### Adopted Levels, Gammas

| Full Evaluation         N. Nica         NDS 187.1 (2023)         12-Oct-2022 $Q(p^{*})=-6701$ 23; $S(n)=11010$ 50; $S(p)=1759$ 18; $Q(\alpha)=1722$ 18         2021Wa16         S(2n)=20670 18; $S(2p)=1703$ 19, $Q(ep)=97$ 27 (2021Wa16). $Q(x^{*})=-6701$ 23; $S(n)=11010$ 50; $S(p)=1759$ 18; $Q(\alpha)=1722$ 18         2021Wa16         S(2n)=20670 18; $S(2p)=1703$ 19, $Q(ep)=97$ 27 (2021Wa16). $Q(x^{*})=-4,9697$ fm 91 (2013An02).         141 Ear Levels         Cross Reference (XREF) Flags           A         141 Ear IT decay (2.7 s)         D         9%Rd <sup>45</sup> T.3p3ny)           B         141 Ga decay (14 s)         E         110°Cd(8°CL2p2ay)           C         141 Gd decay (24.5 s)         F         144 S(a) (2020148722) $Q=+0.855$ 10(855Ah02,201485242)         Q=+0.855 (1985Ah02,2016814)         T <sub>1/2</sub> : weighted average: 40.0 s 7 (1972bc25), 41.4 s 7 (1993A103), see also 1989Gi06. Others: 37 s 4 (973Va12), p <sup>*</sup> : 15 (LASER), Q: 165 (14) T <sub>1/2</sub> : weighted average: 40.0 s 7 (1972bc25), 41.4 s 7 (1993A103), see also 1989Gi06. Others: 37 s 4 (973Va12), p <sup>*</sup> : 15 (LASER), Q: 15 (14, SER), Q: 14 (14, SER), Q: 15 (14, SER), Q: 14 (14, SER), Q: 15 (   |   |  | Туре  | Author  | History<br>Citatio  | n  | Literature Cutoff Date  |
|---|---|--|---|---|---|--|---|
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$  |   |  | Full Evaluation                               | N. Nica   | NDS 187,1   | (2023)   | 12-Oct-2022   |
| $\frac{^{14}\text{Fu} \text{ Levels}}{\frac{141}{6}\text{Ge} \text{ decay} (2.7 \text{ s})   \frac{9^{9}\text{Ru}^{48}\text{Ti},3p3ny)}{10^{10}\text{Gl}^{38}\text{Gl},2p2ny)}}$ $\frac{   \frac{14^{12}        $   | $Q(\beta^{-})=-6701\ 2.5$<br>S(2n)=20670 18.<br>1992Le09: meas<br>$^{1/2}=4.9697$ | <i>B</i> ; S(n)=11010 <i>50</i> ;<br>, S(2p)=7003 <i>19</i> , 0<br>ured isotope shift.<br>fm <i>91</i> (2013An02 | S(p)=1759 <i>18</i> ; Q<br>Q(εp)=997 27 (20). | Q(α)=1722<br>(α)=1722<br>(α)=1722<br>(α)=1722<br>(α)=1722<br>(α)=1722<br>(α)=1722<br>(α)=1722<br>(α)=1722<br>(α)=1722<br>(α)=1722<br>(α)=1722                     | 18 2021Wa   | 16   |   |
| $ \begin{array}{c c c c c c c c c c c c c c c c c c c $   |   |  |   |   | <sup>141</sup> Eu Level   | ls   |   |
| $\begin{array}{c c c c c c c c c c c c c c c c c c c $  |   |  |   | Cross   | Reference (XF   | REF) Fla   | ags   |
| $\begin{array}{c c c c c c c c c c c c c c c c c c c $  |   |  | A 14<br>B 14<br>C 14                          | <sup>1</sup> Eu IT dec<br><sup>1</sup> Gd $\varepsilon$ deca<br><sup>1</sup> Gd $\varepsilon$ deca  | ay (2.7 s) D<br>y (14 s) E<br>y (24.5 s) F  | <sup>99</sup> R<br>110<br>144                        | $Cd(^{48}Ti,3p3n\gamma)$ $Cd(^{35}Cl,2p2n\gamma)$ $Sm(\alpha,p6n\gamma)$  |
| $ \begin{array}{c c c c c c c c c c c c c c c c c c c $   | E(level) <sup>†</sup>   | $J^{\pi \ddagger \#}$  | $T_{1/2}^{(0)}$ XR                            | REF   |   |  | Comments  |
| 96.45 <sup>&amp; 7</sup> 11/2 <sup>-</sup> 2.7 s 3 A CDEF % $\varepsilon + \% \beta^+ = 13 + 4 - 2$ ; %IT=87 + 2-4 (1989Gi06)<br>J <sup>7</sup> : E3 $\gamma$ to 5/2 <sup>+</sup> .<br>T <sub>1/2</sub> : from 1989Gi06. Others: 3.3 s 3 (1977De25), 4 s +6-2 (1973VaY2).<br>Note that in the older paper (1977De25) with % $\varepsilon + \% \beta^+ = 67$ , log $ft(11/2^-$<br>to 11/2 <sup>-</sup> )=4.1 is significantly lower than expected.<br>215.77 8 1/2 <sup>+</sup> , 3/2 <sup>+</sup> B J <sup>7</sup> : log $ft=5.1$ from 1/2 <sup>+</sup> .<br>336.33 8 1/2 <sup>+</sup> , 3/2 <sup>+</sup> B J <sup>7</sup> : log $ft=5.1$ from 1/2 <sup>+</sup> .<br>447.75 9 9/2,11/2,13/2 C J <sup>7</sup> : log $ft=5.5$ from 11/2 <sup>-</sup> .<br>457.59 8 (9/2 <sup>+</sup> ) C J <sup>7</sup> : log $ft=5.5$ from 11/2 <sup>-</sup> .<br>509.28 12 1/2 <sup>+</sup> , 3/2 <sup>+</sup> B J <sup>7</sup> : log $ft=5.5$ from 11/2 <sup>-</sup> .<br>525.92 11 1/2 <sup>+</sup> , 3/2 <sup>+</sup> B J <sup>7</sup> : log $ft=5.2$ from 11/2 <sup>+</sup> .<br>622.56 <sup>&amp;</sup> 13 15/2 <sup>-</sup> CDEF<br>656.82 11 (9/2 <sup>+</sup> ) C J <sup>7</sup> : log $ft=6.3$ from 11/2 <sup>-</sup> and $\gamma$ to 5/2 <sup>+</sup> .<br>671.98 15 13/2 <sup>-</sup> CDEF<br>656.82 11 (9/2 <sup>+</sup> ) C J <sup>7</sup> : log $ft=6.2$ from 11/2 <sup>-</sup> .<br>87.105 11 9/2, 11/2, 13/2 C J <sup>7</sup> : log $ft=6.2$ from 11/2 <sup>-</sup> .<br>869.87 10 9/2, 11/2, 13/2 C J <sup>7</sup> : log $ft=6.2$ from 11/2 <sup>-</sup> .<br>97.108 $ft=6.2$ from 11/2 <sup>-</sup> .<br>197. log $ft=6.3$ from 11/2 <sup>-</sup> .<br>197. log $ft=6.4$ from 11/2 <sup>-</sup> .<br>197. log $ft=6.3$ from 11/2 <sup>-</sup> .<br>197. log $ft=6.4$ from 11/2 <sup>-</sup> and $\gamma$ to (9/2 <sup>+</sup> ).<br>1154.6 3 15/2 <sup>(+)</sup> DE<br>134.93 <sup>&amp; 2</sup> 19/2 <sup>-</sup> DEF<br>134.93 <sup>&amp; 4</sup> 19/2 <sup>-</sup> DEF<br>134.93 <sup>&amp; 6</sup> 0 9/2, 11/2, 13/2 <sup>(+)</sup> DE<br>134.93 <sup>&amp; 6</sup> 0 17/2) DE<br>134.93 <sup>&amp; 6</sup> 0 9/2, 11/2, 13/2 <sup>(+)</sup> DE<br>135.66 (6 9/2, 11/2, 13/2 <sup>(+)</sup> DE | 0.0   | 5/2+   | 40.7 s 7 ABC                                  | $\begin{array}{c} \overline{\textbf{DEF}} & \overline{\boldsymbol{\mathcal{H}}} \\ \mu = 4 \\ Q = - \\ T_{1/2} \\ a \\ J^{\pi} \\ \mu \\ P \\ Q \\ l \end{array}$ | +% $β^+$ =100<br>+3.494 8 (1985<br>+0.85 4 (1985)<br>2: weighted av<br>lso 1989Gi06.<br>hfs (LASER) (<br>fts (LASER).<br>hfs (LASER). | Ah02,20<br>Ah02,20<br>erage: 4<br>Others:<br>(1985Ah | 014StZZ)<br>016St14)<br>0.0 s 7 (1977De25), 41.4 s 7 (1993Al03), see<br>37 s 3 (1973WeZK), 28 s 6 (1973VaYZ).<br>02), log <i>ft</i> =5.2 to 3/2 <sup>+</sup> .          |
| 215.77 8 $1/2^+, 3/2^+$ B $J^{\pi}: \log ft=5.1 \text{ from } 1/2^+.$ 320.35 $I3$ $9/2, 11/2, 13/2$ C $J^{\pi}: \log ft=5.2 \text{ from } 11/2^$ 336.23 8 $1/2^+, 3/2^+$ B $J^{\pi}: \log ft=5.2 \text{ from } 11/2^$ 447.75 9 $9/2, 11/2, 13/2$ C $J^{\pi}: \log ft=6.1 \text{ from } 11/2^$ 457.59 8 $(9/2^+)$ C $J^{\pi}: \log ft=6.5 \text{ from } 11/2^$ 509.28 $I2$ $1/2^+, 3/2^+$ B $J^{\pi}: \log ft=5.8 \text{ from } 1/2^+.$ 525.92 $I1$ $1/2^+, 3/2^+$ B $J^{\pi}: \log ft=5.2 \text{ from } 1/2^+.$ 622.56 $\& I3$ $5/2^-$ CDEF636.82 $I1$ $(9/2^+)$ C $J^{\pi}: \log ft=6.3 \text{ from } 11/2^$ and $\gamma to 5/2^+.671.98 I513/2^-CDEJ^{\pi}: \log ft=6.3 \text{ from } 11/2^749.35 I39/2, 11/2, 13/2CJ^{\pi}: \log ft=6.2 \text{ from } 11/2^869.87 I09/2, 11/2, 13/2CJ^{\pi}: \log ft=6.2 \text{ from } 11/2^967.65 I69/2, 11/2, 13/2CJ^{\pi}: \log ft=6.3 \text{ from } 11/2^967.65 I69/2, 11/2, 13/2CJ^{\pi}: \log ft=6.3 \text{ from } 11/2^1047.43 I09/2, 11/2, 13/2^{(+)}CJ^{\pi}: \log ft=6.4 \text{ from } 11/2^1047.43 I09/2, 11/2, 13/2^{(+)}DE1344.93 \& 2I19/2^DE1344.93 \& 2I19/2^DE1344.93 \& 2I19/2^DE1344.93 \& 2I19/2^DE1363.63 315/2^{(+)}.DE1364.65 \& (17/2)DDE1365.65 (17/2)D$  | 96.45 <sup>&amp;</sup> 7  | 11/2-  | 2.7 s 3 A C                                   | $\begin{array}{llllllllllllllllllllllllllllllllllll$  | $+\%\beta^{+}=13 +4-$<br>E3 $\gamma$ to $5/2^{+}$ .<br>2: from 1989G<br>e that in the ol<br>$(2^{-})=4.1$ is                          | -2; %IT=<br>i06. Oth<br>der papes<br>s signific      | =87 +2-4 (1989Gi06)<br>hers: 3.3 s 3 (1977De25), 4 s +6-2 (1973VaYZ).<br>er (1977De25) with $\%\epsilon+\%\beta^+=67$ , log $ft(11/2^-)$<br>cantly lower than expected. |
| $336.23 \ 8 \ 1/2^+, 3/2^+$ $C$ $J^*$ : $\log ft=5.1$ from $1/2^-$ . $336.23 \ 8 \ 1/2^+, 3/2^+$ $B$ $J^*$ : $\log ft=5.1$ from $1/2^-$ . $447.75 \ 9 \ 9/2, 11/2, 13/2$ $C$ $J^*$ : $\log ft=6.1$ from $11/2^-$ . $457.59 \ 8 \ (9/2^+)$ $C$ $J^*$ : $\log ft=6.5$ from $1/2^+$ . $509.28 \ 12 \ 1/2^+, 3/2^+$ $B$ $J^*$ : $\log ft=5.2 \ from 1/2^+$ . $525.92 \ 11 \ 1/2^+, 3/2^+$ $B$ $J^*$ : $\log ft=5.2 \ from 1/2^+$ . $622.56^{\&} \ 13 \ 15/2^-$ CDEF       C $J^*$ : $\log ft=6.3 \ from 11/2^-$ and $\gamma$ to $5/2^+$ . $622.56^{\&} \ 13 \ 15/2^-$ CDE $J^{\pi}$ : $\log ft=6.3 \ from 11/2^-$ and $\gamma$ to $5/2^+$ .       CDEF $625.82 \ 11 \ (9/2^+)$ C $J^*$ : $\log ft=6.4 \ from 11/2^-$ .       CDE J^{\pi}: $\log ft=6.4 \ from 11/2^-$ . $671.98 \ 15 \ 13/2^-$ CDE $J^{\pi}$ : $\log ft=6.2 \ from 11/2^-$ .       CJ^{\pi}: $\log ft=6.4 \ from 11/2^-$ .       CJ^{\pi}: $\log ft=6.2 \ from 11/2^-$ . $869.87 \ 10 \ 9/2, 11/2, 13/2$ CJ^{\pi}: $\log ft=6.3 \ from 11/2^-$ .       CJ^{\pi}: $\log ft=6.3 \ from 11/2^-$ .       CJ^{\pi}: $\log ft=6.3 \ from 11/2^-$ . $967.65 \ 16 \ 9/2, 11/2, 13/2^{(+)}$ CJ^{\pi}: $\log ft=6.4 \ from 11/2^-$ .       CJ^{\pi}: $\log ft=6.4 \ from 11/2^-$ .       D $1047.43 \ 10 \ 9/2, 11/2, 13/2^{(+)}$ CJ^{\pi}: $\log ft=6.4 \ from 11/2^-$ and $\gamma$ to $(9/2^+)$ .       D   | 215.77 8  | $1/2^+, 3/2^+$   | В   | $J^{\pi}$ :   | $\log ft = 5.1$ from  | n $1/2^+$ .  |   |
| $\begin{array}{rcl} 447.75 & 9 & 9/2, 11/2, 13/2 & C & J^{\pi}: \log ft=6.1 \mbox{ from } 11/2^{-}. \\ 457.59 & (9/2^+) & C & J^{\pi}: \log ft=6.5 \mbox{ from } 11/2^- \mbox{ and } \gamma \mbox{ to } 5/2^+. \\ 509.28 & 12 & 1/2^+, 3/2^+ & B & J^{\pi}: \log ft=5.8 \mbox{ from } 1/2^+. \\ 525.92 & 11 & 1/2^+, 3/2^+ & B & J^{\pi}: \log ft=6.3 \mbox{ from } 11/2^- \mbox{ and } \gamma \mbox{ to } 5/2^+. \\ 622.56^{\&} & 13 & 15/2^- & CDEF \\ 656.82 & 11 & (9/2^+) & C & J^{\pi}: \log ft=6.3 \mbox{ from } 11/2^- \mbox{ and } \gamma \mbox{ to } 5/2^+. \\ 671.98 & 15 & 13/2^- & CDE & J^{\pi}: \log ft=6.3 \mbox{ from } 11/2^- \mbox{ and } \gamma \mbox{ to } 5/2^+. \\ 671.98 & 15 & 13/2^- & CDE & J^{\pi}: \log ft=6.4 \mbox{ from } 11/2^- \mbox{ and } \gamma \mbox{ to } 5/2^+. \\ 749.35 & 13 & 9/2, 11/2, 13/2 & C & J^{\pi}: \log ft=6.4 \mbox{ from } 11/2^ \\ 869.87 & 10 & 9/2, 11/2, 13/2 & C & J^{\pi}: \log ft=6.2 \mbox{ from } 11/2^- \mbox{ and } \gamma \mbox{ to } 15/2^ \\ 967.65 & 16 & 9/2, 11/2, 13/2 & C & J^{\pi}: \log ft=6.1 \mbox{ from } 11/2^- \mbox{ prome transmit} \gamma \mbox{ to } 15/2^ \\ 967.65 & 16 & 9/2, 11/2, 13/2 & C & J^{\pi}: \log ft=6.1 \mbox{ from } 11/2^- \mbox{ and } \gamma \mbox{ to } 15/2^ \\ 1047.43 & 10 & 9/2, 11/2, 13/2 & C & J^{\pi}: \log ft=6.4 \mbox{ from } 11/2^- \mbox{ and } \gamma \mbox{ to } 15/2^ \\ 1047.43 & 10 & 9/2, 11/2, 13/2 & C & J^{\pi}: \log ft=6.4 \mbox{ from } 11/2^- \mbox{ and } \gamma \mbox{ to } 5/2^+. \\ 1154.6 & 3 & 15/2^{(+)} & DE & DE \\ 1309.48 & 21 & (17/2^-) & DE & DEF \\ 1344.93^{\&} & 21 & 19/2^- & DEF & DEF \\ 1408.62 & 12 & 1/2^{2}, 3/2^+ & B & J^{\pi}: \log ft=5.3 \mbox{ from } 1/2^ \\ 1636.3 & 3 & 15/2^{(+)} & DE & DE \\ 1636.3 & 3 & 15/2^{(+)} & DE & DE \\ 1795.68 & 16 & 9/2 \mbox{ 11/2} \mbox{ and } \gamma \mbox{ to } (9/2^+). \\ \end{array}$   | 336.23 8  | $\frac{9}{2}, \frac{11}{2}, \frac{15}{2}$<br>$\frac{1}{2}^{+}, \frac{3}{2}^{+}$                                  | В   | $J^{\pi}$ :   | $\log ft = 5.1$ from  | n 1/2 .<br>n 1/2 <sup>+</sup> .                      |   |
| 457.59 8 $(9/2^+)$ C $J^\pi$ : log ft=6.5 from 11/2 <sup>-</sup> and $\gamma$ to 5/2 <sup>+</sup> .         509.28 12 $1/2^+, 3/2^+$ B $J^\pi$ : log ft=5.8 from 1/2 <sup>+</sup> .         525.92 11 $1/2^+, 3/2^+$ B $J^\pi$ : log ft=5.2 from 1/2 <sup>+</sup> .         622.56 $\& 13$ $5/2^-$ CDEF         656.82 11 $(9/2^+)$ C $J^\pi$ : log ft=6.3 from 11/2 <sup>-</sup> and $\gamma$ to 5/2 <sup>+</sup> .         671.98 15 $13/2^-$ CDE $J^\pi$ : log ft=6.4 from 11/2 <sup>-</sup> .         749.35 13 $9/2, 11/2, 13/2$ C $J^\pi$ : log ft=6.2 from 11/2 <sup>-</sup> .         869.87 10 $9/2, 11/2, 13/2$ C $J^\pi$ : log ft=6.2 from 11/2 <sup>-</sup> .         923.19 10 $11/2^{-}, 13/2$ C $J^\pi$ : log ft=6.3 from 11/2 <sup>-</sup> and $\gamma$ to $(9/2^+)$ .         923.19 10 $11/2^{-}, 13/2$ C $J^\pi$ : log ft=6.3 from 11/2 <sup>-</sup> .         947.43 10 $9/2, 11/2, 13/2^{(+)}$ C $J^\pi$ : log ft=6.4 from 11/2 <sup>-</sup> and $\gamma$ to $(9/2^+)$ .         1072.64 11 $(9/2^+)$ C $J^\pi$ : log ft=6.6 from $11/2^-$ and $\gamma$ to $5/2^+$ .         1154.6 3 $15/2^{(+)}$ DE       DE         1344.93 $\& 21$ $19/2^-$ DE       DE         1344.93 $\& 21$ $19/2^-$ DE       DE   | 447.75 9  | 9/2,11/2,13/2  | С   | $J^{\pi}$ :   | $\log ft = 6.1$ from  | n 11/2   |   |
| $592.28$ $1/2$ , $3/2$ $B$ $J^{\pm} \log fl=5.8$ from $1/2^{\pm}$ . $525.92$ $11$ $1/2^{\pm}, 3/2^{\pm}$ $B$ $J^{\pm} \log ft=5.2$ from $1/2^{\pm}$ . $622.56^{\&}$ $13$ $15/2^{\pm}$ $C$ $J^{\pm} \log ft=5.2$ from $1/2^{\pm}$ . $671.98$ $15$ $13/2^{\pm}$ $C$ $J^{\pm} \log ft=6.3$ from $11/2^{\pm}$ and $\gamma$ to $5/2^{\pm}$ . $671.98$ $13/2^{\pm}$ $C$ $J^{\pm} \log ft=6.4$ from $11/2^{\pm}$ . $(3^5C1.2p2n\gamma)$ . $749.35$ $13$ $9/2, 11/2, 13/2$ $C$ $J^{\pm} \log ft=6.2$ from $11/2^{\pm}$ . $837.05$ $11$ $9/2, 11/2, 13/2$ $C$ $J^{\pm} \log ft=6.2$ from $11/2^{\pm}$ . $869.87$ $10$ $9/2, 11/2, 13/2$ $C$ $J^{\pm} \log ft=6.3$ from $11/2^{\pm}$ and $\gamma$ to $(9/2^{\pm})$ . $923.19$ $10$ $11/2^{(-)}, 13/2$ $C$ $J^{\pm} \log ft=6.3$ from $11/2^{\pm}$ and $\gamma$ to $(9/2^{\pm})$ . $967.65$ $16$ $9/2, 11/2, 13/2^{(+)}$ $C$ $J^{\pm} \log ft=6.4$ from $11/2^{\pm}$ and $\gamma$ to $(9/2^{\pm})$ . $1047.43$ $10$ $9/2, 11/2, 13/2^{(+)}$ $C$ $J^{\pm} \log ft=6.6$ from $11/2^{\pm}$ and $\gamma$ to $5/2^{\pm}$ . $1154.6$ $15/2^{(+)}$ DE       DE $1344.93^{\& \& 21$  | 457.59 8  | $(9/2^+)$  | C   | $J^{\pi}$ :   | $\log ft = 6.5$ from  | $n 11/2^{-1}$  | and $\gamma$ to $5/2^+$ .   |
| 622.56 klip       13       15/2 <sup>-</sup> CDEF         656.82       11       (9/2 <sup>+</sup> )       CDEF       C         671.98       15       13/2 <sup>-</sup> CDE       J <sup>π</sup> : log ft=6.3 from 11/2 <sup>-</sup> and $\gamma$ to 5/2 <sup>+</sup> .         749.35       13       9/2,11/2,13/2       C       J <sup>π</sup> : log ft=6.4 from 11/2 <sup>-</sup> .         837.05       11       9/2,11/2,13/2       C       J <sup>π</sup> : log ft=6.2 from 11/2 <sup>-</sup> .         869.87       10       9/2,11/2,13/2       C       J <sup>π</sup> : log ft=6.2 from 11/2 <sup>-</sup> .         923.19       10       11/2 <sup>-1</sup> ,13/2       C       J <sup>π</sup> : log ft=6.1 from 11/2 <sup>-</sup> parent and $\gamma$ to (9/2 <sup>+</sup> ).         923.19       10       11/2 <sup>-1</sup> ,13/2       C       J <sup>π</sup> : log ft=6.4 from 11/2 <sup>-</sup> .         967.65       16       9/2,11/2,13/2       C       J <sup>π</sup> : log ft=6.4 from 11/2 <sup>-</sup> .         1047.43       10       9/2,11/2,13/2       C       J <sup>π</sup> : log ft=6.4 from 11/2 <sup>-</sup> .         1047.43       10       9/2,11/2,13/2       C       J <sup>π</sup> : log ft=6.4 from 11/2 <sup>-</sup> .         1047.43       10       9/2,11/2,13/2       C       J <sup>π</sup> : log ft=6.4 from 11/2 <sup>-</sup> and $\gamma$ to (9/2 <sup>+</sup> ).         1072.64       11       (9/2 <sup>+</sup> )       C       J <sup>π</sup> : log ft=5.3 from 11/2 <sup>-</sup> and $\gamma$ to 5/2 <sup>+</sup> .         1154.6       15/2 <sup>(+)</sup> D   | 525.92 11   | $1/2^+, 3/2^+$<br>$1/2^+, 3/2^+$   | B   | $J^{\pi}$ :<br>$J^{\pi}$ :  | $\log ft=5.8$ from $\log ft=5.2$ from $ft=5.2$  | $n 1/2^{+}$ .<br>$n 1/2^{+}$ .                       |   |
| 656.82 11 $(9/2^+)$ C $J^{\pi}: \log ft=6.3 \text{ from } 11/2^- \text{ and } \gamma \text{ to } 5/2^+.$ 671.98 15 $13/2^-$ CDE $J^{\pi}: M1+E2 \gamma \text{ to } 11/2^- \text{ in } (^{35}\text{Cl},2p2n\gamma).$ 749.35 13 $9/2,11/2,13/2$ C $J^{\pi}: \log ft=6.4 \text{ from } 11/2^$ 837.05 11 $9/2,11/2,13/2$ C $J^{\pi}: \log ft=6.2 \text{ from } 11/2^$ 869.87 10 $9/2,11/2,13/2^{(+)}$ C $J^{\pi}: \log ft=6.2 \text{ from } 11/2^- \text{ and } \gamma \text{ to } (9/2^+).$ 923.19 10 $11/2^{(-)},13/2$ C $J^{\pi}: \log ft=6.3 \text{ from } 11/2^- \text{ and } \gamma \text{ to } 15/2^$ 967.65 16 $9/2,11/2,13/2$ C $J^{\pi}: \log ft=6.3 \text{ from } 11/2^- \text{ and } \gamma \text{ to } (9/2^+).$ 1072.64 11 $(9/2^+)$ C $J^{\pi}: \log ft=6.4 \text{ from } 11/2^- \text{ and } \gamma \text{ to } 5/2^+.$ 1154.6 3 $15/2^{(+)}$ DE       DE         1309.48 21 $(17/2^-)$ DE $J^{\pi}: \log ft=5.3 \text{ from } 1/2^- \text{ and } \gamma \text{ to } 5/2^+.$ 1408.62 12 $1/2^+, 3/2^+$ B $J^{\pi}: \log ft=5.3 \text{ from } 1/2^- \text{ and } \gamma \text{ to } (9/2^+).$ 1605.8 5 $(17/2)$ DE       DE       DE         1795.68 /6 $9/2, 11/2, 13/2^{(+)}$ C $I^{\pi}: \log ft=6.2 \text{ from } 11/2^- \text{ and } \gamma \text{ to } (9/2^+).$ <   | 622.56 <sup>&amp;</sup> 13  | 15/2-  | Ċ   | DEF   |   |  |   |
| 671.98       13/2 <sup>-</sup> CDE $J^{\pi}$ : M1+E2 $\gamma$ to 11/2 <sup>-</sup> in ( <sup>35</sup> Cl,2p2n $\gamma$ ).         749.35       13       9/2,11/2,13/2       C $J^{\pi}$ : log $ft=6.4$ from 11/2 <sup>-</sup> .         837.05       11       9/2,11/2,13/2       C $J^{\pi}$ : log $ft=6.2$ from 11/2 <sup>-</sup> .         869.87       10       9/2,11/2,13/2 <sup>(+)</sup> C $J^{\pi}$ : log $ft=6.2$ from 11/2 <sup>-</sup> and $\gamma$ to (9/2 <sup>+</sup> ).         923.19       10       11/2 <sup>(-)</sup> ,13/2       C $J^{\pi}$ : log $ft=6.1$ from 11/2 <sup>-</sup> parent and $\gamma$ to 15/2 <sup>-</sup> .         967.65       16       9/2,11/2,13/2 <sup>(+)</sup> C $J^{\pi}$ : log $ft=6.3$ from 11/2 <sup>-</sup> .         1047.43       10       9/2,11/2,13/2 <sup>(+)</sup> C $J^{\pi}$ : log $ft=6.4$ from 11/2 <sup>-</sup> and $\gamma$ to (9/2 <sup>+</sup> ).         1072.64       11       (9/2 <sup>+</sup> )       C $J^{\pi}$ : log $ft=6.6$ from 11/2 <sup>-</sup> and $\gamma$ to 5/2 <sup>+</sup> .         1154.6       15/2 <sup>(+)</sup> DE       DE       DE         1309.48       21       (17/2 <sup>-</sup> )       DE       DE         144.93 <sup>&amp;</sup> 21       19/2 <sup>-</sup> DE       DE       DE         1605.8       (17/2)       D       DE       DE         1636.3       15/2 <sup>(+)</sup> DE       DE       I <sup>\pi</sup> : log $ft=6.2$ from 11/2 <sup>-</sup> and $\gamma$ to (9/2 <sup>+</sup> )  | 656.82 11   | $(9/2^+)$  | C   | $J^{\pi}$ :   | $\log ft = 6.3$ from  | n 11/2-  | and $\gamma$ to $5/2^+$ .   |
| $749.33\ 15$ $9/2,11/2,13/2$ C $J^{\pi}: \log f!=6.4$ from $11/2^{-}$ . $837.05\ 11$ $9/2,11/2,13/2$ C $J^{\pi}: \log ft=6.2$ from $11/2^{-}$ . $869.87\ 10$ $9/2,11/2,13/2^{(+)}$ C $J^{\pi}: \log ft=6.2$ from $11/2^{-}$ and $\gamma$ to $(9/2^{+})$ . $923.19\ 10$ $11/2^{(-)},13/2$ C $J^{\pi}: \log ft=6.3$ from $11/2^{-}$ parent and $\gamma$ to $15/2^{-}$ . $967.65\ 16$ $9/2,11/2,13/2$ C $J^{\pi}: \log ft=6.3$ from $11/2^{-}$ and $\gamma$ to $(9/2^{+})$ . $1047.43\ 10$ $9/2,11/2,13/2^{(+)}$ C $J^{\pi}: \log ft=6.4$ from $11/2^{-}$ and $\gamma$ to $(9/2^{+})$ . $1072.64\ 11$ $(9/2^{+})$ C $J^{\pi}: \log ft=6.6$ from $11/2^{-}$ and $\gamma$ to $5/2^{+}$ . $1154.6\ 3$ $15/2^{(+)}$ DE       DE $1309.48\ 21$ $(17/2^{-})$ DE       DEF $144.93^{\& 21$ $19/2^{-}$ DEF       DEF $1408.62\ 12$ $1/2^{+},3/2^{+}$ B $J^{\pi}: \log ft=5.3$ from $1/2^{+}$ . $1636.3\ 3$ $15/2^{(+)}$ DE       DE $1795.68\ 16$ $9/2,11/2,13/2^{(+)}$ C $J^{\pi}: \log ft=6.2$ from $11/2^{-}$ and $\gamma$ to $(9/2^{+})$   | 671.98 15   | 13/2-  | C   | <b>DE</b> $J^{\pi}$ :   | M1+E2 $\gamma$ to 1   | $1/2^{-}$ in   | $(^{35}\text{Cl},2\text{p}2\text{n}\gamma).$  |
| 869.87 10       9/2,11/2,13/2 <sup>(+)</sup> C $J^{\pi}$ : log $ft=6.2$ from $11/2^{-}$ and $\gamma$ to $(9/2^{+})$ .         923.19 10 $11/2^{(-)}, 13/2$ C $J^{\pi}$ : log $ft=6.1$ from $11/2^{-}$ parent and $\gamma$ to $15/2^{-}$ .         967.65 16 $9/2, 11/2, 13/2$ C $J^{\pi}$ : log $ft=6.3$ from $11/2^{-}$ parent and $\gamma$ to $15/2^{-}$ .         1047.43 10 $9/2, 11/2, 13/2^{(+)}$ C $J^{\pi}$ : log $ft=6.4$ from $11/2^{-}$ and $\gamma$ to $(9/2^{+})$ .         1072.64 11 $(9/2^{+})$ C $J^{\pi}$ : log $ft=6.6$ from $11/2^{-}$ and $\gamma$ to $5/2^{+}$ .         1154.6 3 $15/2^{(+)}$ DE       DE         1309.48 21 $(17/2^{-})$ DE         1344.93 <sup>&amp;</sup> 21 $19/2^{-}$ DEF         1408.62 12 $1/2^{+}, 3/2^{+}$ B       J^{\pi}: log $ft=5.3$ from $1/2^{+}$ .         1605.8 5 $(17/2)$ D       DE         1636.3 3 $15/2^{(+)}$ DE         1795.68 16 $9/2, 11/2, 13/2^{(+)}$ C $J^{\pi}$ : log $ft=6.2$ from $11/2^{-}$ and $\gamma$ to $(9/2^{+})$   | 837.05 11   | 9/2,11/2,13/2  |   | J <sup>π</sup> :  | $\log ft = 6.2$ from  | n 11/2 .<br>n 11/2 <sup>-</sup> .                    |   |
| 923.19 10 $11/2^{(-)}, 13/2$ C $J^{\pi}$ : log $ft=6.1$ from $11/2^{-}$ parent and $\gamma$ to $15/2^{-}$ .         967.65 16 $9/2, 11/2, 13/2$ C $J^{\pi}$ : log $ft=6.3$ from $11/2^{-}$ .         1047.43 10 $9/2, 11/2, 13/2^{(+)}$ C $J^{\pi}$ : log $ft=6.4$ from $11/2^{-}$ and $\gamma$ to $(9/2^{+})$ .         1072.64 11 $(9/2^{+})$ C $J^{\pi}$ : log $ft=6.6$ from $11/2^{-}$ and $\gamma$ to $5/2^{+}$ .         1154.6 3 $15/2^{(+)}$ DE       DE         1309.48 21 $(17/2^{-})$ DE       DE         1344.93 & 21 $19/2^{-}$ DEF       J $\pi$ : log $ft=5.3$ from $1/2^{+}$ .         1605.8 5 $(17/2)$ D       DE         1636.3 3 $15/2^{(+)}$ DE       DE         1795.68 16 $9/2, 11/2, 13/2^{(+)}$ C $J^{\pi}$ : log $ft=6.2$ from $11/2^{-}$ and $\gamma$ to $(9/2^{+})$   | 869.87 10   | 9/2,11/2,13/2 <sup>(+)</sup>   | C   | $J^{\pi}$ :   | $\log ft = 6.2$ from  | n 11/2 <sup>-</sup>                                  | and $\gamma$ to $(9/2^+)$ .   |
| 967.65 $16$ $9/2, 11/2, 13/2$ C $J^{\pi}: \log ft=6.3$ from $11/2^{-}$ .         1047.43 $10$ $9/2, 11/2, 13/2^{(+)}$ C $J^{\pi}: \log ft=6.4$ from $11/2^{-}$ and $\gamma$ to $(9/2^{+})$ .         1072.64 $11$ $(9/2^{+})$ C $J^{\pi}: \log ft=6.6$ from $11/2^{-}$ and $\gamma$ to $5/2^{+}$ .         1154.6 $3$ $15/2^{(+)}$ DE         1309.48 $21$ $(17/2^{-})$ DE         1344.93 & 21 $19/2^{-}$ DEF         1408.62 $12$ $1/2^{+}, 3/2^{+}$ B         1605.8 $5$ $(17/2)$ D         1636.3 $3$ $15/2^{(+)}$ DE         1795.68 $16$ $9/2, 11/2, 13/2^{(+)}$ C $J^{\pi}: \log ft=6.2$ from $11/2^{-}$ and $\gamma$ to $(9/2^{+})$   | 923.19 10   | $11/2^{(-)}, 13/2$   | C   | $J^{\pi}$ :   | $\log ft = 6.1$ from  | n 11/2-  | parent and $\gamma$ to $15/2^-$ .   |
| $1047.45 \ 10^{-1} \ 9/2, 11/2, 13/2^{+7}$ C $J^{\pi_1}: \log ft = 6.4 \text{ from } 11/2^{-1} \text{ and } \gamma \text{ to } (9/2^{-1}).$ $1072.64 \ 11^{-1} \ (9/2^{+})$ C $J^{\pi_1}: \log ft = 6.6 \text{ from } 11/2^{-1} \text{ and } \gamma \text{ to } 5/2^{+}.$ $1154.6 \ 3 \ 15/2^{(+)}$ DE       DE $1309.48 \ 21^{-1} \ (17/2^{-1})$ DE $1344.93^{\& 21^{-1}} \ 19/2^{-1}$ DE $1408.62 \ 12^{-1} \ 1/2^{+}, 3/2^{+}$ B       J^{\pi_1}: \log ft = 5.3 \text{ from } 1/2^{+}. $1605.8 \ 5 \ (17/2)$ D $1636.3 \ 3 \ 15/2^{(+)}$ DE $1795.68 \ 16^{-9} \ 9/2, 11/2, 13/2^{(+)}$ C       J^{\pi_1}: \log ft = 6.2 \text{ from } 11/2^{-} \text{ and } \gamma \text{ to } (9/2^{+}).   | 967.65 16   | 9/2,11/2,13/2  | C   | $J^{\pi}$ :<br>$T^{\pi}$ .  | $\log ft = 6.3$ from  | n 11/2 <sup>-</sup> .                                | $(0/2^{+})$   |
| 1154.6 3 $15/2^{(+)}$ DE         1309.48 21 $(17/2^-)$ DE         1344.93 <sup>&amp;</sup> 21 $19/2^-$ DEF         1408.62 12 $1/2^+, 3/2^+$ B $J^{\pi}$ : log ft=5.3 from $1/2^+$ .         1605.8 5 $(17/2)$ D         1636.3 3 $15/2^{(+)}$ DE         1795.68 16 $9/2, 11/2, 13/2^{(+)}$ C $J^{\pi}$ : log ft=6.2 from $11/2^-$ and $\gamma$ to $(9/2^+)$   | 1047.43 10  | $(9/2^+)$  |   | J <sup>π</sup> :  | $\log ft = 6.6$ from  | n 11/2<br>$n 11/2^{-1}$                              | and $\gamma$ to $(9/2^{-})$ .<br>and $\gamma$ to $5/2^{+}$ .  |
| 1360 Ho Er $(1/2^{-})^{-}$ DEF         1344.93 <sup>&amp;</sup> 21       19/2 <sup>-</sup> DEF         1408.62 I2       1/2 <sup>+</sup> ,3/2 <sup>+</sup> B       J <sup><math>\pi</math></sup> : log ft=5.3 from 1/2 <sup>+</sup> .         1605.8 5       (17/2)       D         1636.3 3       15/2 <sup>(+)</sup> DE         1795.68 I6       9/2.11/2.13/2 <sup>(+)</sup> C       J <sup><math>\pi</math></sup> : log ft=6.2 from 11/2 <sup>-</sup> and $\gamma$ to (9/2 <sup>+</sup> )   | 1154.6 <i>3</i><br>1309 48 <i>21</i>  | $15/2^{(+)}$<br>(17/2 <sup>-</sup> )   |   | DE<br>DE  | 2.5   | ,  |   |
| 1408.62 12 $1/2^+, 3/2^+$ B $J^{\pi}: \log ft=5.3 \text{ from } 1/2^+.$ 1605.8 5       (17/2)       D         1636.3 3 $15/2^{(+)}$ DE         1795.68 16 $9/2.11/2.13/2^{(+)}$ C $J^{\pi}: \log ft=6.2 \text{ from } 11/2^- \text{ and } x \text{ to } (9/2^+)$  | 1344.93 <sup>&amp;</sup> 21   | 19/2-  |   | DEF   |   |  |   |
| 1605.8 5       (17/2)       D         1636.3 3 $15/2^{(+)}$ DE         1795.68 16 $9/2.11/2.13/2^{(+)}$ C $J^{\pi}$ : log ft=6.2 from $11/2^{-}$ and $\gamma$ to $(9/2^{+})$  | 1408.62 12  | 1/2+,3/2+  | В   | $J^{\pi}$ :   | $\log ft = 5.3$ from  | m 1/2+.  |   |
| 1050.5 5 $15/2^{11}$ DE<br>1795.68 16 $9/2.11/2.13/2^{(+)}$ C $1^{\pi}$ : log ft=6.2 from $11/2^{-1}$ and $\gamma$ to $(9/2^{+})$   | 1605.8 5  | (17/2)   |   | D   |   |  |   |
| $\sim 0, 10 \leq 10^{-0.2} \leq 10 \leq 10^{-0.2} < 10^{-0.2} < 10^{-0.2} < 10^{-0.2} < 10^{-0.2} < 10^{-0.2} < 10^{-0.2} < 10^{-0.2} < 10^{-0.2} < 10^{-0.2} < 10^{-0.2} < 10^{-0.2} < 10^{-0.2} < 10^{-0.2} < 10^{-0.2} < 10^{-0.2} < 10^{-0.2} < 10^{-0.2} < 10^{-0.2} < 10^{-0.2} < 10^{-0.2} < 10^{-0.2} < 10^{-0.2} < 10^{-0.2} < 10^{-0.2} < 10^{-0.2} < 10^{-0.2} < 10^{-0.2} < 10^{-0.2} < 10^{-0.2} < 10^{-0.2} < 10^{-0.2} < 10^{-0.2} < 10^{-0.2} < 10^{-0.2} < 10^{-0.2} < 10^{-0.2} < 10^{-0.2} < 10^{-0.2} < 10^{-0.2} < 10^{-0.2} < 10^{-0.2} < 10^{-0.2} < 10^{-0.2} < 10^{-0.2} < 10^{-0.2} < 10^{-0.2} < 10^{-0.2} < 10^{-0.2} < 10^{-0.2} < 10^{-0.2} < 10^{-0.2} < 10^{-0.2} < 10^{-0.2} < 10^{-0.2} < 10^{-0.2} < 10^{-0.2} < 10^{-0.2} < 10^{-0.2} < 10^{-0.2} < 10^{-0.2} < 10^{-0.2} < 10^{-0.2} < 10^{-0.2} < 1$  | 1030.3 3<br>1795.68 <i>16</i>   | $15/2^{(+)}$<br>9/2,11/2,13/2 <sup>(+)</sup>   | C   | $J^{\pi}$ :   | $\log ft = 6.2$ from  | n 11/2 <sup>-</sup>                                  | and $\gamma$ to $(9/2^+)$ .   |

Continued on next page (footnotes at end of table)

# <sup>141</sup>Eu Levels (continued)

| E(level) <sup>†</sup>                     | J <sup>π‡#</sup>              | $T_{1/2}^{(a)}$            | XREF   | Comments  |
|---|-------------------------------|----------------------------|--------|---|
| 1820.65 13                                | $9/2^{-},11/2,13/2^{(+)}$     |                            | С      | $J^{\pi}$ : log ft=6.3 from 11/2 <sup>-</sup> , $\gamma$ to (9/2 <sup>+</sup> ) and $\gamma$ to 13/2 <sup>-</sup> . |
| 1902.68 <sup>b</sup> 21                   | 17/2 <sup>(+)</sup>           |                            | DEF    |   |
| 2019.56 13                                | 9/2 <sup>(+)</sup> ,11/2,13/2 |                            | С      | $J^{\pi}$ : log ft=6.0 from 11/2 <sup>-</sup> and $\gamma$ to 9/2,11/2,13/2 <sup>(+)</sup> .                        |
| 2030.6 <sup>b</sup> 3                     | 19/2 <sup>(+)</sup>           |                            | DEF    |   |
| 2116.9 3                                  | $(21/2^{-})$                  |                            | E      |   |
| 2177.1 <sup>&amp;</sup> 4                 | 23/2-                         |                            | DEF    |   |
| 2229.2 <sup>b</sup> 4                     | $21/2^{(+)}$                  |                            | DEF    |   |
| 2441.0 <sup>b</sup> 5                     | $23/2^{(+)}$                  |                            | DEF    |   |
| 2596.9 <sup>°</sup> 5                     | $25/2^{(+)}$                  |                            | DE     |   |
| 2750.3 <sup>e</sup> 6                     | $(25/2^+)$                    |                            | DEF    |   |
| 2847.9° 5                                 | $27/2^{(+)}$                  |                            | DEF    |   |
| 3009.1 4                                  | $(25/2^{-})$                  |                            | DE     |   |
| 3024.1 <sup><i>x</i></sup> 4              | $27/2^{-}$                    |                            | DEF    |   |
| 3076.0 <sup>J</sup> 4                     | 27/2-                         |                            | DEF    |   |
| 3162.7 4<br>3183.0 <sup>C</sup> 5         | $\frac{21}{2}$                |                            | DE     |   |
| 3105.0 J<br>34177f                        | (23/2)                        | 0.76  ps + 28 - 21         | DE     |   |
| 3446.3 <sup>e</sup> 12                    | 29/2                          | 0.70 ps +28-21             | DEF    |   |
| 3589.7 <sup>b</sup> 6                     | $(31/2^+)$                    |                            | DE     |   |
| 3596.6 <sup>&amp;</sup> 5                 | $(31/2^{-})$                  |                            | DEF    |   |
| $3684.1^{f} 4$                            | $31/2^{-}$                    | 1.7  ps + 7 - 3            | DEF    |   |
| $3857.1^{d}$ 10                           | <i>c 1</i> / <b>-</b>         | 117 po 17 o                | D      |   |
| 3935.1 5                                  | 31/2-                         |                            | E      |   |
| 4039.4 <sup>°</sup> 6                     | $(33/2^+)$                    |                            | DE     |   |
| 4156.1 <sup><i>f</i></sup> 5              | 33/2-                         | 0.76 ps +28-21             | DEF    |   |
| 4369.2 <mark>&amp;</mark> 6               | 35/2-                         |                            | DEF    |   |
| 4417.2? 12                                | $(35/2^+)$                    |                            | E      |   |
| 4562.7° 12                                | $(33/2^+)$                    |                            | D      |   |
| 4585.5° 10                                | (35/2)                        |                            | ע<br>ת |   |
| $4766 1^{d} 13$                           | (55/2)                        |                            | D      |   |
| $4847.2f_{5}$                             | $(35/2^{-})$                  |                            | DF     |   |
| 4934.9 <sup>°</sup> 7                     | $(37/2^+)$                    |                            | DE     |   |
| 5021.2 <sup>g</sup> 6                     | (37/2-)                       |                            | DE     |   |
| 5191.6 <sup>8</sup> 7                     | (39/2 <sup>-</sup> )          |                            | DE     |   |
| 5390.2 <sup>&amp;</sup> 11                | 39/2-                         |                            | D      |   |
| 5391.7 15                                 |                               |                            | D      |   |
| 5599.715<br>5640 7 <sup><i>a</i></sup> 16 |                               |                            | ע<br>ח |   |
| 5657.9 <sup>8</sup> 11                    | $(41/2^{-})$                  | 0.38 ps +17-14             | D      |   |
| 5676.1 <sup>d</sup> 13                    |                               | 1                          | D      |   |
| 5975.9 <sup>a</sup> 18                    |                               |                            | D      |   |
| 5994.2 <mark>8</mark> 11                  | (43/2 <sup>-</sup> )          | 0.55 ps 14                 | DE     |   |
| 6324.6 <sup><i>u</i></sup> 18             |                               |                            | D      |   |
| 6432.1° <i>13</i>                         | $(43/2^{-})$<br>$(45/2^{-})$  | $0.20 m_{\odot} + 14 + 10$ | D      |   |
| $6727 3^a$ 18                             | (43/2)                        | 0.20  ps + 14 - 10         | ע      |   |
| 0121.5 10                                 |                               |                            | U      |   |

#### <sup>141</sup>Eu Levels (continued)

| E(level) <sup>†</sup>  | J <sup>π‡#</sup>     | XREF        | E(level) <sup>†</sup>   | J <sup>π‡#</sup>     | XREF        | E(level) <sup>†</sup>  | XREF   |
|--|----------------------|-------------|---|----------------------|-------------|--|--------|
| 7048.1 <sup>&amp;</sup> 16<br>7196.4 <sup>a</sup> 19<br>7639.4 <sup>a</sup> 19 | (47/2 <sup>-</sup> ) | D<br>D<br>D | 7861.2 <sup>&amp;</sup> 19<br>7964.2 19<br>8112.4 <sup>a</sup> 20 | (51/2 <sup>-</sup> ) | D<br>D<br>D | 8543.4 <sup><i>a</i></sup> 20<br>9035.4 <sup><i>a</i></sup> 21 | D<br>D |

<sup>†</sup> From least-squares fit to  $E\gamma$  data ( $\gamma$ 's with no listed uncertainties were assigned  $\Delta E\gamma = 1$  keV for the fit).

<sup>±</sup> J>11/2 from  $\gamma(\theta)$ , RUL and assumption of a stretched character of E2 and D  $\gamma'$ s, and band assignments in (<sup>35</sup>Cl,2p2n $\gamma$ ), ( $\alpha$ ,p6n $\gamma$ ), and (<sup>48</sup>Ti,3p3n $\gamma$ ) (the last also measured  $\gamma(\text{lin pol})$  but with no details provided); J=9/2,11/2,13/2 from 5.9 < log *ft* < 7.4 via 11/2<sup>-</sup> parent;  $J^{\pi}$ =1/2<sup>+</sup>,3/2<sup>+</sup> from log *ft*≤5.9 via 1/2<sup>+</sup> parent and syst.

<sup>#</sup>  $\pi$ =+ bands have been assigned on the basis of 1280 transition (from 1902, 17/2<sup>(+)</sup> level) being a D transition, and from suggested configurations, (( $\pi g_{7/2}$ )( $\pi h_{11/2}$ )<sup>2</sup>) or (( $\pi d_{5/2}$ )( $\pi h_{11/2}$ )<sup>2</sup>). See 1991Xu01, 2003Ma95, and 2004Po13 for discussion of possible configurations for the  $\pi$ =- bands.

<sup>@</sup> From 2004Po13 by Doppler-Shift Attenuation Method (DSAM);  $T_{1/2} < 6$  ns for levels with E>96 seen in ( $\alpha$ ,p6n $\gamma$ ).

- <sup>*a*</sup> Band(B): magnetic rotational band #1.
- <sup>b</sup> Band(b): Band based on  $17/2^{(+)}$ .
- <sup>c</sup> Band(C): Band based on 25/2<sup>(+)</sup>.
- <sup>d</sup> Seq.(F):  $\gamma$  sequence.
- <sup>e</sup> Seq.(G):  $\gamma$  cascade based on (25/2<sup>+</sup>).
- <sup>*f*</sup> Band(D): Magnetic rotational band #2. ( $\nu h_{11/2}^{-2} \pi h_{11/2}^{1}$  configuration from (<sup>48</sup>Ti,3p3n $\gamma$ ), 2004Po13).
- <sup>*g*</sup> Band(E): Magnetic rotational band #3.  $(\pi h_{11/2}^1 \otimes \nu h_{11/2}^{-4} \text{ configuration from } (^{48}\text{Ti},3p3n\gamma), 2004\text{Pol}3; \nu h_{11/2}^{-2}\pi h_{11/2}$  $g_{9/2}^{-2}$  in 2003Ma95).

<sup>&</sup>lt;sup>&</sup> Band(A): 11/2<sup>-</sup> band.

## $\gamma(^{141}\mathrm{Eu})$

Data are from  $\varepsilon$  decay, (<sup>35</sup>Cl,2p2n $\gamma$ ), and (<sup>48</sup>Ti,3p3n $\gamma$ ).

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| E <sub>i</sub> (level) | $\mathbf{J}_i^\pi$           | $E_{\gamma}$         | $I_{\gamma}$ | $E_f$  | $\mathbf{J}_f^{\pi}$            | Mult.      | $\alpha^{\dagger}$ | Comments   |
|------------------------|------------------------------|----------------------|--------------|--------|---------------------------------|------------|--------------------|--|
| 96.45                  | 11/2-                        | 96.4 <i>1</i>        | 100          | 0.0    | 5/2+                            | E3         | 46.3               | B(E3)(W.u.)=0.090 11   |
|                        |                              |                      |              |        |                                 |            |                    | $\alpha(K)=5.03 8$ ; $\alpha(L)=31.6 5$ ; $\alpha(M)=7.79 12$  |
| 015 55                 |                              | 015 0 1              | 100          | 0.0    | 5 (0)                           |            | 0.100.04           | $\alpha$ (N)=1.73 3; $\alpha$ (O)=0.230 4; $\alpha$ (P)=0.000472 7   |
| 215.77                 | 1/2 ,3/2                     | 215.8 1              | 100          | 0.0    | 5/21                            | [M1,E2]    | 0.190 24           | $\alpha(\mathbf{K})=0.15 \ 3; \ \alpha(\mathbf{L})=0.031 \ 6; \ \alpha(\mathbf{M})=0.0069 \ 14$  |
| 320 35                 | 0/2 11/2 13/2                | 222.0.1              | 100          | 06.45  | 11/2-                           |            |                    | $\alpha(N)=0.0016\ 3;\ \alpha(O)=0.00023\ 4;\ \alpha(P)=1.52\times10^{-5}\ 48$   |
| 336.23                 | $1/2^+ 3/2^+$                | 120.6.1              | 54.6         | 215 77 | $1/2^+$ $3/2^+$                 | [M1 E2]    | 1 16 8             | $\alpha(\mathbf{K}) = 0.81$ 11: $\alpha(\mathbf{I}) = 0.27$ 15: $\alpha(\mathbf{M}) = 0.063$ 35  |
| 550.25                 | 1/2 ,5/2                     | 120.0 1              | 540          | 215.77 | 1/2 ,5/2                        | [1011,122] | 1.10 0             | $\alpha(\mathbf{N})=0.0140$ 76: $\alpha(\mathbf{O})=0.00199$ 97: $\alpha(\mathbf{P})=7.7\times10^{-5}$ 25                                      |
|                        |                              | 336.2 1              | 100 11       | 0.0    | $5/2^{+}$                       | [M1.E2]    | 0.053 12           | $\alpha(K) = 0.044 \ 12; \ \alpha(L) = 0.0073 \ 4; \ \alpha(M) = 0.00160 \ 7$  |
|                        |                              |                      |              |        | - 1                             | L / J      |                    | $\alpha(N)=0.000364 \ 17; \ \alpha(O)=5.6\times10^{-5} \ 5; \ \alpha(P)=4.6\times10^{-6} \ 15$   |
| 447.75                 | 9/2,11/2,13/2                | 351.1 <i>I</i>       | 100          | 96.45  | $11/2^{-}$                      |            |                    |  |
| 457.59                 | $(9/2^+)$                    | 361.2 <i>1</i>       | 100 10       | 96.45  | $11/2^{-}$                      |            |                    |  |
|                        |                              | 457.6 <i>1</i>       | 21 5         | 0.0    | 5/2+                            |            |                    |  |
| 509.28                 | $1/2^+, 3/2^+$               | 173.1 <i>1</i>       | 100 33       | 336.23 | $1/2^+, 3/2^+$                  | [M1,E2]    | 0.371 22           | $\alpha$ (K)=0.28 5; $\alpha$ (L)=0.068 21; $\alpha$ (M)=0.0152 51   |
|                        |                              |                      |              |        |                                 |            |                    | $\alpha$ (N)=0.0034 11; $\alpha$ (O)=5.0×10 <sup>-4</sup> 14; $\alpha$ (P)=2.81×10 <sup>-5</sup> 86  |
|                        |                              | 293.3 2              | 67 <i>33</i> | 215.77 | $1/2^+, 3/2^+$                  | [M1,E2]    | 0.078 16           | $\alpha$ (K)=0.064 <i>16</i> ; $\alpha$ (L)=0.01116 <i>18</i> ; $\alpha$ (M)=0.00246 <i>8</i>  |
|                        |                              |                      |              |        |                                 |            |                    | $\alpha$ (N)=0.000558 13; $\alpha$ (O)=8.52×10 <sup>-5</sup> 23; $\alpha$ (P)=6.6×10 <sup>-6</sup> 22  |
|                        |                              | 509.0 <sup>‡</sup> 5 |              | 0.0    | 5/2+                            |            |                    |  |
| 525.92                 | $1/2^+, 3/2^+$               | 189.7 <i>1</i>       | 20 6         | 336.23 | $1/2^+, 3/2^+$                  | [M1,E2]    | 0.281 24           | $\alpha(K)=0.22$ 4; $\alpha(L)=0.048$ 12; $\alpha(M)=0.0109$ 30  |
|                        |                              |                      |              |        |                                 |            |                    | $\alpha$ (N)=0.00245 65; $\alpha$ (O)=0.00036 8; $\alpha$ (P)=2.18×10 <sup>-5</sup> 67   |
|                        |                              | 525.9 2              | 100 17       | 0.0    | 5/2+                            |            |                    |  |
| 622.56                 | 15/2-                        | 526.0 2              | 100          | 96.45  | 11/2-                           | E2         | 0.01171            | $\alpha(K)=0.00961$ 14; $\alpha(L)=0.001648$ 24; $\alpha(M)=0.000362$ 5  |
| 656 97                 | $(0/2^{+})$                  | 560 5 1              | 100 11       | 06 45  | 11/2-                           |            |                    | $\alpha(N) = 8.22 \times 10^{-5} I2; \ \alpha(O) = 1.253 \times 10^{-5} I8; \ \alpha(P) = 9.61 \times 10^{-5} I4$                              |
| 030.82                 | (9/2)                        | 500.5 I<br>657 0 2   | 100 11       | 90.45  | $\frac{11/2}{5/2^+}$            |            |                    |  |
| 671 98                 | 13/2-                        | 574.9.3              | 100          | 96.45  | $\frac{3}{2}$ 11/2 <sup>-</sup> | M1+F2      | 0.0129.36          | $\alpha(K) = 0.0108.32; \alpha(L) = 0.0016.4; \alpha(M) = 0.00035.7$   |
| 0/1.90                 | 15/2                         | 571.75               | 100          | 20.15  | 11/2                            | 1011   112 | 0.0129 50          | $\alpha(\mathbf{N}) = 7.9 \times 10^{-5} \ 16: \ \alpha(\mathbf{O}) = 1.2 \times 10^{-5} \ 3: \ \alpha(\mathbf{P}) = 1.14 \times 10^{-6} \ 37$ |
| 749.35                 | 9/2.11/2.13/2                | 652.9 1              | 100          | 96.45  | $11/2^{-}$                      |            |                    |  |
| 837.05                 | 9/2,11/2,13/2                | 389.2 1              | 78 11        | 447.75 | 9/2,11/2,13/2                   |            |                    |  |
|                        |                              | 740.7 1              | 100 11       | 96.45  | 11/2-                           |            |                    |  |
| 869.87                 | 9/2,11/2,13/2 <sup>(+)</sup> | 412.2 <i>I</i>       | 87 <i>13</i> | 457.59 | $(9/2^+)$                       |            |                    |  |
|                        |                              | 773.5 1              | 100 13       | 96.45  | 11/2-                           |            |                    |  |
| 923.19                 | $11/2^{(-)}, 13/2$           | 300.7 1              | 77 15        | 622.56 | 15/2-                           |            |                    |  |
|                        |                              | 475.4 1              | 100 15       | 447.75 | 9/2,11/2,13/2                   |            |                    |  |
|                        |                              | 826.7 <i>1</i>       | 69 15        | 96.45  | $11/2^{-}$                      |            |                    |  |
| 967.65                 | 9/2,11/2,13/2                | 647.3 <i>1</i>       | 100          | 320.35 | 9/2,11/2,13/2                   |            |                    |  |
| 1047.43                | 9/2,11/2,13/2 <sup>(+)</sup> | 590.0 <i>1</i>       | 100 15       | 457.59 | $(9/2^+)$                       |            |                    |  |

### $\gamma(^{141}\text{Eu})$ (continued)

| $E_i$ (level) | $\mathbf{J}_i^{\pi}$         | Eγ              | Iγ       | $E_f$   | ${ m J}_f^\pi$   | Mult. | $\alpha^{\dagger}$    | Comments   |
|---------------|------------------------------|-----------------|----------|---------|------------------|-------|-----------------------|--|
| 1047.43       | 9/2,11/2,13/2 <sup>(+)</sup> | 599.6 <i>1</i>  | 92 15    | 447.75  | 9/2,11/2,13/2    |       |                       |  |
| 1072.64       | (9/2 <sup>+</sup> )          | 976.2 1         | 100 22   | 96.45   | 11/2-            |       |                       |  |
|               | (1)                          | 1072.6 2        | 22 11    | 0.0     | 5/2+             |       |                       |  |
| 1154.6        | 15/2(+)                      | 482.8 <i>3</i>  | 100      | 671.98  | 13/2-            | [E1]  | 0.00488               | $\alpha(K)=0.00417 \ 6; \ \alpha(L)=0.000559 \ 8; \ \alpha(M)=0.0001197 \ 17$<br>$\alpha(N)=2.73\times10^{-5} \ 4; \ \alpha(O)=4.28\times10^{-6} \ 6; $<br>$\alpha(P)=4.08\times10^{-7} \ 6$ |
|               |                              | 532             |          | 622.56  | 15/2-            |       |                       |  |
| 1309.48       | $(17/2^{-})$                 | 638.2 <i>3</i>  | 100 4    | 671.98  | 13/2-            |       |                       |  |
|               |                              | 686.5 <i>3</i>  | 77.8 23  | 622.56  | 15/2-            |       |                       |  |
| 1344.93       | 19/2-                        | 722.4 2         | 100      | 622.56  | 15/2-            | E2    | 0.00537               | $\alpha$ (K)=0.00448 7; $\alpha$ (L)=0.000691 <i>10</i> ; $\alpha$ (M)=0.0001504 2 <i>1</i>  |
|               |                              |                 |          |         |                  |       |                       | $\alpha$ (N)=3.42×10 <sup>-5</sup> 5; $\alpha$ (O)=5.31×10 <sup>-6</sup> 8;<br>$\alpha$ (P)=4.57×10 <sup>-7</sup> 7  |
| 1408.62       | $1/2^+, 3/2^+$               | 1072.6 2        | 14 7     | 336.23  | $1/2^+, 3/2^+$   |       |                       |  |
|               |                              | 1192.8 <i>1</i> | 100 14   | 215.77  | $1/2^+, 3/2^+$   |       |                       |  |
| 1605.8        | (17/2)                       | 261             |          | 1344.93 | 19/2-            |       |                       |  |
|               |                              | 934             |          | 671.98  | 13/2-            |       |                       |  |
|               | (1)                          | 983             |          | 622.56  | 15/2-            |       |                       |  |
| 1636.3        | $15/2^{(+)}$                 | 964             |          | 671.98  | 13/2-            |       | 2                     |  |
|               |                              | 1013.4 <i>3</i> | 100      | 622.56  | $15/2^{-}$       | [E1]  | $1.06 \times 10^{-3}$ | $\alpha(K)=0.000907 \ 13; \ \alpha(L)=0.0001174 \ 17;$   |
|               |                              |                 |          |         |                  |       |                       | $\alpha(M)=2.51\times10^{-5} 4$  |
|               |                              |                 |          |         |                  |       |                       | $\alpha(N)=5.73\times10^{-6} \ 8; \ \alpha(O)=9.08\times10^{-7} \ 13; \alpha(P)=9.08\times10^{-8} \ 13$  |
| 1795.68       | 9/2,11/2,13/2(+)             | 1338.0 2        | 100 50   | 457.59  | $(9/2^+)$        |       |                       |  |
|               |                              | 1348.0 2        | 100 33   | 447.75  | 9/2,11/2,13/2    |       |                       |  |
| 1820.65       | 9/2-,11/2,13/2(+)            | 1148.5 <i>1</i> | 100 40   | 671.98  | 13/2-            |       |                       |  |
|               |                              | 1164.0 <i>1</i> | 100 40   | 656.82  | $(9/2^+)$        |       |                       |  |
| 1902.68       | $17/2^{(+)}$                 | 266.0 <i>3</i>  | ≤22      | 1636.3  | $15/2^{(+)}$     |       |                       |  |
|               |                              | 297             |          | 1605.8  | (17/2)           |       |                       |  |
|               |                              | 558             |          | 1344.93 | 19/2-            |       |                       |  |
|               |                              | 593             |          | 1309.48 | $(17/2^{-})$     |       |                       |  |
|               |                              | 748.3 <i>3</i>  | ≤22      | 1154.6  | $15/2^{(+)}$     |       |                       |  |
|               |                              | 1231            |          | 671.98  | 13/2-            |       |                       |  |
|               |                              | 1279.9 <i>3</i> | 100.00 9 | 622.56  | 15/2-            | [E1]  | $7.55 \times 10^{-4}$ | $\alpha(K)=0.000595 \ 9; \ \alpha(L)=7.63 \times 10^{-5} \ 11; \ \alpha(M)=1.629 \times 10^{-5} \ 23$  |
|               |                              |                 |          |         |                  |       |                       | $\alpha(N)=3.72\times10^{-6} 6; \ \alpha(O)=5.91\times10^{-7} 9; \\ \alpha(P)=5.97\times10^{-8} 9; \ \alpha(IPF)=6.30\times10^{-5} 9$  |
| 2019.56       | 9/2(+),11/2,13/2             | 972.2 1         | 100 20   | 1047.43 | 9/2.11/2.13/2(+) |       |                       |  |
|               | 1 7 1 7 -1 -                 | 1922.8 2        | 60 20    | 96.45   | 11/2-            |       |                       |  |

 $\gamma(^{141}\text{Eu})$  (continued)

| E <sub>i</sub> (level) | $\mathbf{J}_i^{\pi}$ | $E_{\gamma}$                            | $I_{\gamma}$ | $E_f$                        | $\mathrm{J}_f^\pi$                                   | Mult. | $\alpha^{\dagger}$ | Comments  |
|------------------------|----------------------|---|--------------|------------------------------|--|-------|--------------------|---|
| 2030.6                 | 19/2 <sup>(+)</sup>  | 127.6 3                                 | 100.0 15     | 1902.68                      | 17/2 <sup>(+)</sup>                                  | M1+E2 | 0.97 5             | $\alpha(K)=0.69\ 10;\ \alpha(L)=0.22\ 11;\ \alpha(M)=0.050\ 26$<br>$\alpha(N)=0.0111\ 57;\ \alpha(Q)=0.00159\ 72;\ \alpha(P)=6.6\times10^{-5}\ 21$  |
| 2116.9                 | (21/2 <sup>-</sup> ) | 425<br>721.4 <i>3</i><br>772.1 <i>3</i> | ≤37<br>≤63   | 1605.8<br>1309.48<br>1344.93 | (17/2)<br>$(17/2^{-})$<br>$19/2^{-}$<br>$(17/2^{-})$ | 50    | 0.00416            |   |
|                        |                      | 807.5 3                                 | 100.0 25     | 1309.48                      | (17/2)   | E2    | 0.00416            | $\alpha(\mathbf{K})=0.00349$ 5; $\alpha(\mathbf{L})=0.000523$ 8; $\alpha(\mathbf{M})=0.0001135$ 16<br>$\alpha(\mathbf{N})=2.58\times10^{-5}$ 4: $\alpha(\mathbf{O})=4.03\times10^{-6}$ 6: $\alpha(\mathbf{P})=3.58\times10^{-7}$ 5  |
| 2177.1                 | 23/2-                | 832.1 3                                 | 100          | 1344.93                      | 19/2-  | E2    | 0.00389            | $\alpha(N)=2.50\times10^{-5}$ 4; $\alpha(O)=4.05\times10^{-6}$ 6; $\alpha(P)=5.50\times10^{-5}$ 5<br>$\alpha(K)=0.00327$ 5; $\alpha(L)=0.000486$ 7; $\alpha(M)=0.0001054$ 15<br>$\alpha(N)=2.40\times10^{-5}$ 4; $\alpha(O)=3.75\times10^{-6}$ 6; $\alpha(P)=3.35\times10^{-7}$ 5 |
| 2229.2                 | $21/2^{(+)}$         | 53                                      |              | 2177.1                       | 23/2-  |       |                    |   |
|                        |                      | 198.5 <i>3</i>                          | 100          | 2030.6                       | $19/2^{(+)}$   | M1+E2 | 0.245 25           | $\alpha(K)=0.19$ 4; $\alpha(L)=0.041$ 9; $\alpha(M)=0.0092$ 23  |
| 2441.0                 | 23/2(+)              | 211.7 3                                 | 100          | 2229.2                       | 21/2 <sup>(+)</sup>                                  | M1+E2 | 0.202 24           | $\alpha(N)=0.0021 5; \alpha(O)=0.00031 6; \alpha(P)=1.92 \times 10^{-5} 59$<br>$\alpha(K)=0.16 4; \alpha(L)=0.033 6; \alpha(M)=0.0073 16$<br>$\alpha(N)=0.0017 4; \alpha(O)=0.00025 4; \alpha(P)=1.61 \times 10^{-5} 50$  |
| 2596.9                 | 25/2 <sup>(+)</sup>  | 155.5 <i>3</i>                          | 59 <i>3</i>  | 2441.0                       | 23/2 <sup>(+)</sup>                                  | M1+E2 | 0.517 14           | $\alpha(K)=0.00174, \alpha(G)=0.002254, \alpha(I)=1.01\times10^{-5}50^{-6}$<br>$\alpha(K)=0.396; \alpha(L)=0.10138; \alpha(M)=0.022891$<br>$\alpha(N)=0.005120; \alpha(O)=7.5\times10^{-4}25; \alpha(P)=3.8\times10^{-5}12$   |
|                        |                      | 367.8 <i>3</i>                          | 100.0 20     | 2229.2                       | 21/2 <sup>(+)</sup>                                  | E2    | 0.0315             | $\alpha$ (K)=0.0250 4; $\alpha$ (L)=0.00508 8; $\alpha$ (M)=0.001133 17<br>$\alpha$ (N)=0.000256 4; $\alpha$ (O)=3.81×10 <sup>-5</sup> 6; $\alpha$ (P)=2.40×10 <sup>-6</sup> 4  |
| 2750.3                 | $(25/2^+)$           | 309.3 <i>3</i>                          | 100          | 2441.0                       | $23/2^{(+)}$   | D     |                    |   |
| 2847.9                 | $27/2^{(+)}$         | 250.5 3                                 | ≤56          | 2596.9                       | $25/2^{(+)}$   |       |                    |   |
|                        |                      | 407.3 <i>3</i>                          | 100 6        | 2441.0                       | 23/2(+)  | E2    | 0.0235             | $\alpha$ (K)=0.0188 3; $\alpha$ (L)=0.00363 6; $\alpha$ (M)=0.000805 12<br>$\alpha$ (N)=0.000182 3; $\alpha$ (O)=2.73×10 <sup>-5</sup> 4; $\alpha$ (P)=1.84×10 <sup>-6</sup> 3  |
| 3009.1                 | $(25/2^{-})$         | 892.3 <i>3</i>                          | 100          | 2116.9                       | $(21/2^{-})$   |       |                    |   |
| 3024.1                 | 27/2-                | 846.9 <i>3</i>                          | 100          | 2177.1                       | 23/2-  | E2    | 0.00374            | $\alpha(K)=0.00315 \ 5; \ \alpha(L)=0.000466 \ 7; \ \alpha(M)=0.0001010 \ 15$<br>$\alpha(N)=2.30\times10^{-5} \ 4; \ \alpha(O)=3.59\times10^{-6} \ 5; \ \alpha(P)=3.23\times10^{-7} \ 5$  |
| 3076.0                 | 27/2-                | (53)                                    | 70 7         | 3024.1                       | $27/2^{-}$   |       |                    |   |
|                        |                      | 07.03                                   | /0./         | 3009.1                       | (25/2)   | E2    | 0.00220            | $\alpha(K) = 0.00077.4, \alpha(L) = 0.000404.6, \alpha(M) = 9.75 \times 10^{-5}.12$   |
|                        |                      | 898.8 3                                 | 100.0 11     | 21//.1                       | 23/2   | E2    | 0.00329            | $\alpha(\mathbf{N})=0.002774; \alpha(\mathbf{L})=0.0004046; \alpha(\mathbf{M})=8.73\times10^{-6} 15$<br>$\alpha(\mathbf{N})=2.00\times10^{-5} 3; \alpha(\mathbf{O})=3.12\times10^{-6} 5; \alpha(\mathbf{P})=2.85\times10^{-7} 4$  |
| 3162.7                 | 27/2-                | 985.7 <i>3</i>                          | 100          | 2177.1                       | 23/2-  | E2    | 0.00270            | $\alpha(K)=0.00228 \ 4; \ \alpha(L)=0.000327 \ 5; \ \alpha(M)=7.06\times10^{-5} \ 10$<br>$\alpha(N)=1.611\times10^{-5} \ 23; \ \alpha(O)=2.53\times10^{-6} \ 4; \ \alpha(P)=2.35\times10^{-7} \ 4$  |
| 3183.0                 | $(29/2^+)$           | 335.0 <i>3</i>                          |              | 2847.9                       | $27/2^{(+)}$   |       |                    |   |
|                        |                      | 586.2 <i>3</i>                          | 100.0 22     | 2596.9                       | 25/2(+)  | E2    | 0.00888            | $\alpha(K)=0.00734\ 11;\ \alpha(L)=0.001208\ 17;\ \alpha(M)=0.000265\ 4$<br>$\alpha(N)=6.01\times10^{-5}\ 9;\ \alpha(O)=9.23\times10^{-6}\ 13;\ \alpha(P)=7.40\times10^{-7}\ 11$  |
| 3417.7                 | 29/2-                | 341.8 <i>3</i>                          | 100.0 20     | 3076.0                       | 27/2-  | M1+E2 | 0.051 12           | $\alpha(K)=0.042 \ 11; \ \alpha(L)=0.0070 \ 5; \ \alpha(M)=0.00152 \ 7 \ \alpha(N)=0.00346 \ 19; \ \alpha(Q)=5.3\times10^{-5} \ 5; \ \alpha(P)=4.4\times10^{-6} \ 15$   |
|                        |                      | 393.5 <i>3</i>                          | 19.5 8       | 3024.1                       | 27/2-  |       |                    |   |
| 3446.3                 |                      | 696                                     | 100          | 2750.3                       | $(25/2^+)$   |       |                    |   |
| 3589.7                 | $(31/2^+)$           | 741.8 <i>3</i>                          | 100          | 2847.9                       | $27/2^{(+)}$   |       |                    |   |

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 $^{141}_{63}\mathrm{Eu}_{78}\text{-}6$ 

### $\gamma(^{141}\text{Eu})$ (continued)

| $E_i$ (level) | $\mathbf{J}_i^{\pi}$ | $E_{\gamma}$          | $I_{\gamma}$ | $E_f$            | $\mathbf{J}_f^{\pi}$                   | Mult. | $\alpha^{\dagger}$ | Comments   |
|---------------|----------------------|-----------------------|--------------|------------------|--|-------|--------------------|--|
| 3596.6        | 31/2-                | 433.9 <i>3</i>        | 63.1 9       | 3162.7           | 27/2-                                  | E2    | 0.0197             | $\alpha(K)=0.01587\ 23;\ \alpha(L)=0.00296\ 5;\ \alpha(M)=0.000656\ 10$  |
|               |                      | 572.4 3               | 100.0 18     | 3024.1           | 27/2-                                  | E2    | 0.00943            | $\begin{array}{c} \alpha(N)=0.0001484\ 21,\ \alpha(O)=2.24\times10^{-4},\ \alpha(P)=1.538\times10^{-2}22\\ \alpha(K)=0.00778\ 11;\ \alpha(L)=0.001292\ 19;\ \alpha(M)=0.000283\ 4\\ \alpha(L)=0.000283\ 4 \end{array}$   |
| 3684.1        | 31/2-                | 266.5 3               | 100.0 19     | 3417.7           | 29/2-                                  | M1+E2 | 0.103 19           | $\alpha(N)=6.43\times10^{-5}$ 9; $\alpha(O)=9.86\times10^{-5}$ 14; $\alpha(P)=7.84\times10^{-5}$ 11<br>$\alpha(K)=0.083$ 20; $\alpha(L)=0.0152$ 9; $\alpha(M)=0.0034$ 3<br>$\alpha(N)=0.00076$ 6; $\alpha(O)=0.000115$ 3; $\alpha(P)=8.5\times10^{-6}$ 28  |
|               |                      | 608.1 <i>3</i><br>659 | ≤23          | 3076.0<br>3024.1 | 27/2 <sup>-</sup><br>27/2 <sup>-</sup> |       |                    | $u(1) = 0.000700, u(0) = 0.0001155, u(1) = 0.5 \times 10^{-20}$  |
| 3857.1        |                      | 833                   | 100          | 3024.1           | $\frac{27}{2}$                         |       |                    |  |
| 3935.1        | 31/2-                | 911.0 3               | 100          | 3024.1           | 27/2-                                  | E2    | 0.00319            | $\alpha$ (K)=0.00269 4; $\alpha$ (L)=0.000392 6; $\alpha$ (M)=8.48×10 <sup>-5</sup> 12<br>$\alpha$ (N)=1.93×10 <sup>-5</sup> 3; $\alpha$ (O)=3.03×10 <sup>-6</sup> 5; $\alpha$ (P)=2.77×10 <sup>-7</sup> 4   |
| 4039.4        | $(33/2^+)$           | 856.4 <i>3</i>        | 100          | 3183.0           | (29/2+)                                | E2    | 0.00365            | $\alpha(K) = 0.00307 5; \alpha(L) = 0.000453 7; \alpha(M) = 9.83 \times 10^{-5} 14$<br>$\alpha(K) = 2.4 \times 10^{-5} 4; \alpha(Q) = 3.50 \times 10^{-6} 5; \alpha(P) = 3.15 \times 10^{-7} 5$  |
| 4156.1        | 33/2-                | 471.9 <i>3</i>        | 100          | 3684.1           | 31/2-                                  | M1+E2 | 0.0213 58          | $\alpha(N)=2.24\times10^{-4}$ ; $\alpha(O)=5.50\times10^{-5}$ ; $\alpha(I)=5.15\times10^{-5}$<br>$\alpha(K)=0.0179$ 52; $\alpha(L)=0.0027$ 5; $\alpha(M)=0.00059$ 9<br>$\alpha(N)=0.000135$ 22; $\alpha(O)=2.1\times10^{-5}$ 4; $\alpha(P)=1.88\times10^{-6}$ 63   |
|               |                      | 738.0                 |              | 3417.7           | 29/2-                                  |       |                    |  |
| 4369.2        | 35/2-                | 772.6 3               | 100          | 3596.6           | 31/2-                                  | E2    | 0.00460            | $\alpha(K)=0.00385\ 6;\ \alpha(L)=0.000583\ 9;\ \alpha(M)=0.0001267\ 18$<br>$\alpha(N)=2.88\times10^{-5}\ 4;\ \alpha(O)=4.49\times10^{-6}\ 7;\ \alpha(P)=3.94\times10^{-7}\ 6$   |
| 4417 22       | $(35/2^+)$           | 828 3 3 3             | 100.0        | 3589 7           | $(31/2^+)$                             |       |                    |  |
| 4562.7        | $(33/2^+)$           | 973                   | 100.0        | 3589.7           | $(31/2^+)$                             |       |                    |  |
| 4583.3        | (33/2)               | 1137                  | 100          | 3446.3           | (31/2)                                 |       |                    |  |
| 4650.4        | (35/2)               | 494.3                 | 100          | 4156.1           | 33/2-                                  |       |                    |  |
| 4766.1        | (00/=)               | 909                   | 100          | 3857.1           | 00/2                                   |       |                    |  |
| 4847.2        | $(35/2^{-})$         | 690.9.3               | <51          | 4156.1           | $33/2^{-}$                             |       |                    |  |
|               | (==)                 | 1163.3 3              | 100.3        | 3684.1           | $31/2^{-}$                             |       |                    |  |
| 4934.9        | $(37/2^+)$           | 895.5 3               | 100          | 4039.4           | $(33/2^+)$                             | (E2)  | 0.00331            | $\alpha(K)=0.00279 4; \alpha(L)=0.000408 6; \alpha(M)=8.83\times10^{-5} 13$<br>$\alpha(N)=2.01\times10^{-5} 3; \alpha(Q)=3.15\times10^{-6} 5; \alpha(P)=2.87\times10^{-7} 4$   |
| 5021.2        | (37/2 <sup>-</sup> ) | 174.1 <i>3</i>        | 100          | 4847.2           | (35/2 <sup>-</sup> )                   | M1+E2 | 0.365 22           | $\alpha(\text{N})=2.61\times10^{-5}$ , $\alpha(\text{O})=5.15\times10^{-5}$ , $\alpha(1)=2.67\times10^{-7}$<br>$\alpha(\text{K})=0.28$ 5; $\alpha(\text{L})=0.066$ 20; $\alpha(\text{M})=0.0149$ 49<br>$\alpha(\text{N})=0.0034$ 11; $\alpha(\text{O})=4.9\times10^{-4}$ 13; $\alpha(\text{P})=2.77\times10^{-5}$ 84 |
|               |                      | 864.5                 |              | 4156.1           | $33/2^{-}$                             |       |                    |  |
| 5191.6        | (39/2-)              | 170.4 3               | 100          | 5021.2           | (37/2 <sup>-</sup> )                   | M1+E2 | 0.390 21           | $\alpha(K)=0.305; \alpha(L)=0.07223; \alpha(M)=0.016156$<br>$\alpha(N)=0.003612; \alpha(O)=5.3\times10^{-4}15; \alpha(P)=2.94\times10^{-5}89$  |
| 5390.2        | 39/2-                | 1021                  | 100          | 4369.2           | 35/2-                                  | E2    | 0.00251            | $\alpha(K)=0.00212 \ 3; \ \alpha(L)=0.000302 \ 5; \ \alpha(M)=6.52\times10^{-5} \ 10 \ \alpha(N)=1.487\times10^{-5} \ 21; \ \alpha(Q)=2.33\times10^{-6} \ 4; \ \alpha(P)=2.18\times10^{-7} \ 3$  |
| 5391.7        |                      | 829                   |              | 4562.7           | $(33/2^+)$                             |       |                    | a(1) 1.10/110 21, a(0) 2.00/10 1, a(1)=2.10/10 0   |
| 5399.7        |                      | 837                   |              | 4562.7           | $(33/2^+)$                             |       |                    |  |
| 5640.7        |                      | 241                   |              | 5399.7           | (35/2)                                 |       |                    |  |
| 20.017        |                      | 249                   |              | 5391.7           |  |       |                    |  |
| 5657.9        | (41/2 <sup>-</sup> ) | 466.3                 | 100          | 5191.6           | (39/2 <sup>-</sup> )                   | M1+E2 | 0.0220 59          | $\alpha$ (K)=0.0184 54; $\alpha$ (L)=0.0028 5; $\alpha$ (M)=0.00061 10<br>$\alpha$ (N)=0.000140 22; $\alpha$ (O)=2.2×10 <sup>-5</sup> 4; $\alpha$ (P)=1.94×10 <sup>-6</sup> 65   |

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| Adopted Levels, Gammas (continued)    |                      |       |     |        |                      |       |                    |  |  |  |  |
|---------------------------------------|----------------------|-------|-----|--------|----------------------|-------|--------------------|--|--|--|--|
| $\gamma(^{141}\text{Eu})$ (continued) |                      |       |     |        |                      |       |                    |  |  |  |  |
| $E_i$ (level)                         | $\mathbf{J}_i^\pi$   | Eγ    | Iγ  | $E_f$  | $\mathrm{J}_f^\pi$   | Mult. | $\alpha^{\dagger}$ | Comments   |  |  |  |
| 5676.1                                |                      | 910   | 100 | 4766.1 |                      |       |                    |  |  |  |  |
| 5975.9                                |                      | 335   | 100 | 5640.7 |                      |       |                    |  |  |  |  |
| 5994.2                                | (43/2 <sup>-</sup> ) | 336.3 |     | 5657.9 | (41/2 <sup>-</sup> ) | M1+E2 | 0.053 12           | $\alpha(K)=0.044 \ I2; \ \alpha(L)=0.0073 \ 4; \ \alpha(M)=0.00160 \ 7 \ \alpha(N)=0.000364 \ I7; \ \alpha(O)=5.6\times10^{-5} \ 5; \ \alpha(P)=4.5\times10^{-6} \ I5$ |  |  |  |
|                                       |                      | 802.6 |     | 5191.6 | $(39/2^{-})$         |       |                    |  |  |  |  |
| 6324.6                                |                      | 349   | 100 | 5975.9 |                      |       |                    |  |  |  |  |
|                                       |                      | 684   |     | 5640.7 |                      |       |                    |  |  |  |  |
| 6432.1                                | $(43/2^{-})$         | 756   |     | 5676.1 |                      |       |                    |  |  |  |  |
|                                       |                      | 1042  |     | 5390.2 | 39/2-                |       |                    |  |  |  |  |
| 6621.9                                | $(45/2^{-})$         | 627.7 | 100 | 5994.2 | $(43/2^{-})$         |       |                    |  |  |  |  |
| 6727.3                                |                      | 403   |     | 6324.6 |                      |       |                    |  |  |  |  |
|                                       |                      | 751   |     | 5975.9 |                      |       |                    |  |  |  |  |
| 7048.1                                | $(47/2^{-})$         | 616   | 100 | 6432.1 | $(43/2^{-})$         |       |                    |  |  |  |  |
| 7196.4                                |                      | 469   |     | 6727.3 |                      |       |                    |  |  |  |  |
|                                       |                      | 872   |     | 6324.6 |                      |       |                    |  |  |  |  |
| 7639.4                                |                      | 443   |     | 7196.4 |                      |       |                    |  |  |  |  |
|                                       |                      | 912   |     | 6727.3 |                      |       |                    |  |  |  |  |
| 7861.2                                | $(51/2^{-})$         | 813   | 100 | 7048.1 | $(47/2^{-})$         |       |                    |  |  |  |  |
| 7964.2                                |                      | 916   | 100 | 7048.1 | $(47/2^{-})$         |       |                    |  |  |  |  |
| 8112.4                                |                      | 473   |     | 7639.4 |                      |       |                    |  |  |  |  |
|                                       |                      | 916   |     | 7196.4 |                      |       |                    |  |  |  |  |
| 8543.4                                |                      | 431   |     | 8112.4 |                      |       |                    |  |  |  |  |
|                                       |                      | 904   |     | 7639.4 |                      |       |                    |  |  |  |  |
| 9035.4                                |                      | 492   |     | 8543.4 |                      |       |                    |  |  |  |  |
|                                       |                      | 923   |     | 8112.4 |                      |       |                    |  |  |  |  |

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<sup>†</sup> Additional information 1.
 <sup>‡</sup> Placement of transition in the level scheme is uncertain.

 $^{141}_{63}\mathrm{Eu}_{78}\text{--}8$ 

### Level Scheme

Intensities: Relative photon branching from each level



Legend

#### Level Scheme (continued)

Intensities: Relative photon branching from each level

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



 $^{141}_{63}\mathrm{Eu}_{78}$ 

Level Scheme (continued)





<sup>141</sup><sub>63</sub>Eu<sub>78</sub>

Legend

# Level Scheme (continued)

Intensities: Relative photon branching from each level



<sup>141</sup><sub>63</sub>Eu<sub>78</sub>



 $<sup>^{141}</sup>_{63}\rm{Eu}_{78}$ 



