28-19 (2001Co01).                                      |
|                     |                | 1421.10 <sup>a</sup> 2                | <4.2 <sup>a</sup>                 | 657.755                          | 2 <sup>+</sup>                                     | E1                                 |             |   |
| 2078.884            | 0 <sup>+</sup> | 295.45 4<br>1421.10 <sup>a</sup> 2    | ≈0.63<br><0.2 <sup>a</sup>        | 1783.512<br>657.755              | 2 <sup>+</sup><br>2 <sup>+</sup>                   |                                    |             |   |
| 2162.806            | 3 <sup>+</sup> | 620.3 2                               | 0.35 7                            | 1542.444                         | 4 <sup>+</sup>                                     | M1+E2 <sup>@</sup>                 | -0.46 +7-6  | I <sub>γ</sub> : 0.49 2 in 2001Co01.<br>δ: From 2001Co01.   |
|                     |                | 687.01 2                              | 0.84 4                            | 1475.796                         | 2 <sup>+</sup>                                     | M1+E2 <sup>@</sup>                 | -1.66 +9-8  | I <sub>γ</sub> : 0.74 2 in 2001Co01.<br>Mult.: Other: A <sub>2</sub> =-0.55 3, A <sub>4</sub> =+0.09 4 (1992De41).<br>δ: From 2001Co01. Others: -1.48 10 or -0.40 4 (1992De41), -1.48 15 (1990Ar20), 0.4 +1-2 (1976De23).   |
|                     |                | 1505.04 2                             | 1.75 8                            | 657.755                          | 2 <sup>+</sup>                                     | M1+E2                              | -1.37 8     | Mult.: A <sub>2</sub> =-0.590 17, A <sub>4</sub> =+0.06 3.<br>δ: Others: -0.1 1 or 3 +2-1 (1976De23), -1.37 15 (1990Ar20), -1.52 +11-14 (2001Co01).   |
| 2220.082            | 4 <sup>+</sup> | 677.63 2                              | 1.39 5                            | 1542.444                         | 4 <sup>+</sup>                                     | M1+E2                              | -0.34 3     | Mult.: A <sub>2</sub> =+0.14 2, A <sub>4</sub> =+0.03 3.<br>δ: Others: -0.34 4 (1990Ar20), -0.41 2 (2001Co01).<br>Mult.: A <sub>2</sub> =+0.36 2, A <sub>4</sub> =-0.05 8.  |
|                     |                | 744.30 3<br>1562.2 2                  | 0.62<br>0.18 3                    | 1475.796<br>657.755              | 2 <sup>+</sup><br>2 <sup>+</sup>                   | E2<br>E2                           |             |   |
| 2250.54             | 4 <sup>+</sup> | 467.13 13<br>708.05 10                | 0.25 2<br>1.43 15                 | 1783.512<br>1542.444             | 2 <sup>+</sup><br>4 <sup>+</sup>                   | E2 <sup>@</sup><br>M1+E2           | -0.15 9     | I <sub>γ</sub> : 0.14 1 in 2001Co01.<br>Mult.: A <sub>2</sub> =+0.22 6, A <sub>4</sub> =-0.10 8.<br>δ: Others: -0.15 9 (1990Ar20), 0.13 +4-3 (2001Co01).  |
|                     |                | 774.0 5<br>1592.7 <sup>&amp;</sup> 5  | 0.11 3<br>0.09 <sup>&amp;</sup> 2 | 1475.796<br>657.755              | 2 <sup>+</sup><br>2 <sup>+</sup>                   | E2 <sup>@</sup><br>E2 <sup>@</sup> |             | I <sub>γ</sub> : 0.06 1 in 2001Co01.<br>I <sub>γ</sub> : 0.12 1 in 2001Co01.  |
| 2287.417            | 2 <sup>+</sup> | 1629.65 2                             | 1.96 15                           | 657.755                          | 2 <sup>+</sup>                                     | M1+E2                              | +0.06 3     | Mult.: A <sub>2</sub> =+0.24 3, A <sub>4</sub> =+0.01 4.<br>δ: Others: +0.06 3 (1990Ar20), -0.01 2 (2001Co01).  |
| 2331.92             | 0 <sup>+</sup> | 548.4 <sup>&amp;</sup> 2<br>1674.15 4 | 0.08 <sup>&amp;</sup> 2<br>0.33 2 | 1783.512<br>657.755              | 2 <sup>+</sup><br>2 <sup>+</sup>                   |                                    |             | Mult.: A <sub>2</sub> =+0.02 6, A <sub>4</sub> =+0.00 8 (1992De41).   |
| 2355.787            | 2 <sup>+</sup> | 624.47 <sup>‡</sup> 9<br>1698.02 2    |                                   | 1731.293<br>657.755              | 0 <sup>+</sup><br>2 <sup>+</sup>                   | E2 <sup>@</sup><br>M1+E2           |             | Mult.: A <sub>2</sub> =+0.27 3, A <sub>4</sub> =-0.01 3.<br>δ: +0.11 4 or +1.75 15 (1992De41), 0.1 +2-1 or 1.7 +6-5 (1976De23), 1.8 2 or +0.10 5 (1990Ar20).  |
| 2433.269            | 3 <sup>+</sup> | 651.3 5<br>890.7 5<br>957.47 2        | 0.17 3<br>0.05 2<br>0.59 4        | 1783.512<br>1542.444<br>1475.796 | 2 <sup>+</sup><br>4 <sup>+</sup><br>2 <sup>+</sup> |                                    |             | E <sub>γ</sub> : Least-squares fit gives 649.754 25.<br>Mult.: A <sub>2</sub> =-0.58 3, A <sub>4</sub> =+0.07 3.<br>δ: -0.45 5 or -1.38 14 (1992De41), -0.43 8 or -1.38 20 (1990Ar20).<br>Mult.: A <sub>2</sub> =-0.56 8, A <sub>4</sub> =0.00 3.<br>δ: -0.35 10 or -1.6 3 (1992De41), -0.35 10 or -1.6 4 (1990Ar20). |
|                     |                | 1775.47 5                             | 0.24 2                            | 657.755                          | 2 <sup>+</sup>                                     | M1+E2                              |             |   |

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$^{110}\text{Cd}(n,n'\gamma)$  **1992De41,2001Co01** (continued) $\gamma(^{110}\text{Cd})$  (continued)

| $E_i(\text{level})$ | $J_i^\pi$                         | $E_\gamma^\dagger$       | $I_\gamma^\dagger$      | $E_f$    | $J_f^\pi$         | Mult. #            | $\delta^\#$  | Comments  |
|---------------------|-----------------------------------|--------------------------|-------------------------|----------|-------------------|--------------------|--------------|---|
| 2477.56             | 2 <sup>+</sup>                    | 746.19 <sup>‡</sup> 17   |                         | 1731.293 | 0 <sup>+</sup>    | E2                 |              | $I_\gamma=42\%$ in <b>2001Co01</b> .  |
|                     |                                   | 1001.65 <sup>‡</sup> 17  |                         | 1475.796 | 2 <sup>+</sup>    | (E2) <sup>@</sup>  |              | $I_\gamma=100\%$ in <b>2001Co01</b> .   |
|                     |                                   | 1819.82 <sup>‡</sup> 24  |                         | 657.755  | 2 <sup>+</sup>    |                    |              | $I_\gamma=20\%$ in <b>2001Co01</b> .  |
|                     |                                   | 2477.81 <sup>‡</sup> 22  | 0.360 7                 | 0.0      | 0 <sup>+</sup>    | E2 <sup>@</sup>    |              | $I_\gamma=91\%$ in <b>2001Co01</b> .  |
| 2480.00             | 6 <sup>+</sup>                    | 937.55 4                 | 0.71 4                  | 1542.444 | 4 <sup>+</sup>    | E2                 |              | Mult.: $A_2=+0.39$ 3, $A_4=-0.07$ 3.  |
| 2481.602            | (2 <sup>+</sup> )                 | 402.84 <sup>‡</sup> 17   |                         | 2078.878 | 3 <sup>-</sup>    | E1 <sup>@</sup>    |              |   |
|                     |                                   | 698.0 2                  | 0.19 2                  | 1783.512 | 2 <sup>+</sup>    |                    |              |   |
|                     |                                   | 1005.58 10               | 0.36 2                  | 1475.796 | 2 <sup>+</sup>    |                    |              | Mult.: $A_2=-0.02$ 5, $A_4=0.06$ 4<br>( <b>1992De41</b> ).  |
|                     |                                   |                          |                         |          |                   |                    |              | $\delta: 1/\delta=+0.01$ +9-1 or $\delta=-0.41$ 10<br>( <b>1992De41</b> ).  |
|                     |                                   | 1823.84 2                | 0.71 4                  | 657.755  | 2 <sup>+</sup>    | M1+E2              |              | Mult.: $A_2=-0.15$ 3, $A_4=0.02$ 4.<br>$\delta: -0.70$ 9 or -4.9 +24-11<br>( <b>1992De41</b> ), -0.70 10 or -5.2 20<br>( <b>1990Ar20</b> ). |
| 2539.69             | 5 <sup>-</sup>                    | 460.83 <sup>‡</sup> 17   |                         | 2078.878 | 3 <sup>-</sup>    | (E2) <sup>@</sup>  |              |   |
|                     |                                   | 997.24 4                 | 1.40 20                 | 1542.444 | 4 <sup>+</sup>    | E1                 |              | Mult.: $A_2=-0.17$ 2, $A_4=+0.04$ 3.  |
| 2561.29             | 4 <sup>+</sup>                    | 1018.7 5                 | 0.08 3                  | 1542.444 | 4 <sup>+</sup>    | M1+E2 <sup>@</sup> | -0.49 +16-19 | $\delta$ : From <b>2001Co01</b> .   |
|                     |                                   | 1085.54 8                | 0.47 3                  | 1475.796 | 2 <sup>+</sup>    | E2                 |              | Mult.: $A_2=+0.36$ 4, $A_4=-0.10$ 5.  |
|                     |                                   | 1903.7 3                 | 0.08 2                  | 657.755  | 2 <sup>+</sup>    | E2 <sup>@</sup>    |              | $I_\gamma: 0.13$ 1 in <b>2001Co01</b> .   |
| 2566.46             | 2 <sup>+</sup> ,3 <sup>+</sup>    | 782.8 2                  | 0.14 2                  | 1783.512 | 2 <sup>+</sup>    |                    |              |   |
|                     |                                   | 1908.70 6                | 0.48 3                  | 657.755  | 2 <sup>+</sup>    |                    |              | Mult.: $A_2=+0.12$ 5, $A_4=+0.08$ 6<br>( <b>1992De41</b> ).   |
| 2633.20             | (2 <sup>+</sup> ,3 <sup>+</sup> ) | 1090.83 10               | 0.23 2                  | 1542.444 | 4 <sup>+</sup>    |                    |              | Mult.: $A_2=+0.25$ 10, $A_4=-0.01$ 12<br>( <b>1992De41</b> ).   |
|                     |                                   |                          |                         |          |                   |                    |              | $\delta: -0.15$ 10 or +1.4 3 ( <b>1992De41</b> ).   |
|                     |                                   | 1157.24 <sup>‡</sup> 17  |                         | 1475.796 | 2 <sup>+</sup>    |                    |              |   |
|                     |                                   | 1975.42 5                | 0.55 5                  | 657.755  | 2 <sup>+</sup>    | E2                 |              | Mult.: $A_2=+0.43$ 4, $A_4=0.00$ 4.   |
| 2649.95             | 1 <sup>-</sup>                    | 1176.8 2                 | 0.18 2                  | 1473.088 | 0 <sup>+</sup>    |                    |              | $I_\gamma: 0.058$ 2 in <b>2001Co01</b> .  |
|                     |                                   | 2649.92 6                | 0.56 5                  | 0.0      | 0 <sup>+</sup>    | E1                 |              | Mult.: $A_2=-0.09$ 4, $A_4=0.00$ 5.   |
| 2659.88             | (5) <sup>-</sup>                  | 120.21 10                | 0.28 5                  | 2539.69  | 5 <sup>-</sup>    |                    |              |   |
|                     |                                   | 409.1 <sup>&amp;</sup> 4 | 0.07 <sup>&amp;</sup> 2 | 2250.54  | 4 <sup>+</sup>    |                    |              |   |
|                     |                                   | 1117.44 12               | 0.48 8                  | 1542.444 | 4 <sup>+</sup>    |                    |              |   |
| 2662.00             | 0 <sup>+</sup>                    | 1186.13 <sup>‡</sup> 5   |                         | 1475.796 | 2 <sup>+</sup>    |                    |              | $E_\gamma$ : Depopulate 2661.06 keV level<br>in <b>1992De41</b> .   |
|                     |                                   | 2004.33 <sup>‡</sup> 6   |                         | 657.755  | 2 <sup>+</sup>    |                    |              | $E_\gamma$ : Depopulate 2662.18 keV level<br>in <b>1992De41</b> .   |
| 2705.65             | 4 <sup>+</sup>                    | 1163.2 2                 | 0.49 4                  | 1542.444 | 4 <sup>+</sup>    | M1+E2              | -0.03 +6-9   | Mult., $\delta: A_2=+0.32$ 5, $A_4=-0.03$ 6.<br>Other: E2 deduced from $\gamma(\theta)$ in<br><b>2001Co01</b> .                             |
| 2707.45             | 4 <sup>+</sup>                    | 544.65 7                 | 0.22 2                  | 2162.806 | 3 <sup>+</sup>    | M1+E2              |              | $I_\gamma: 0.17$ 1 in <b>2001Co01</b> .   |
|                     |                                   |                          |                         |          |                   |                    |              | Mult.: $A_2=-0.28$ 10, $A_4=+0.01$ 12.<br>$\delta: -0.03$ 5 or -5.5 +24-10<br>( <b>1992De41</b> ).  |
|                     |                                   | 1164.9 2                 | 0.39 4                  | 1542.444 | 4 <sup>+</sup>    | M1+E2              | -0.07 +10-7  | Mult.: $A_2=+0.39$ 11, $A_4=+0.02$ 14.  |
| 2758.26             | 3 <sup>+</sup>                    | 402.4 <sup>b</sup> 2     | 0.19 3                  | 2355.787 | 2 <sup>+</sup>    |                    |              | $E_\gamma$ : Not observed in <b>2001Co01</b> .  |
|                     |                                   | 1282.45 8                | 0.42 3                  | 1475.796 | 2 <sup>+</sup>    | M1+E2              | +0.32 5      |   |
|                     |                                   | 2100.6 5                 | 0.14 4                  | 657.755  | 2 <sup>+</sup>    |                    |              |   |
| 2787.30             | 2 <sup>+</sup>                    | 305.8 2                  | 0.07 2                  | 2481.602 | (2 <sup>+</sup> ) |                    |              |   |
|                     |                                   | 2129.52 5                | 0.44 3                  | 657.755  | 2 <sup>+</sup>    | M1+E2              |              | Mult.: $A_2=-0.31$ 5, $A_4=-0.02$ 5.<br>mult=(M1) in <b>2001Co01</b> .  |
|                     |                                   |                          |                         |          |                   |                    |              | $\delta: +0.18$ 10-7 or +1.5 3.   |
|                     |                                   | 2788.1 10                | 0.07 2                  | 0.0      | 0 <sup>+</sup>    |                    |              |   |

Continued on next page (footnotes at end of table)

$^{110}\text{Cd}(n,n'\gamma)$  **1992De41,2001Co01** (continued) $\gamma(^{110}\text{Cd})$  (continued)

| $E_i(\text{level})$ | $J_i^\pi$ | $E_\gamma^\dagger$   | $I_\gamma^\dagger$                     | $E_f$   | $J_f^\pi$                    | Mult. #               | Comments   |
|---------------------|-----------|--|--|---|------------------------------|-----------------------|--|
| 2793.48             |           | 573.3 5<br>630.6 2<br>715.5 10<br>1251.0 4<br>(182.8 6)      | <0.1<br>0.16 3<br>0.04 2<br>0.12 2     | 2220.082<br>2162.806<br>2078.878<br>1542.444<br>2659.88 | 4+<br>3+<br>3-<br>4+<br>(5)- |                       | $E_\gamma$ : Not observed in 2001Co01.   |
| 2842.68             | 5-        |  |  |   |                              |                       | $E_\gamma$ : From 2001Co01. Not observed by the authors due to the attenuation of low-energy $\gamma$ -rays in the sample but taken from literature.<br>$I_\gamma$ : 0.02 1 in 2001Co01. |
| 2869.08             | 2+        | 409.1& 4<br>1300.3 2<br>1085.49‡ 5<br>2211.53 9<br>2870.6 10 | 0.07& 2<br>0.26 5<br>0.35 2<br>0.05 2  | 2433.269<br>1542.444<br>1783.512<br>657.755<br>0.0      | 3+<br>4+<br>2+<br>2+<br>0+   | (E1)@<br>E2@<br>M1+E2 | $\delta$ : +1.8 7 or +0.10 +22-13 (1992De41).<br>$E_\gamma$ : Not observed in 2001Co01.  |
| 2876.9              |           | 1334.4 5   | 0.05 2                                 | 1542.444  | 4+                           |                       |  |
| 2879.10             | (7-)      | 399.1 2  | 0.16 2                                 | 2480.00   | 6+                           |                       |  |
| 2896.07?            |           | 356.38& 8  | 0.15& 2                                | 2539.69   | 5-                           |                       |  |
| 2917.62             | 2+,3-     | 356.38& 8<br>1441.9&<br>2259.5 2                             | 0.15& 2<br><0.30&<br>0.13 2            | 2561.29<br>1475.796<br>657.755                          | 4+<br>2+<br>2+               |                       | Mult.: $A_2=-0.10$ 6, $A_4=-0.03$ 7 (1992De41).<br>$I_\gamma$ : 0.25 2 in 2001Co01.  |
| 2926.75             | 5+        | 705.2 10<br>763.95 9   | 0.06 2                                 | 2220.082<br>2162.806                                    | 4+<br>3+                     |                       | $E_\gamma$ : Not observed in 2001Co01.<br>$E_\gamma$ : From 2001Co01, $I_\gamma \approx$ same as 705.2 keV transition observed only in 1992De41.   |
| 2975.28             | 1+,2+     | 1384.5 5<br>2317.50 8  | 0.08 2<br>0.22 2                       | 1542.444<br>657.755                                     | 4+<br>2+                     | M1+E2                 | $\delta$ : $1/\delta=+0.26 +13-10$ or $\delta=-0.16$ 12 (1992De41) if $J^\pi=2^+$ .  |
| 2984.63             | 3+        | 2975.6 8<br>905.7 2<br>1441.9&<br>2326.9 2                   | 0.033 10<br>0.08 2<br><0.30&<br>0.12 2 | 0.0<br>2078.878<br>1542.444<br>657.755                  | 0+<br>3-<br>4+<br>2+         |                       | Mult.: $A_2=-0.10$ 6, $A_4=-0.03$ 7 (1992De41).<br>$E_\gamma$ : Not observed in 2001Co01.<br>Mult.: $A_2=-0.50$ 18, $A_4=+0.02$ 18.<br>$\delta$ : -1.9 +12-7 or -0.3 +3-2 (1992De41).    |
| 2993.64             | (0+)      | 1517.83‡ 17  |  | 1475.796  | 2+                           |                       |  |
| 2994.07             | (3+,4+)   | 1451.62‡ 8   |  | 1542.444  | 4+                           |                       |  |
| 3008.4?             |           | 2350.7 10<br>3008.3 10                                       | 0.05 2<br>0.04 2                       | 657.755<br>0.0  | 2+<br>0+                     |                       |  |
| 3042.86             | (2+)      | 1566.92‡ 10<br>2385.22 11<br>3042.98 28                      |  | 1475.796<br>657.755<br>0.0                              | 2+<br>2+<br>0+               |                       | $E_\gamma$ : From 2001Co01, 2385.1 keV 5 in 1992De41.<br>$E_\gamma$ : From 2001Co01, 3044.0 keV 2 in 1992De41.   |
| 3063.94             |           | 270.4 2<br>584.0 2   | 0.07 2<br>0.10 5                       | 2793.48<br>2480.00                                      | 6+                           |                       |  |
| 3078.22             | 1+,2+     | 1602.8 5<br>2420.5 3<br>3077.6 5                             | 0.06 2<br>0.11 2<br>0.08 2             | 1475.796<br>657.755<br>0.0                              | 2+<br>2+<br>0+               |                       |  |
| 3101.99             | 1,2+      | 184.4 2<br>2444.1 4  | 0.10 2<br>0.13 2                       | 2917.62<br>657.755                                      | 2+,3-<br>2+                  |                       |  |
| 3122.2              | 6+        | 1579.7 3   | 0.12 2                                 | 1542.444  | 4+                           |                       |  |
| 3135.17             | 2+,3+     | 1592.7& 3<br>2477.39 7                                       | 0.09& 2<br>0.30 2                      | 1542.444<br>657.755                                     | 4+<br>2+                     | M1+E2                 | Mult.: $A_2=+0.31$ 7, $A_4=-0.02$ 7.<br>$\delta$ : +0.23 +19-10 or +1.4 4 (1992De41).  |
| 3171.19             |           | 2513.4 2   | 0.19 2                                 | 657.755   | 2+                           |                       |  |
| 3193.0              | 1,2,3     | 1030.0 5<br>2535.4 4   | 0.09 3<br>0.18 2                       | 2162.806<br>657.755                                     | 3+<br>2+                     |                       |  |
| 3256.48             | 2,3+      | 2598.69 14   | 0.25 2                                 | 657.755   | 2+                           |                       | Mult.: $A_2=+0.30$ 10, $A_4=+0.14$ 10.<br>$\delta$ : +0.02 129 or +2.2 7 for $J^\pi=2^+$ (1992De41).   |

Continued on next page (footnotes at end of table)

$^{110}\text{Cd}(n,n'\gamma)$  **1992De41,2001Co01** (continued) $\gamma(^{110}\text{Cd})$  (continued)

| $E_i(\text{level})$ | $J_i^\pi$                      | $E_\gamma^\dagger$       | $I_\gamma^\dagger$      | $E_f$    | $J_f^\pi$         | Comments |
|---------------------|--------------------------------|--------------------------|-------------------------|----------|-------------------|----------|
| 3277.79             |                                | 2620.00 <i>14</i>        | 0.12 2                  | 657.755  | 2 <sup>+</sup>    |          |
| 3298.13             |                                | 2640.1 7                 | 0.06 2                  | 657.755  | 2 <sup>+</sup>    |          |
|                     |                                | 3298.1 2                 | 0.09 2                  | 0.0      | 0 <sup>+</sup>    |          |
| 3314.31             | 1 <sup>+</sup> ,2 <sup>+</sup> | 1838.2 <i>4</i>          | 0.04 2                  | 1475.796 | 2 <sup>+</sup>    |          |
|                     |                                | 2656.6 2                 | 0.08 2                  | 657.755  | 2 <sup>+</sup>    |          |
|                     |                                | 3315.2 <sup>b</sup> 7    | 0.028 9                 | 0.0      | 0 <sup>+</sup>    |          |
| 3340.82             |                                | 2683.03 <i>14</i>        | 0.13 2                  | 657.755  | 2 <sup>+</sup>    |          |
| 3359.06             |                                | 3359.0 2                 | 0.16 2                  | 0.0      | 0 <sup>+</sup>    |          |
| 3366.8              |                                | 2709.0 <i>4</i>          | 0.10 2                  | 657.755  | 2 <sup>+</sup>    |          |
| 3403.7              | (1 <sup>-</sup> )              | 2745.9 8                 | 0.06 2                  | 657.755  | 2 <sup>+</sup>    |          |
| 3427.5              |                                | 548.4 <sup>&amp;</sup> 2 | 0.08 <sup>&amp;</sup> 2 | 2879.10  | (7 <sup>-</sup> ) |          |
| 3449.6              |                                | 1973.8 3                 | 0.13 4                  | 1475.796 | 2 <sup>+</sup>    |          |
| 3466.1              | 1 <sup>+</sup> ,2 <sup>+</sup> | 2808.3 5                 | 0.11 2                  | 657.755  | 2 <sup>+</sup>    |          |
| 3475.6              | 1 <sup>+</sup> ,2 <sup>+</sup> | 3475.5 <i>4</i>          | 0.07 2                  | 0.0      | 0 <sup>+</sup>    |          |
| 3493.1              |                                | 2835.3 <i>4</i>          | 0.14 2                  | 657.755  | 2 <sup>+</sup>    |          |
| 3598.0              |                                | 3597.9 7                 | 0.05 2                  | 0.0      | 0 <sup>+</sup>    |          |
| 3772.8              |                                | 3772.7 <i>10</i>         | 0.04 2                  | 0.0      | 0 <sup>+</sup>    |          |

<sup>†</sup> From **1992De41** ( $I_\gamma(657.75)=100$ ), unless otherwise stated.

<sup>‡</sup> Only observed in **2001Co01**.

<sup>#</sup> From **1992De41**, deduced from  $\gamma(\theta)$ , unless otherwise stated.

<sup>@</sup> From **2001Co01**, deduced from  $\gamma(\theta)$ .

<sup>&</sup> Multiply placed with undivided intensity.

<sup>a</sup> Multiply placed with intensity suitably divided.

<sup>b</sup> Placement of transition in the level scheme is uncertain.

<sup>x</sup>  $\gamma$  ray not placed in level scheme.

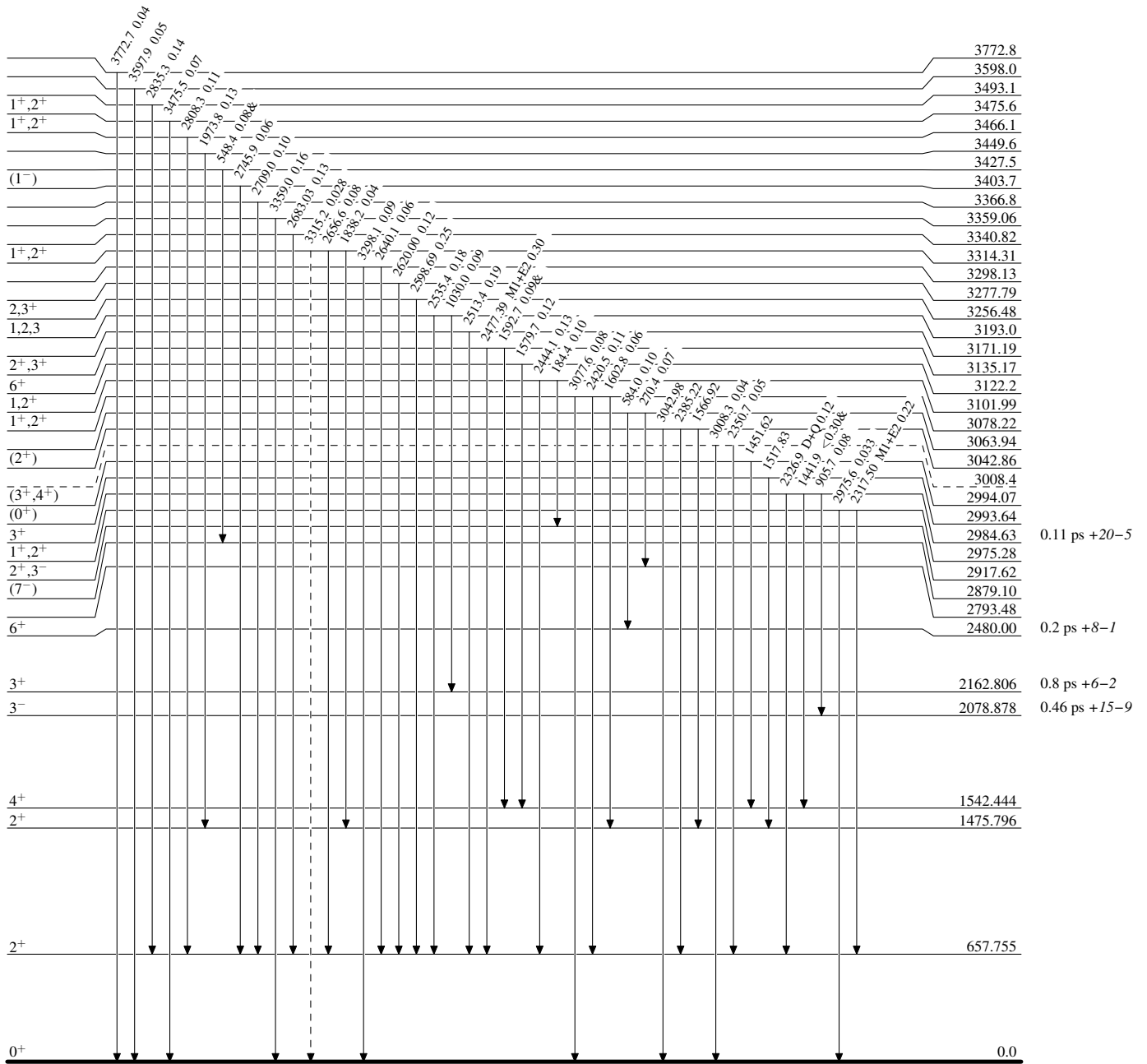
$^{110}\text{Cd}(n,n'\gamma)$  1992De41,2001Co01

Legend

Level Scheme

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

----->  $\gamma$  Decay (Uncertain)



$^{110}_{48}\text{Cd}_{62}$

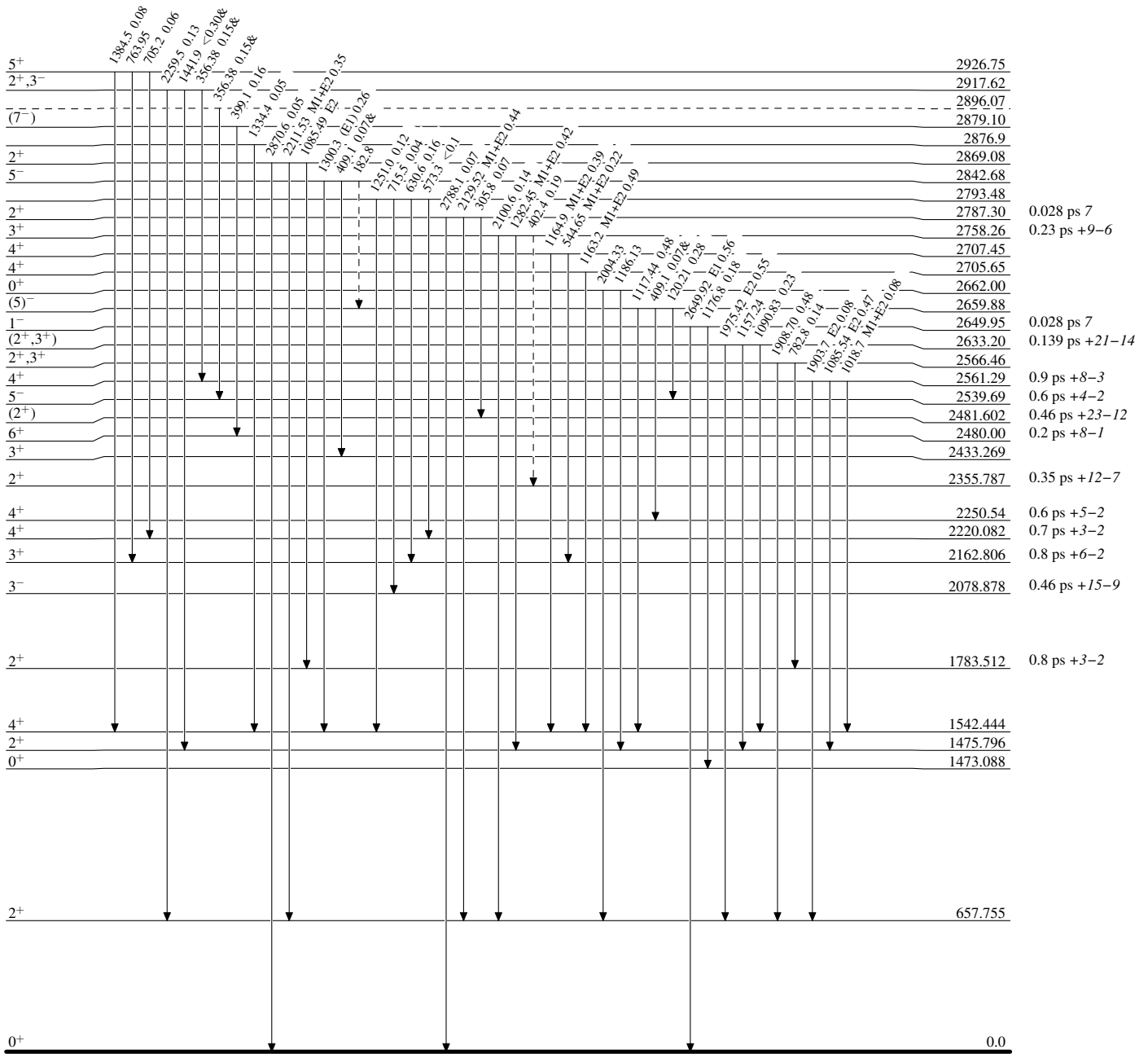
<sup>110</sup>Cd(n,n'γ) 1992De41,2001Co01

Legend

Level Scheme (continued)

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

-----▶ γ Decay (Uncertain)



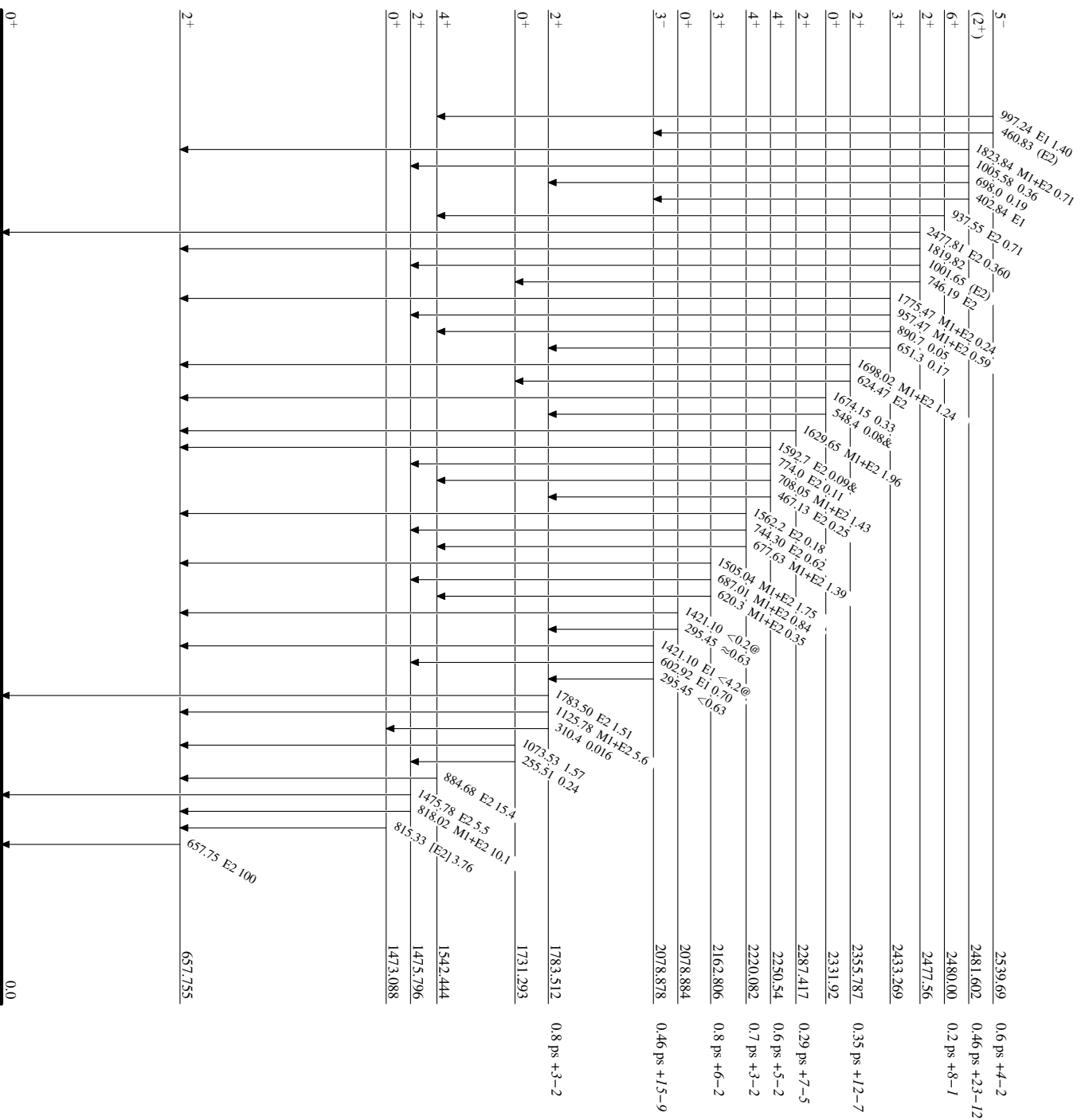
<sup>110</sup><sub>48</sub>Cd<sub>62</sub>



<sup>110</sup>Cd(n,γ) **1992De41,2001Co01**

Level Scheme (continued)

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



<sup>110</sup>Cd<sub>62</sub><sup>-9</sup>