## $^{181}$Ta($\alpha$,6n$\gamma$) 1976RoYE

History

| Type | Author | Citation | Literature Cutoff Date |
|---|---|---|---|
| Full Evaluation | Coral M. Baglin | NDS 110, 265 (2009) | 15-Nov-2008 |

1976RoYE: ($\alpha$,6n$\gamma$), E$\alpha$=70 MeV; target: natural tantalum. Measured E$\gamma$, I$\gamma$ at $\theta$=125°, Ag($\theta$) at $\theta$=90, 110, 125, and 150°, $\gamma\gamma$ coin, beam-$\gamma$(t) (time resolution FWHM=13 ns). Detector:Ge(Li).

### $^{179}$Re Levels

| E(level)[†] | J$^{\pi}$[‡] | T$_{1/2}$[#] | Comments |
|---|---|---|---|
| 0.0[@] | 5/2+ | | |
| 0+x[a] | 9/2− | | Additional information 1.<br>E(level): x=87.54 *23* from Adopted Levels. |
| 65.35[&] *9* | 5/2− | | Additional information 2.<br>from Adopted Levels. |
| 65.35+y[&] *9* | 9/2− | | Additional information 3.<br>E(level): y=50.24 keV from Adopted Levels. |
| 124.3[@] *5* | 7/2+ | | |
| 165.4+x[a] *4* | 11/2− | | |
| 234.2+y[&] *5* | 13/2− | | |
| 280.1[@] *7* | 9/2+ | | |
| 359.4+x[a] *4* | 13/2− | | |
| 466.0[@] *8* | 11/2+ | | |
| 519.7+y[&] *7* | 17/2− | | |
| 576.9+x[a] *5* | 15/2− | | |
| 676.8[@] *8* | 13/2+ | | |
| 818.3+x[a] *6* | 17/2− | | |
| 911.3+y[&] *9* | 21/2− | | |
| 913.9[@] *9* | 15/2+ | | |
| 1076.3+x[a] *6* | 19/2− | | |
| 1114.2+x *8* | (21/2) | ≈21 ns | |
| 1166.2[@] *9* | 17/2+ | | |
| 1351.8+x[a] *7* | 21/2− | | |
| 1390.6+x *9* | (23/2) | | |
| 1394.7+y[&] *10* | 25/2− | | |
| 1437.1[@] *10* | 19/2+ | | |
| 1954.5+y[&] *12* | 29/2− | | |
| 2573.3+y[&] *13* | 33/2− | | |
| 3239.3+y[&] *14* | 37/2− | | |
| 3950.2+y[&] *15* | 41/2− | | |

[†] From least-squares fit to E$\gamma$, holding the energies of the 0+x, 65.35 and 65.35+Y levels fixed.
[‡] Authors′ values (1976RoYE), supported by deduced band structure and measured $\gamma(\theta)$.
[#] From beam-$\gamma$(t) (1976RoYE).
[@] Band(A): 5/2[402] g.s. band.
[&] Band(B): 1/2[541] band, $\alpha$=+1/2.
[a] Band(C): 9/2[514] band.

## $^{181}$Ta($\alpha$,6n$\gamma$) 1976RoYE (continued)

### $\gamma$($^{179}$Re)

| $E_\gamma$ | $I_\gamma$[†] | $E_i$(level) | $J_i^\pi$ | $E_f$ | $J_f^\pi$ | Mult.[‡] | Comments |
|---|---|---|---|---|---|---|---|
| 124.3 *5* | 28.8 *9* | 124.3 | 7/2$^+$ | 0.0 | 5/2$^+$ | D(+Q) | Mult.: $A_2$=−0.14 *6*. |
| 155.8 *5* | 31.7 *8* | 280.1 | 9/2$^+$ | 124.3 | 7/2$^+$ | D(+Q) | Mult.: $A_2$=−0.16 *5*. |
| 165.6 *5* | 154.7 *12* | 165.4+x | 11/2$^-$ | 0+x | 9/2$^-$ | D(+Q) | Mult.: $A_2$=−0.18 *2*. $T_{1/2}$≈21.5 ns. |
| 168.8 *5* | 122.6 *11* | 234.2+y | 13/2$^-$ | 65.35+y | 9/2$^-$ | (Q) | Mult.: $A_2$=+0.21 *2*. |
| 185.8 *5* | 32.5 *11* | 466.0 | 11/2$^+$ | 280.1 | 9/2$^+$ | D+Q | Mult.: $A_2$=−0.09 *6*. |
| 194.2 *5* | 149.9 *13* | 359.4+x | 13/2$^-$ | 165.4+x | 11/2$^-$ | D+Q | Mult.: $A_2$=−0.12 *2*. $T_{1/2}$≈22.5 ns. |
| 211.1 *5* | 36.3 *12* | 676.8 | 13/2$^+$ | 466.0 | 11/2$^+$ | D | Mult.: $A_2$=−0.23 *8*. |
| 217.6 *5* | 118.0 *14* | 576.9+x | 15/2$^-$ | 359.4+x | 13/2$^-$ | D+Q | Mult.: $A_2$=−0.11 *3*. $T_{1/2}$≈20.5 ns. |
| 237.2 *5* | 36.4 *18* | 913.9 | 15/2$^+$ | 676.8 | 13/2$^+$ | D+Q | Mult.: $A_2$=−0.05 *4*. |
| 241.1 *5* | 86.4 *15* | 818.3+x | 17/2$^-$ | 576.9+x | 15/2$^-$ | (D+Q) | Mult.: $A_2$=+0.20 *4*; stretched Q also possible, $T_{1/2}$≈20.5 ns. |
| 252.6 *5* | 23.9 *11* | 1166.2 | 17/2$^+$ | 913.9 | 15/2$^+$ | (D+Q) | Mult.: $A_2$=+0.24 *9*; stretched Q also possible. |
| 257.4 *5* | 27.3 *11* | 1076.3+x | 19/2$^-$ | 818.3+x | 17/2$^-$ | D+Q | Mult.: $A_2$=+0.10 *6*. |
| 271.3 *5* | 5.6 *12* | 1437.1 | 19/2$^+$ | 1166.2 | 17/2$^+$ | | |
| 275.1 *5* | 20.8 *6* | 1351.8+x | 21/2$^-$ | 1076.3+x | 19/2$^-$ | D | Mult.: $A_2$=−0.20 *7*. |
| 276.4 *5* | 58.9 *11* | 1390.6+x | (23/2) | 1114.2+x | (21/2) | (D+Q) | Mult.: $A_2$=+0.20 *3*; stretched Q also possible. |
| 285.5 *5* | 105.9 *24* | 519.7+y | 17/2$^-$ | 234.2+y | 13/2$^-$ | Q | Mult.: $A_2$=+0.38 *3*. |
| 295.9 *5* | 72.4 *23* | 1114.2+x | (21/2) | 818.3+x | 17/2$^-$ | Q | Mult.: $A_2$=+0.33 *5*. |
| 359.2 *5* | 8.0 *11* | 359.4+x | 13/2$^-$ | 0+x | 9/2$^-$ | Q | Mult.: $A_2$=+0.27 *12*. |
| 391.6 *5* | 121.9 *8* | 911.3+y | 21/2$^-$ | 519.7+y | 17/2$^-$ | Q | Mult.: $A_2$=+0.35 *2*. |
| 396.8 *5* | 21.7 *16* | 676.8 | 13/2$^+$ | 280.1 | 9/2$^+$ | Q | Mult.: $A_2$=+0.38 *10*. |
| 411.4 *5* | 40.7 *16* | 576.9+x | 15/2$^-$ | 165.4+x | 11/2$^-$ | Q | Mult.: $A_2$=+0.27 *6*. |
| 447.6 *5* | 33.3 *16* | 913.9 | 15/2$^+$ | 466.0 | 11/2$^+$ | Q | Mult.: $A_2$=+0.33 *8*. |
| 458.9 *5* | 19.0 *16* | 818.3+x | 17/2$^-$ | 359.4+x | 13/2$^-$ | Q | Mult.: $A_2$=+0.52 *13*. |
| 483.4 *5* | 96.8 *12* | 1394.7+y | 25/2$^-$ | 911.3+y | 21/2$^-$ | (Q) | Mult.: $A_2$=+0.20 *3*. |
| 489.5 *5* | 36.2 *10* | 1166.2 | 17/2$^+$ | 676.8 | 13/2$^+$ | Q | Mult.: $A_2$=+0.28 *7*. |
| 499.7 *5* | 6.2 *13* | 1076.3+x | 19/2$^-$ | 576.9+x | 15/2$^-$ | | |
| 522.9 *5* | 16.9 *16* | 1437.1 | 19/2$^+$ | 913.9 | 15/2$^+$ | Q | Mult.: $A_2$=+0.37 *17*. |
| 533.9 *5* | 10.8 *14* | 1351.8+x | 21/2$^-$ | 818.3+x | 17/2$^-$ | | |
| 559.8 *5* | 57.1 *15* | 1954.5+y | 29/2$^-$ | 1394.7+y | 25/2$^-$ | (Q) | Mult.: $A_2$=+0.60 *6*; unexpectedly large $A_2$. |
| 618.8 *5* | 42.0 *13* | 2573.3+y | 33/2$^-$ | 1954.5+y | 29/2$^-$ | | |
| 666.0 *5* | 18.1 *21* | 3239.3+y | 37/2$^-$ | 2573.3+y | 33/2$^-$ | | |
| 710.9 *5* | 7.2 *9* | 3950.2+y | 41/2$^-$ | 3239.3+y | 37/2$^-$ | | |

† I$\gamma$ at $\theta$=125° from ($\alpha$,6n$\gamma$) for E$\alpha$=70 MeV (1976RoYE); deduced by evaluator from authors′ quoted I($\gamma$+ce), assumed mult and stated source of conversion coefficients (Hager-Seltzer).

‡ From Ag($\theta$) and rotational band structure. $A_2$ data from $\gamma$($\theta$) (1976RoYE) are given in comments. Authors assign mult=M1 and E2,respectively, to D or D+Q and Q transitions for the purpose of converting measured I$\gamma$ to I($\gamma$+ce).

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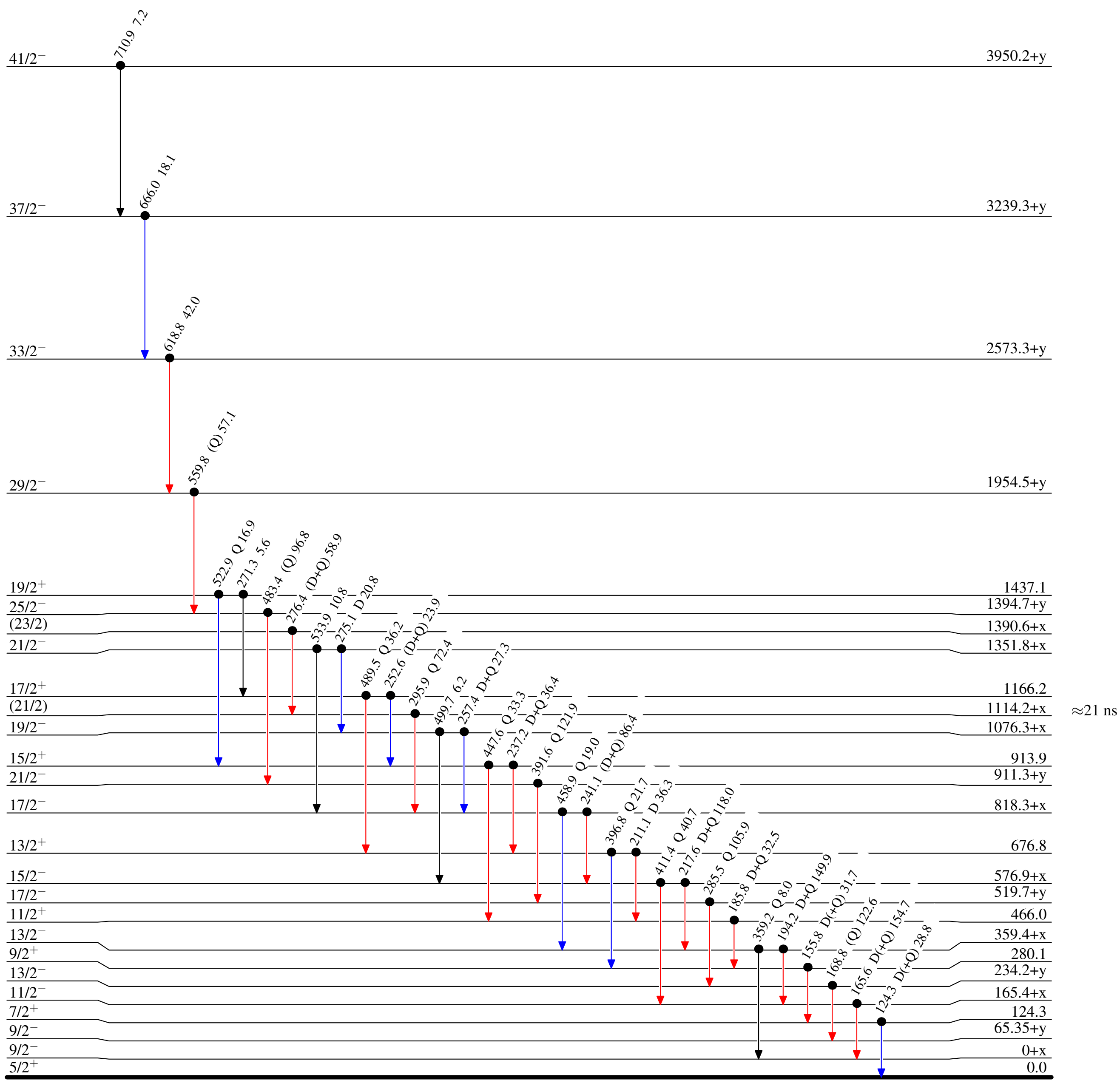
### Level Scheme

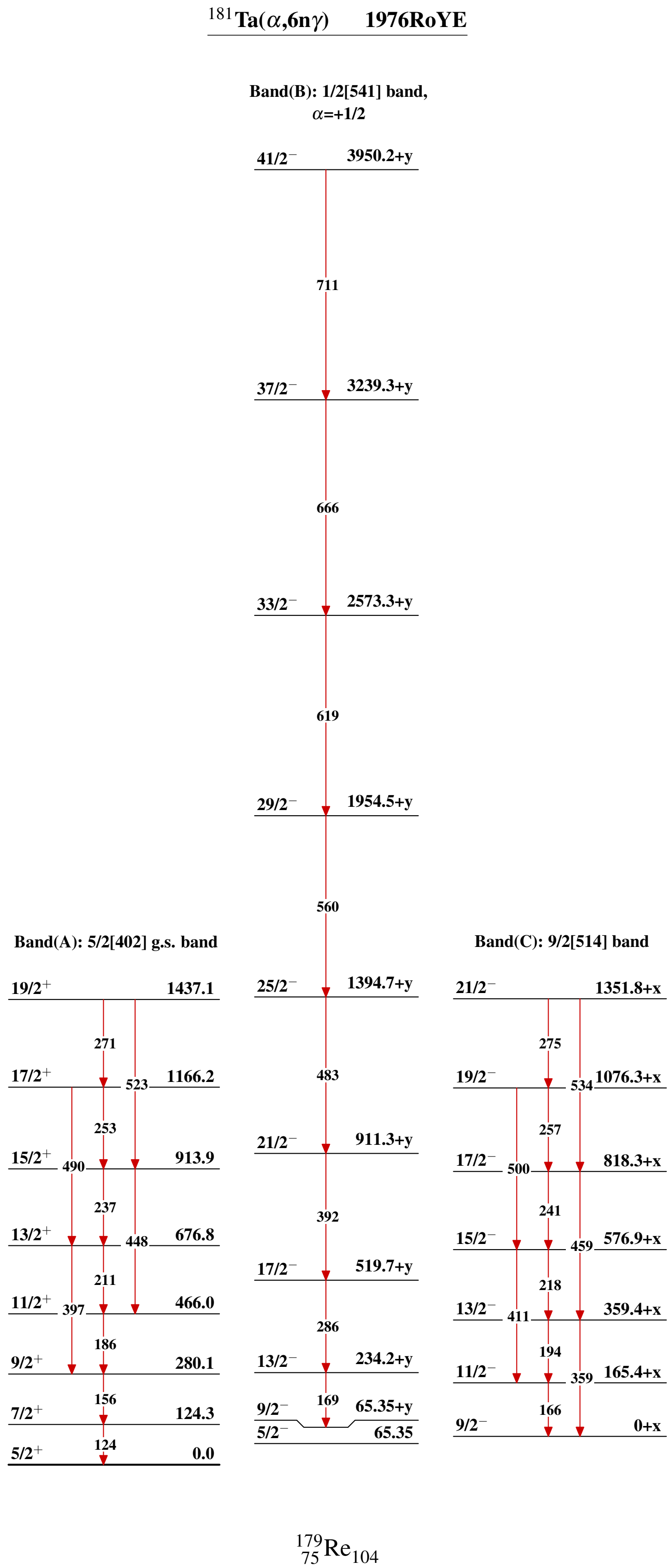
Intensities: Relative $I_\gamma$

Legend

$I_\gamma < 2\% \times I_\gamma^{max}$
$I_\gamma < 10\% \times I_\gamma^{max}$
$I_\gamma > 10\% \times I_\gamma^{max}$
● Coincidence




$^{179}_{75}Re_{104}$


$^{181}$Ta(α,6nγ) 1976RoYE
Band(B): 1/2[541] band, α=+1/2
41/2− 3950.2+y
711
37/2− 3239.3+y
666
33/2− 2573.3+y
619
29/2− 1954.5+y
560
Band(A): 5/2[402] g.s. band
Band(C): 9/2[514] band
19/2+ 1437.1
25/2− 1394.7+y
21/2− 1351.8+x
271
275
483
17/2+ 1166.2
523
19/2− 1076.3+x
534
253
257
21/2− 911.3+y
15/2+ 913.9
490
17/2− 818.3+x
500
237
241
392
13/2+ 676.8
448
15/2− 576.9+x
459
211
218
17/2− 519.7+y
11/2+ 466.0
397
13/2− 359.4+x
411
186
286
194
9/2+ 280.1
13/2− 234.2+y
11/2− 165.4+x
359
156
169
166
7/2+ 124.3
9/2− 65.35+y
5/2− 65.35
9/2− 0+x
124
5/2+ 0.0
$^{179}_{75}Re_{104}$