## $^{58}$Ni($^{50}$Cr,4pn$\gamma$) 1997Pa25

| Type | Author | History Citation | Literature Cutoff Date |
|---|---|---|---|
| Full Evaluation | D. De Frenne | NDS 110, 2081 (2009) | 1-Mar-2009 |

1997Pa25: $^{58}$Ni($^{50}$Cr,4pn$\gamma$), E($^{58}$Ni)=261 MeV. Measured: E$\gamma$, I$\gamma$, $\gamma\gamma$, $\gamma(\theta)$ Nordball array with neutron and charged particle detectors and $BaF_2$ multiplicity filter. Deduced: $^{103}$Cd levels, $J^\pi$.

### $^{103}$Cd Levels

| E(level) | $J^\pi$† | $T_{1/2}$ | E(level) | $J^\pi$† | E(level) | $J^\pi$† |
|---|---|---|---|---|---|---|
| 0.0 | $(5/2)^+$ | | 2799.21 *18* | | 4778.9? *7* | |
| 187.88 *8* | $(7/2)^+$ | | 3077.19 *15* | $(21/2)^+$ | 4813.61 *18* | $(27/2)^-$ |
| 740.02 *8* | $(9/2)^+$ | | 3133.01 *13* | $(19/2)^-$ | 4836.25 *24* | |
| 908.01 *11* | $(11/2)^+$ | | 3205.72? *23* | | 5040.0? *7* | |
| 1512.59 *11* | $(13/2)^+$ | | 3253.21 *19* | | 5041.55 *24* | |
| 1670.94 *12* | $(11/2)^-$ | | 3596.65 *19* | $(23/2)^+$ | 5098.7 *4* | |
| 1830.10 *13* | $(15/2)^+$ | | 3658.61 *18* | | 5290.2? *7* | |
| 2184.67 *12* | $(17/2)^+$ | | 3766.74 *20* | $(25/2)^+$ | 5547.42 *23* | |
| 2314.05 *12* | $(15/2)^-$ | | 4000.51 *15* | $(23/2)^-$ | 5714.21 *21* | $(31/2)^-$ |
| 2452.70 *16* | $(19/2)^+$ | 1.3‡ ns *2* | 4025.64 *22* | $(27/2)^+$ | 6045.17 *23* | |
| 2571.42 *18* | $(21/2)^+$ | | 4096.11 *17* | | 6488.73 *24* | |
| 2611.91 *16* | $(19/2)^+$ | | 4545.72 *21* | | 6777.16 *23* | |
| 2779.82? *21* | | | 4729.0 | | 8010.97 *25* | |

† Based on $\gamma(\theta)$, and observed cascades in $^{58}$Ni($^{50}$Cr,4pn$\gamma$) (1997Pa25); Apart from parentheses the Adopted values for $J^\pi$ are the same.

‡ From $\gamma$(t)(1997Pa25). Not excluded that $T_{1/2}$ is associated with 2571 keV level (1997Pa25).

### $\gamma(^{103}Cd)$

The anisotropy ratio R is defined as the ratio of the intensity of $\gamma$ lines observed at two non-equivalent angles with respect to the beam axis (143° versus 79° and 101°). A stretched quadrupole should have an R value of about 1.5 and a pure dipole about 0.8.

| $E_\gamma$ | $I_\gamma$ | $E_i$(level) | $J_i^\pi$ | $E_f$ | $J_f^\pi$ | Mult.† | $\delta$ | Comments |
|---|---|---|---|---|---|---|---|---|
| 118.7 *1* | 39 *2* | 2571.42 | $(21/2)^+$ | 2452.70 | $(19/2)^+$ | D | | R=0.93 1. |
| 168.0 *2* | 0.7 *4* | 908.01 | $(11/2)^+$ | 740.02 | $(9/2)^+$ | | | |
| 170.1 *1* | 6.6 *3* | 3766.74 | $(25/2)^+$ | 3596.65 | $(23/2)^+$ | D | | R=0.79 2. |
| 187.5 *1* | 1.5 *1* | 2799.21 | | 2611.91 | $(19/2)^+$ | | | |
| 187.9 *1* | 100 *4* | 187.88 | $(7/2)^+$ | 0.0 | $(5/2)^+$ | M1(+E2) | ≤0.1 | R=0.87 1. |
| 208.4‡ *1* | 3.4 *2* | 2779.82? | | 2571.42 | $(21/2)^+$ | | | R=0.75 2. |
| 250.2‡ *1* | 0.6 *1* | 5290.2? | | 5040.0? | | | | |
| 258.9 *1* | 24.7 *13* | 4025.64 | $(27/2)^+$ | 3766.74 | $(25/2)^+$ | D | | R=0.81 1. |
| 261.1‡ *1* | 0.4 *1* | 5040.0? | | 4778.9? | | | | |
| 288.2 *2* | 0.3 *1* | 6777.16 | | 6488.73 | | | | |
| 317.9 *1* | 1.4 *1* | 1830.10 | $(15/2)^+$ | 1512.59 | $(13/2)^+$ | D | | R=0.70 15. |
| 330.9 *1* | 3.7 *2* | 6045.17 | | 5714.21 | $(31/2)^-$ | | | |
| 354.8 *1* | 2.7 *2* | 2184.67 | $(17/2)^+$ | 1830.10 | $(15/2)^+$ | D | | R=0.83 5. |
| 425.9‡ *1* | 1.7 *1* | 3205.72? | | 2779.82? | | | | |
| 443.5 *1* | 1.9 *1* | 6488.73 | | 6045.17 | | | | |
| 552.2 *1* | 7.3 *5* | 740.02 | $(9/2)^+$ | 187.88 | $(7/2)^+$ | D | | R=0.76 9. |
| 604.7 *1* | 5.0 *3* | 1512.59 | $(13/2)^+$ | 908.01 | $(11/2)^+$ | D | | R=0.73 11. |
| 622.6 *1* | 53 *5* | 2452.70 | $(19/2)^+$ | 1830.10 | $(15/2)^+$ | E2 | | R=1.45 2. |

Continued on next page (footnotes at end of table)

## $^{58}$Ni($^{50}$Cr,4pn$\gamma$) 1997Pa25 (continued)

### $\gamma$($^{103}$Cd) (continued)

| $E_\gamma$ | $I_\gamma$ | $E_i$(level) | $J_i^\pi$ | $E_f$ | $J_f^\pi$ | Mult.[†] | Comments |
|---|---|---|---|---|---|---|---|
| 641.3 *1* | 2.9 *2* | 3253.21 | | 2611.91 | $(19/2)^+$ | | |
| 643.1 *1* | 22.1 *12* | 2314.05 | $(15/2)^-$ | 1670.94 | $(11/2)^-$ | E2 | R=1.43 10. |
| 671.9 *1* | 11.8 *7* | 2184.67 | $(17/2)^+$ | 1512.59 | $(13/2)^+$ | E2 | R=1.5 3. |
| 689.0 *2* | 0.9 *1* | 3766.74 | $(25/2)^+$ | 3077.19 | $(21/2)^+$ | | |
| 720.1 *1* | 94 *5* | 908.01 | $(11/2)^+$ | 187.88 | $(7/2)^+$ | E2 | R=1.43 1. |
| 740.0 *1* | 54 *4* | 740.02 | $(9/2)^+$ | 0.0 | $(5/2)^+$ | E2 | R=1.37 2. |
| 772.6 *1* | 30 *2* | 1512.59 | $(13/2)^+$ | 740.02 | $(9/2)^+$ | E2 | R=1.5 3. |
| 781.8 *1* | 9.4 *6* | 2611.91 | $(19/2)^+$ | 1830.10 | $(15/2)^+$ | E2 | R=1.43 5. |
| 801.4 *1* | 17.8 *10* | 2314.05 | $(15/2)^-$ | 1512.59 | $(13/2)^+$ | D | R=0.89 9. |
| 810.6 *1* | 4.1 *2* | 4836.25 | | 4025.64 | $(27/2)^+$ | D | R=0.70 13. |
| 813.1 *1* | 36 *2* | 4813.61 | $(27/2)^-$ | 4000.51 | $(23/2)^-$ | E2 | R=1.38 9. |
| 818.9 *1* | 38 *2* | 3133.01 | $(19/2)^-$ | 2314.05 | $(15/2)^-$ | E2 | R=1.45 2. |
| 859.6 *1* | 4.3 *3* | 3658.61 | | 2799.21 | | | |
| 867.5 *1* | 33 *2* | 4000.51 | $(23/2)^-$ | 3133.01 | $(19/2)^-$ | E2 | R=1.39 9. |
| 887.1 *1* | 3.9 *2* | 4545.72 | | 3658.61 | | | |
| 892.5 *1* | 7.0 *4* | 3077.19 | $(21/2)^+$ | 2184.67 | $(17/2)^+$ | | |
| 900.6 *1* | 26.6 *14* | 5714.21 | $(31/2)^-$ | 4813.61 | $(27/2)^-$ | E2 | R=1.36 10. |
| 921.5 *2* | 83 *4* | 1830.10 | $(15/2)^+$ | 908.01 | $(11/2)^+$ | E2 | R=1.34 4. |
| 923.3 *1* | 2.9 *2* | 4000.51 | $(23/2)^-$ | 3077.19 | $(21/2)^+$ | | |
| 930.9 *1* | 24.5 *14* | 1670.94 | $(11/2)^-$ | 740.02 | $(9/2)^+$ | | R=0.77 1. |
| 948.4 *1* | 3.2 *2* | 3133.01 | $(19/2)^-$ | 2184.67 | $(17/2)^+$ | | |
| 962.9 *1* | 2.2 *2* | 4729.0 | | 3766.74 | $(25/2)^+$ | | |
| 963.1 *1* | 3.3 *3* | 4096.11 | | 3133.01 | $(19/2)^-$ | | |
| 968.5 *1* | 4.6 *3* | 2799.21 | | 1830.10 | $(15/2)^+$ | | |
| 1001.7 *1* | 3.1 *2* | 5547.42 | | 4545.72 | | | |
| 1001.9[‡] *2* | 1.2 *1* | 5098.7 | | 4096.11 | | | |
| 1015.9 *1* | 1.8 *1* | 5041.55 | | 4025.64 | $(27/2)^+$ | | |
| 1025.2 *1* | 10.5 *6* | 3596.65 | $(23/2)^+$ | 2571.42 | $(21/2)^+$ | D | R=0.90 3. |
| 1046.5 *1* | 1.7 *1* | 3658.61 | | 2611.91 | $(19/2)^+$ | | |
| 1063.0 *1* | 10.5 *6* | 6777.16 | | 5714.21 | $(31/2)^-$ | | |
| 1144.1 *2* | 1.3 *1* | 3596.65 | $(23/2)^+$ | 2452.70 | $(19/2)^+$ | | |
| 1195.3 *1* | 26.7 *14* | 3766.74 | $(25/2)^+$ | 2571.42 | $(21/2)^+$ | E2 | R=1.36 3. |
| 1233.8 *1* | 2.5 *2* | 8010.97 | | 6777.16 | | | |
| 1331.9 *3* | 0.5 *1* | 5098.7 | | 3766.74 | $(25/2)^+$ | | |
| 1429.9 *9* | 0.8 *1* | 4000.51 | $(23/2)^-$ | 2571.42 | $(21/2)^+$ | | |
| 1573.2[‡] *6* | 0.7 *1* | 4778.9? | | 3205.72? | | | R=1.5 2. |

[†] From anisotropy values in $^{58}$Ni($^{50}$Cr,4pn$\gamma$). Stretched quadrupole transitions are assumed E2.

[‡] Placement of transition in the level scheme is uncertain.

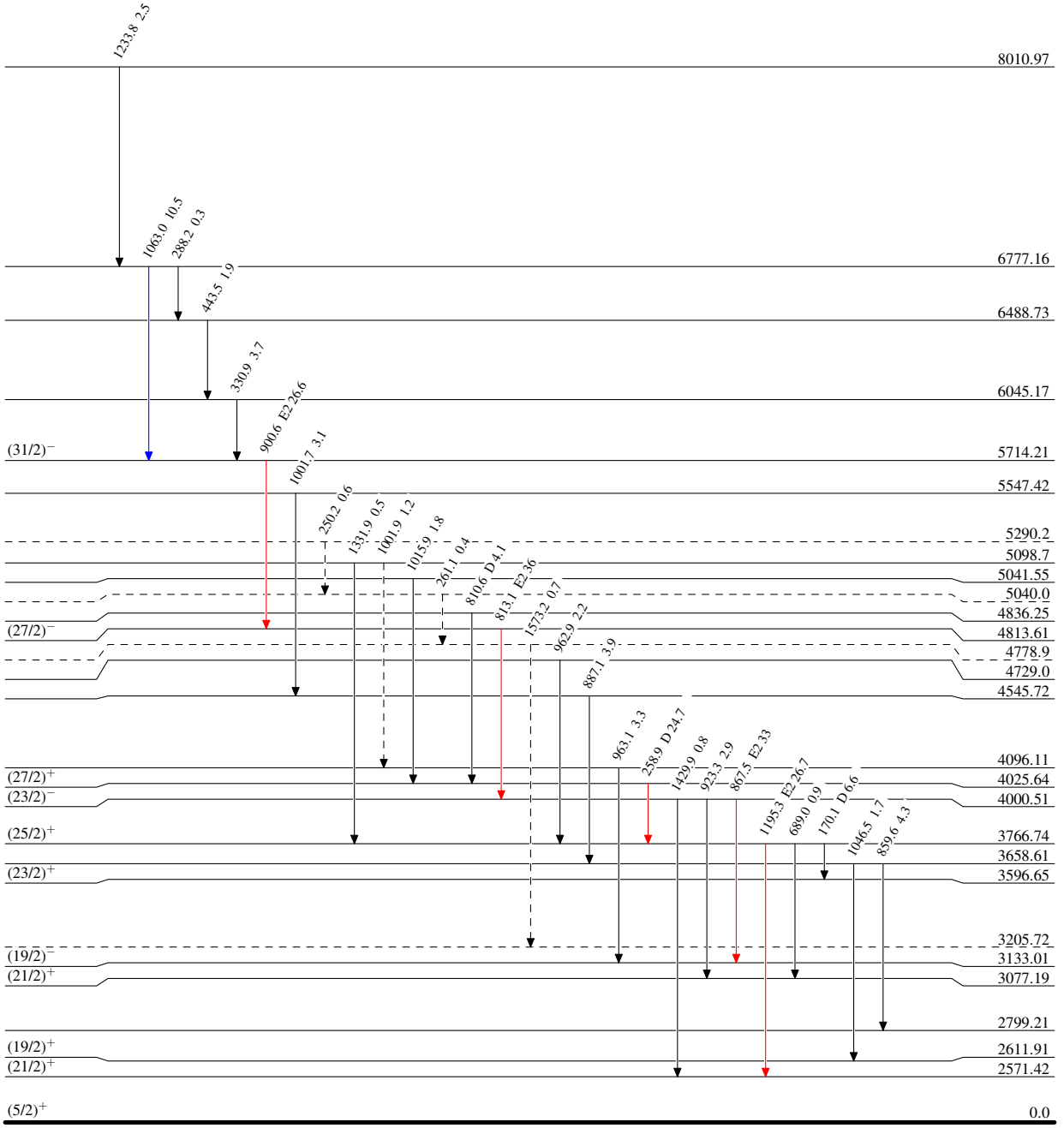
**$^{58}$Ni($^{50}$Cr,4pnγ) 1997Pa25**

Level Scheme

Intensities: Type not specified

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)




$^{103}_{48}Cd_{55}$

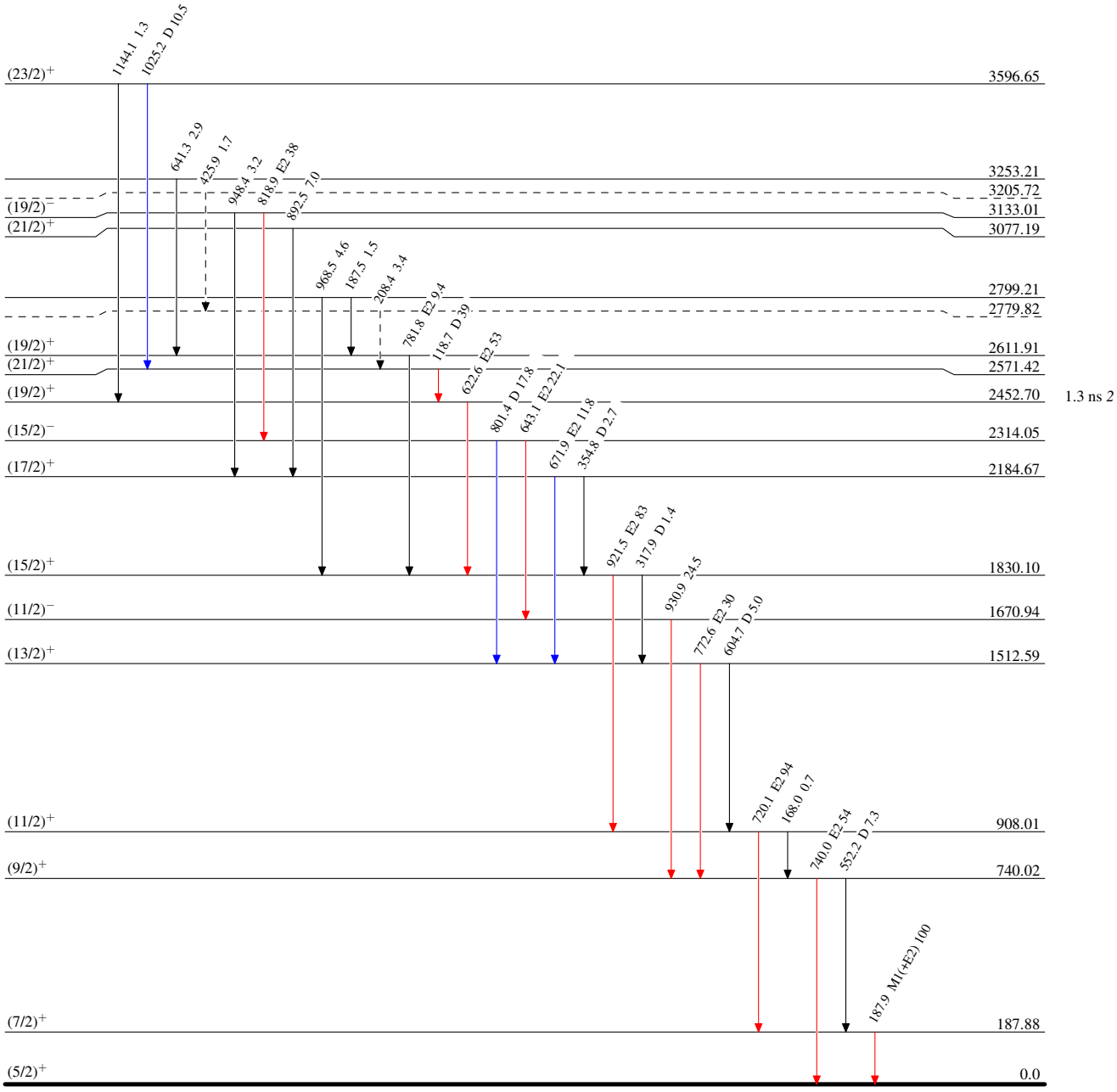
**$^{58}$Ni($^{50}$Cr,4pnγ) 1997Pa25**

## Level Scheme (continued)

Intensities: Type not specified

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)




$^{103}_{48}Cd_{55}$