# $^{103}$Tc $\beta^-$ decay 1979Ni05

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

Parent: $^{103}$Tc: E=0.0; $J^\pi=5/2^+$; $T_{1/2}$=54.2 s *8*; Q($\beta^-$)=2662 *10*; %$\beta^-$ decay=100.0

Others: 1975Ba60, 1972Tr08, 1970HeZU.

$^{103}$Tc activity from $^{104}$Ru($\gamma$,p) measured: E$\gamma$, I$\gamma$, $\gamma\gamma$, E$\beta$, I$\beta$; deduced: log *ft*, $^{103}$Ru levels, $J^\pi$. Enriched isotope.

## $^{103}$Ru Levels

| E(level)† | Jπ‡ | E(level)† | Jπ‡ | E(level)† | Jπ‡ |
|---|---|---|---|---|---|
| 0.0 | $3/2^+$ | 404.44 *7* | $(7/2)^+$ | 661.73 *7* | $(3/2)^+$ |
| 3.03 *6* | $5/2^+$ | 406.19 *8* | $3/2^+,5/2^+$ | 774.87 *7* | $(3/2^+,5/2^+)$ |
| 136.079 *3* | $5/2^+$ | 432.10 *10* | $1/2^+$ | 905.32 *15* | $3/2^+,5/2^+$ |
| 174.32 *5* | $1/2^+$ | 501.06 *7* | $(5/2)^+$ | 940.70 *13* | |
| 213.52 *6* | $7/2^+$ | 555.00 *10* | $(1/2^+)$ | 1065.60 *8* | $3/2^+,5/2^+,7/2^+$ |
| 297.83 *12* | $(7/2)^-$ | 562.90 *8* | $(3/2^+,5/2^+)$ | | |
| 346.383 *12* | $3/2^+$ | 591.98 *6* | $(5/2)^+$ | | |

† Calculated from observed gammas.

‡ From Adopted Levels.

## $\beta^-$ radiations

| E(decay) | E(level) | Iβ⁻†# | Log *ft* | Comments |
|---|---|---|---|---|
| (1596 *10*) | 1065.60 | 1.07 *15* | 5.82 *7* | av Eβ= 606 *5* |
| (1721 *10*) | 940.70 | 0.82 *13* | 6.07 *7* | av Eβ= 662 *5* |
| (1757 *10*) | 905.32 | 1.56 *22* | 5.82 *7* | av Eβ= 678 *5* |
| (1887 *10*) | 774.87 | 1.49 *21* | 5.97 *7* | av Eβ= 737 *5* |
| (2000 *10*) | 661.73 | 1.10 *17* | 6.20 *7* | av Eβ= 788 *5* |
| (2070 *10*) | 591.98 | 0.52 *9* | 6.59 *8* | av Eβ= 820 *5* |
| (2099 *10*) | 562.90 | 9.9 *14* | 5.33 *7* | av Eβ= 834 *5* |
| (2107 *10*) | 555.00 | 0.068‡ *16* | 7.50 *11* | av Eβ= 837 *5* |
| (2161 *10*) | 501.06 | 3.6 *5* | 5.82 *7* | av Eβ= 862 *5* |
| (2230 *10*) | 432.10 | 0.057‡ *15* | 7.68 *12* | av Eβ= 894 *5* |
| (2256 *10*) | 406.19 | 2.8 *4* | 6.01 *7* | av Eβ= 906 *5* |
| (2258 *10*) | 404.44 | 0.37 *16* | 6.89 *19* | av Eβ= 907 *5* |
| (2316 *10*) | 346.383 | 30 *4* | 5.03 *6* | av Eβ= 934 *5* |
| (2364 *10*) | 297.83 | 0.09 *6* | 7.6 *3* | av Eβ= 956 *6* |
| (2448 *10*) | 213.52 | 2.5 *5* | 6.21 *9* | av Eβ= 995 *6* |
| (2488@ *10*) | 174.32 | ≤0.9 | ≥6.7 | av Eβ= 1013 *6* |
| (2526 *10*) | 136.079 | 10.1 *17* | 5.66 *8* | av Eβ= 1031 *6* |
| (2659 *10*) | 3.03 | | | |
| (2662 *10*) | 0.0 | 34 *8* | 5.23 *11* | av Eβ= 1095 *6* |

Iβ⁻: total calculated $\beta^-$ intensity to g.s. and/or 2.8-keV level. From simultaneous $\beta$- and $\gamma$ measurements, Iβ=41 *10* is deduced by 1979Ni05.

Log *ft*: calculated for total Iβ=34 *8* to g.s.

† Calculated by evaluator from I($\gamma$+ce) imbalance at each level.

‡ log *ft* too small for ΔJ=2, Δπ=no, no explanation if $J^\pi$ values of level is correct.

# Absolute intensity per 100 decays.

@ Existence of this branch is questionable.

## $^{103}$Tc $\beta^-$ decay 1979Ni05 (continued)

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

Iγ normalization: the value I(346.4γ)=17.5% *19* is a weighted average of I(346.4γ)=18.4% *23* deduced from fission-yield measurements in $^{245}$Cm(n,F) (1981Di01) and I(346.4γ)=16% *3* deduced by the evaluator from simultaneous β and γ measurements (1979Ni05).

| $E_\gamma$ | $I_\gamma$[#] | $E_i$(level) | $J_i^\pi$ | $E_f$ | $J_f^\pi$ | Mult. | α[‡] | Comments |
|---|---|---|---|---|---|---|---|---|
| (2.8) | | 3.03 | $5/2^+$ | 0.0 | $3/2^+$ | | | |
| 133.2 *5* | 2.1 *3* | 136.079 | $5/2^+$ | 3.03 | $5/2^+$ | [M1] | 0.1398 *25* | |
| 136.079 *3* | 95 *5* | 136.079 | $5/2^+$ | 0.0 | $3/2^+$ | [M1] | 0.1319 *19* | α(K)= 0.1156; α(L)=0.01386; α(M)=0.00254; α(N+..)=0.00049 |
| 160.9 *1* | 0.35 *10* | 661.73 | $(3/2)^+$ | 501.06 | $(5/2)^+$ | [M1] | 0.0836 *12* | |
| 172.0 *10* | 0.38 *3* | 346.383 | $3/2^+$ | 174.32 | $1/2^+$ | [M1] | 0.0699 *15* | |
| 174.31 *5* | 16 *2* | 174.32 | $1/2^+$ | 0.0 | $3/2^+$ | [M1] | 0.0675 *10* | |
| 190.3 *5* | 0.32 *6* | 404.44 | $(7/2)^+$ | 213.52 | $7/2^+$ | [M1] | 0.0534 *9* | |
| 210.40 *5* | 18[†] *2* | 213.52 | $7/2^+$ | 3.03 | $5/2^+$ | [M1] | 0.0409 *6* | |
| 210.40 | 39[†] *2* | 346.383 | $3/2^+$ | 136.079 | $5/2^+$ | | | |
| 213.0 *2* | 0.87 *5* | 213.52 | $7/2^+$ | 0.0 | $3/2^+$ | [E2] | 0.0871 *13* | |
| 232.0 *2* | 0.58 *11* | 406.19 | $3/2^+,5/2^+$ | 174.32 | $1/2^+$ | [M1] | 0.0317 *5* | |
| x239.0 *2* | 0.35 *11* | | | | | | | |
| 245.3 *3* | 0.25 *6* | 591.98 | $(5/2)^+$ | 346.383 | $3/2^+$ | [M1] | 0.0274 *5* | |
| 268.6 *1* | 0.8 *3* | 404.44 | $(7/2)^+$ | 136.079 | $5/2^+$ | [M1] | 0.0217 *3* | |
| 270.1 *1* | 3.4 *3* | 406.19 | $3/2^+,5/2^+$ | 136.079 | $5/2^+$ | [M1] | 0.0214 *3* | |
| 287.6 *1* | 3.7 *3* | 501.06 | $(5/2)^+$ | 213.52 | $7/2^+$ | [M1] | 0.0182 *3* | |
| 294.8 *1* | 0.5 *3* | 297.83 | $(7/2)^-$ | 3.03 | $5/2^+$ | | | |
| 315.25 *10* | 0.88 *14* | 661.73 | $(3/2)^+$ | 346.383 | $3/2^+$ | [M1] | 0.0144 *4* | |
| 343.55 *15* | 23.1 *11* | 346.383 | $3/2^+$ | 3.03 | $5/2^+$ | [M1] | 0.01164 *17* | |
| 346.377 *12* | 100 *5* | 346.383 | $3/2^+$ | 0.0 | $3/2^+$ | [M1] | 0.01141 *16* | |
| 365.1 *2* | 2.4 *3* | 501.06 | $(5/2)^+$ | 136.079 | $5/2^+$ | [M1] | 0.01001 *14* | |
| 368.7 *1* | 1.1 *2* | 774.87 | $(3/2^+,5/2^+)$ | 406.19 | $3/2^+,5/2^+$ | | | |
| 370.6 *1* | 0.82 *15* | 774.87 | $(3/2^+,5/2^+)$ | 404.44 | $(7/2)^+$ | | | |
| 378.0 *1* | 0.59 *15* | 591.98 | $(5/2)^+$ | 213.52 | $7/2^+$ | | | $E_\gamma$: Poor energy fit. Level energy difference = 378.46. |
| 388.6 *1* | 12.7 *8* | 562.90 | $(3/2^+,5/2^+)$ | 174.32 | $1/2^+$ | | | |
| 401.6 *5* | 3.9 *7* | 404.44 | $(7/2)^+$ | 3.03 | $5/2^+$ | | | |
| 403.2 *5* | 12.0 *7* | 406.19 | $3/2^+,5/2^+$ | 3.03 | $5/2^+$ | | | |
| 418 *1* | 0.2 *1* | 591.98 | $(5/2)^+$ | 174.32 | $1/2^+$ | | | |
| 428.3 *1* | 1.1 *2* | 774.87 | $(3/2^+,5/2^+)$ | 346.383 | $3/2^+$ | | | |
| 432.1 *1* | 0.31 *7* | 432.10 | $1/2^+$ | 0.0 | $3/2^+$ | | | |
| 456.1 *1* | 0.59 *15* | 591.98 | $(5/2)^+$ | 136.079 | $5/2^+$ | | | |
| 487.3 *1* | 0.94 *13* | 661.73 | $(3/2)^+$ | 174.32 | $1/2^+$ | | | |
| 501.2 *1* | 13.9 *8* | 501.06 | $(5/2)^+$ | 0.0 | $3/2^+$ | | | |
| 525.5 *3* | 0.39 *10* | 661.73 | $(3/2)^+$ | 136.079 | $5/2^+$ | | | |
| x533.1 *5* | 0.31 *15* | | | | | | | |
| 555.0 *1* | 0.37 *7* | 555.00 | $(1/2^+)$ | 0.0 | $3/2^+$ | | | |
| 559.7 *3* | 1.2 *3* | 562.90 | $(3/2^+,5/2^+)$ | 3.03 | $5/2^+$ | | | |
| 562.9 *1* | 40 *3* | 562.90 | $(3/2^+,5/2^+)$ | 0.0 | $3/2^+$ | | | |
| x583.6 *5* | 0.13 *4* | | | | | | | |
| 589.1 *1* | 0.58 *12* | 591.98 | $(5/2)^+$ | 3.03 | $5/2^+$ | | | |
| 592.1 *1* | 0.60 *13* | 591.98 | $(5/2)^+$ | 0.0 | $3/2^+$ | | | |
| x600.7 *2* | 0.24 *7* | | | | | | | |
| x607.6 *3* | 0.18 *6* | | | | | | | |
| x625.0 *5* | 0.47 *15* | | | | | | | |
| 638.6 *3* | 1.6 *2* | 774.87 | $(3/2^+,5/2^+)$ | 136.079 | $5/2^+$ | | | |
| x652.3 *3* | 0.16 *5* | | | | | | | |

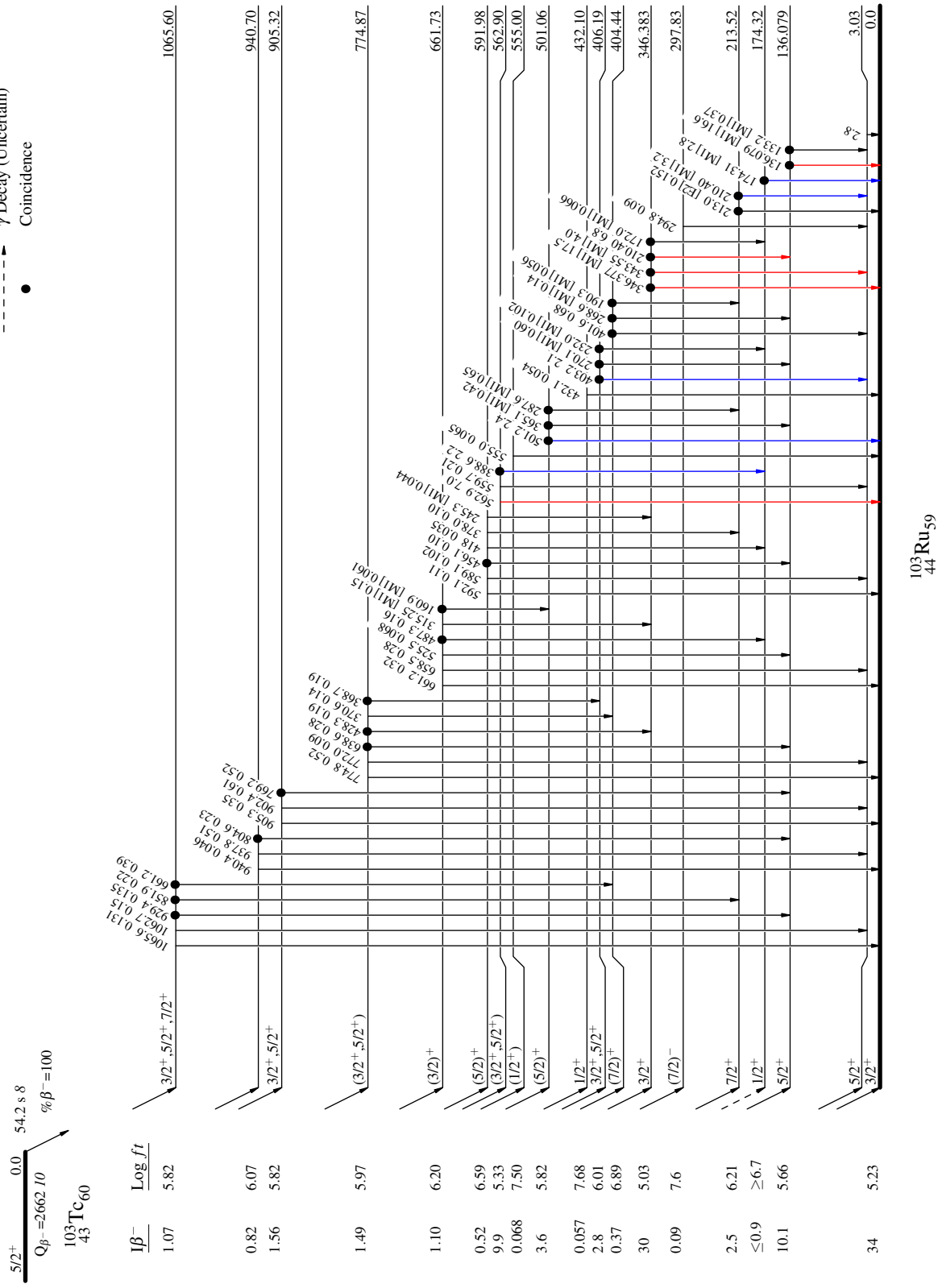
Continued on next page (footnotes at end of table)

## $^{103}$Tc $\beta^-$ decay 1979Ni05 (continued)

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

| $E_\gamma$ | $I_\gamma$[#] | $E_i$(level) | $J_i^\pi$ | $E_f$ | $J_f^\pi$ |
|---|---|---|---|---|---|
| 658.5 *5* | 1.6 *4* | 661.73 | $(3/2)^+$ | 3.03 | $5/2^+$ |
| 661.2 | 1.8[†] *2* | 661.73 | $(3/2)^+$ | 0.0 | $3/2^+$ |
| 661.2 *1* | 2.2[†] *2* | 1065.60 | $3/2^+,5/2^+,7/2^+$ | 404.44 | $(7/2)^+$ |
| [x]741.4 *3* | 0.26 *8* | | | | |
| 769.2 *2* | 3.0 *2* | 905.32 | $3/2^+,5/2^+$ | 136.079 | $5/2^+$ |
| 772.0 *3* | 0.5 *3* | 774.87 | $(3/2^+,5/2^+)$ | 3.03 | $5/2^+$ |
| 774.8 *2* | 3.0 *2* | 774.87 | $(3/2^+,5/2^+)$ | 0.0 | $3/2^+$ |
| [x]785.0 *5* | 0.26 *8* | | | | |
| 804.6 *2* | 1.3 *2* | 940.70 | | 136.079 | $5/2^+$ |
| [x]830.7 *5* | 0.23 *7* | | | | |
| 851.9 *2* | 1.24 *20* | 1065.60 | $3/2^+,5/2^+,7/2^+$ | 213.52 | $7/2^+$ |
| 902.4 *3* | 3.5 *3* | 905.32 | $3/2^+,5/2^+$ | 3.03 | $5/2^+$ |
| 905.3 *3* | 2.0 *3* | 905.32 | $3/2^+,5/2^+$ | 0.0 | $3/2^+$ |
| 929.4 *2* | 0.77 *10* | 1065.60 | $3/2^+,5/2^+,7/2^+$ | 136.079 | $5/2^+$ |
| 937.8 *2* | 2.9 *3* | 940.70 | | 3.03 | $5/2^+$ |
| 940.4 *3* | 0.26 *9* | 940.70 | | 0.0 | $3/2^+$ |
| [x]952.0 *3* | 0.16 *5* | | | | |
| [x]955.2 *5* | 0.58 *15* | | | | |
| [x]1042.7 *5* | 0.41 *12* | | | | |
| 1062.7 *2* | 0.83 *13* | 1065.60 | $3/2^+,5/2^+,7/2^+$ | 3.03 | $5/2^+$ |
| 1065.6 *2* | 0.75 *11* | 1065.60 | $3/2^+,5/2^+,7/2^+$ | 0.0 | $3/2^+$ |
| [x]1181.0 *10* | 0.18 *6* | | | | |
| [x]1233.3 *10* | 0.33 *10* | | | | |
| [x]1312.0 *10* | 0.13 *4* | | | | |
| [x]1315.0 *10* | 0.09 *3* | | | | |

[†] Intensity of the members of a doublet obtained from coincidence spectra.
[‡] Calculated assuming M1 multipolarity, unless noted otherwise. Only $\alpha'$s>1% are given and this is done only with the goal of calculating approximate logft values. These multipolarities are not adopted in the Adopted Levels, Gammas data set.
[#] For absolute intensity per 100 decays, multiply by 0.175 *19*.
[x] $\gamma$ ray not placed in level scheme.


$^{103}$Tc $\beta^-$ decay 1979Ni05
Decay Scheme
Intensities: $I_\gamma$ per 100 parent decays
Legend
$I_\gamma < 2\% \times I_\gamma^{max}$
$I_\gamma < 10\% \times I_\gamma^{max}$
$I_\gamma > 10\% \times I_\gamma^{max}$
$\gamma$ Decay (Uncertain)
Coincidence
$^{103}_{43}Tc_{60}$
$Q_{\beta^-}$=2662 10
5/2+
0.0
54.2 s 8
%$\beta^-$=100
$^{103}_{44}Ru_{59}$
Iβ− Log ft
1.07 5.82
0.82 6.07
1.56 5.82
1.49 5.97
1.10 6.20
0.52 6.59
9.9 5.33
0.068 7.50
3.6 5.82
0.057 7.68
2.8 6.01
0.37 6.89
30 5.03
0.09 7.6
2.5 6.21
≤0.9 ≥6.7
10.1 5.66
34 5.23
3/2+,5/2+,7/2+
3/2+,5/2+
(3/2+,5/2+)
(3/2)+
(5/2)+
(3/2+,5/2+)
(1/2+)
(5/2)+
1/2+
3/2+,5/2+
(7/2)+
3/2+
(7/2)−
7/2+
1/2+
5/2+
5/2+
3/2+
1065.60
940.70
905.32
774.87
661.73
591.98
562.90
555.00
501.06
432.10
406.19
404.44
346.383
297.83
213.52
174.32
136.079
3.03
0.0
1065.6 0.131
1063.7 0.15
929.4 0.15
851.9 0.22
661.2 0.39
940.4 0.046
937.8 0.51
904.6 0.23
905.3 0.35
905.4 0.61
769.2 0.52
774.8 0.52
772.0 0.09
658.8 0.28
428.3 0.19
370.6 0.14
368.7 0.19
661.2 0.32
658.5 0.38
525.5 0.068
487.3 0.16
315.25 0.16
160.9 [M1] 0.061
592.1 0.11
589.1 0.102
456.1 0.102
418 0.035
378.0 0.10
245.3 0.10
562.9 7.0
559.7 0.21
388.6 2.2
555.0 0.065
501.2 2.4
365.1 2.4
287.6 [M1] 0.42
432.1 0.054
403.2 2.1
270.1 2.1
232.0 [M1] 0.60
401.6 0.68
268.6 [M1] 0.102
190.3 [M1] 0.056
346.37 [M1] 1.75
343.35 [M1] 4.0
210.40 6.8
172.0 [M1] 4.0
294.8 0.09
213.0 [E2] 0.152
210.40 [M1] 3.2
174.31 [M1] 2.8
136.079 [M1] 16.6
133.2 [M1] 0.37
2.8