103 Mo β^- decay **1980**TiZX

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

Parent: ¹⁰³Mo: E=0.0; $J^{\pi}=(3/2^+)$; $T_{1/2}=67.5 \text{ s } 15$; $Q(\beta^-)=3750 \ 60$; $\%\beta^-$ decay=100.0

Assignment: mass separation of fission fragments and chemical separation of molybdenum produced in 235 U(n,F). Measured: E γ , I γ , $\gamma\gamma$, T_{1/2}. Deduced: 103 Tc levels (1980TiZX).

1987Gr18: on-line mass separator LOHENGRIN, measured $\gamma\beta$, Q(β^-), E β . Others: 1977Ki14, 1977Ti02, 1976KaYO.

¹⁰³Tc Levels

From delayed $\gamma\gamma$ -coin results, states with T_{1/2}>500 ns are not observed.

E(level)	$J^{\pi \dagger}$	E(level)	$J^{\pi \dagger}$	E(level)	$J^{\pi \dagger}$
0.0	5/2+	469.83 13	$(3/2^+, 5/2^+)$	887.2 4	
45.80 <i>13</i>	7/2+	487.1 <i>4</i>	1/2-	1085.95 16	
83.38 16	3/2-	519.22 20	3/2-	1219.85 20	$(5/2^+, 7/2, 9/2^+)$
138.9 5	9/2+	620.77 17		1494.44 22	
178.3 8	$5/2^{-}$	686.6 7		1621.1 6	
259.0 6	5/2-	687.62 15	$(3/2^+, 5/2, 7/2)$		
383.2 <i>3</i>	$(3/2, 5/2, 7/2^{-})$	691.59 <i>16</i>	$(1/2^+, 3/2, 5/2^-)$		

[†] From Adopted Levels.

β^{-} radiations

Levels for which a net β -feeding is found from I(γ +ce) imbalances are indicated by arrows in the drawing.

E(decay)	E(level)	Comments
$(2.13 \times 10^3 6)$	1621.1	
$(2.26 \times 10^3 6)$	1494.44	
2.52×10 ³ 12	1219.85	E(decay): from 1987Gr18, no branching given.
2.60×10 ³ 10	1085.95	E(decay): from 1987Gr18, no branching given.
$(2.86 \times 10^3 6)$	887.2	
3.07×10 ³ 12	691.59	E(decay): from 1987Gr18, no branching given.
$(3.06 \times 10^3 6)$	687.62	
$(3.06 \times 10^3 6)$	686.6	
$(3.13 \times 10^3 6)$	620.77	
3.26×10 ³ 15	519.22	E(decay): from 1987Gr18, no branching given.
3.31×10 ³ 12	487.1	E(decay): from 1987Gr18, no branching given.
3.30×10 ³ 12	469.83	E(decay): from 1987Gr18, no branching given.
$(3.37 \times 10^3 6)$	383.2	
$(3.49 \times 10^{3}^{\dagger} 6)$	259.0	
$(3.57 \times 10^{3}^{\dagger} 6)$	178.3	
$(3.67 \times 10^3 6)$	83.38	
$(3.70 \times 10^3 6)$	45.80	E(decay): $(3/2^+)$ to $(7/2^+)$, so no β feeding expected.
$(3.75 \times 10^3 ^{\dagger} 6)$	0.0	

 † Existence of this branch is questionable.

103 Mo β^- decay **1980TiZX** (continued)

$\gamma(^{103}\text{Tc})$

I γ normalization: from the low intensity of the A=103 γ 's compared to transitions in A=104, a large b⁻ feeding to the ¹⁰³Tc g.s. can be expected (1980TiZX); however, the feeding is not known, so no normalization can be obtained.

45.8 282 1745.80 $7/2^+$ 0.0 $5/2^+$ 83.4 2145 2283.38 $3/2^-$ 0.0 $5/2^+$ 93 [†] 115 [#] 5138.9 $9/2^+$ 45.80 $7/2^+$ 95 [†] 116 [#] 5178.3 $5/2^-$ 83.38 $3/2^-$ 150.8 516.1 18620.77469.83 $(3/2^+,5/2^+)$ 172 113 4691.59 $(1/2^+,3/2,5/2^-)$ 519.22 $3/2^-$ 200.5 55.8 13687.62 $(3/2^+,5/2,7/2)$ 487.1 $1/2^-$ 204.5 515.0 18691.59 $(1/2^+,3/2,5/2^-)$ 487.1 $1/2^-$ 204.5 515.0 18691.59 $(1/2^+,3/2,5/2^-)$ 487.1 $1/2^-$ 205 [†] 13.2 [#] 15383.2 $(3/2,5/2,7/2^-)$ 178.3 $5/2^-$ 217.8 222.0 16687.62 $(3/2^+,5/2,7)^-$ 83.38 $3/2^-$ 299.8 513.5 15383.2 $(3/2,5/2,7/2^-)$ 83.38 $3/2^-$ 30.9 53.7 4469.83 $(3/2^+,5/2^+)$ 138.9 $9/2^+$ 330.9 53.7 4469.83 $(3/2^+,5/2^+)$ 138.9 $9/2^+$ 447.3 59.7 14887.2469.83 $(3/2^+,5/2^+)^-$ 404 132 11487.1 $1/2^-$ 83.38 $3/2^-$ 449.8 222.1 16469.83 $(3/2^+,5/2^+)^-$ 0.0 $5/2^+$ 436 [†] 1 $\leq 1^{#}$ 519.22 $3/2^-$ 0.0 $5/2^+$ 449.8 222.1 16469.83 $(3/2^+,5/2^+)^-$ 0.0 $5/2^+$ 459.222.1 16 </th <th>Eγ</th> <th>Iγ</th> <th>E_i(level)</th> <th>J_i^{π}</th> <th>E_f</th> <th>J_f^{π}</th>	Eγ	Iγ	E_i (level)	J_i^{π}	E_f	J_f^{π}
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	45.8 2	82 17	45.80	7/2+	0.0	5/2+
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	83.4 2	145 22	83.38	3/2-	0.0	5/2+
9511665178.3 $5/2^-$ 83.38 $3/2^-$ 150.8516.118620.77469.83 $(3/2^+, 5/2^+)$ 1721134691.59 $(1/2^+, 3/2, 5/2^-)$ 519.22 $3/2^-$ 200.555.813687.62 $(3/2^+, 5/2, 7/2)$ 487.1 $1/2^-$ 204.5515.018691.59 $(1/2^+, 3/2, 5/2^-)$ 487.1 $1/2^-$ 2051 $3.2^\#$ 15383.2 $(3/2^+, 5/2, 7/2)$ 469.83 $(3/2^+, 5/2^+)$ 2051 $5.1.5$ 259.0 $5/2^-$ 0.0 $5/2^+$ 299.8513.515383.2 $(3/2^+, 5/2, 7/2^-)$ 83.38 $3/2^-$ 308.555.64691.59 $(1/2^+, 3/2, 5/2^-)$ 383.2 $(3/2, 5/2, 7/2^-)$ 330.953.74469.83 $(3/2^+, 5/2^+)$ 188.9 $9/2^+$ 383.251.77383.2 $(3/2^+, 5/2^+)$ 188.9 $9/2^+$ 4043211487.1 $1/2^-$ 83.38 $3/2^-$ 4043211487.1 $1/2^-$ 83.38 $3/2^-$ 417.359.714887.2469.83 $(3/2^+, 5/2^+)$ 423.91047100469.83 $(3/2^+, 5/2^+)$ 45.80 $7/2^+$ 43612.25487.1 $1/2^-$ 0.0 $5/2^+$ 447.56.98620.7745.80 $7/2^+$ 459.8	93 [†] 1	15 [#] 5	138.9	9/2+	45.80	7/2+
150.8 516.1 18620.77469.83 $(3/2^+, 5/2^+)$ 172 113 4691.59 $(1/2^+, 3/2, 5/2^-)$ 519.22 $3/2^-$ 176 123 6259.0 $5/2^-$ 83.38 $3/2^-$ 200.5 55.8 13687.62 $(3/2^+, 5/2, 7/2)$ 487.1 $1/2^-$ 204.5 515.0 1/8691.59 $(1/2^+, 3/2, 5/2^-)$ 487.1 $1/2^-$ 205 t^+ 3.2 t^+ 15383.2 $(3/2, 5/2, 7/2^-)$ 487.1 $1/2^-$ 205 t^+ 2.0 16687.62 $(3/2^+, 5/2, 7/2)$ 469.83 $(3/2^+, 5/2^+)$ 259 15.1 5259.0 $5/2^-$ 0.0 $5/2^+$ 299.8 513.5 1/5383.2 $(3/2, 5/2, 7/2^-)$ 83.38 $3/2^-$ 308.5 55.6 4691.59 $(1/2^+, 3/2, 5/2^-)$ 383.2 $(3/2, 5/2, 7/2^-)$ 330.9 53.7 4469.83 $(3/2^+, 5/2^+)$ 13.89 $9/2^+$ 404 132 11487.1 $1/2^-$ 83.38 $3/2^-$ 417.3 59.7 1/4887.2469.83 $(3/2^+, 5/2^+)$ 45.80429 10.5 2687.62 $(3/2^+, 5/2, 7/2)$ 259.0 $5/2^-$ 436 t^+ 1 $\leq 1t^+$ 519.22 $3/2^-$ 83.38 $3/2^-$ 469.8222.1 1/6469.83 $(3/2^+, 5/2^+)$ 0.0 $5/2^+$ 49.8 222.1 1/6469.83 $(3/2^+, 5/2^+)$ 0.0 $5/2^+$ 519.2 t^+ 240.3519.22 $3/2^-$ 0.0 $5/2^+$ 519.2 t^+ 240.3519.22 $3/2^-$	95 [†] 1	16 [#] 5	178.3	5/2-	83.38	3/2-
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	150.8 5	16.1 18	620.77	0/2	469.83	$(3/2^+, 5/2^+)$
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	172 <i>I</i>	13 4	691.59	$(1/2^+, 3/2, 5/2^-)$	519.22	3/2-
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	176 <i>1</i>	23 6	259.0	5/2-	83.38	3/2-
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	200.5 5	5.8 13	687.62	$(3/2^+, 5/2, 7/2)$	487.1	1/2-
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	204.5 5	15.0 18	691.59	$(1/2^+, 3/2, 5/2^-)$	487.1	$1/2^{-}$
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	205 [†] 1	3.2 [#] 15	383.2	$(3/2, 5/2, 7/2^{-})$	178.3	5/2-
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	217.8 2	22.0 16	687.62	$(3/2^+, 5/2, 7/2)$	469.83	$(3/2^+, 5/2^+)$
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	259 1	5.1 5	259.0	5/2-	0.0	5/2+
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	299.8 5	13.5 15	383.2	$(3/2, 5/2, 7/2^{-})$	83.38	3/2-
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	308.5 5	5.6 4	691.59	$(1/2^+, 3/2, 5/2^-)$	383.2	$(3/2, 5/2, 7/2^{-})$
383.25 1.77 383.2 $(3/2,5/2,7/2^-)$ 0.0 $5/2^+$ $404 I$ $32 II$ 487.1 $1/2^ 83.38$ $3/2^ 417.35$ $9.7 I4$ 887.2 469.83 $(3/2^+,5/2^+)$ $423.910^{\ddagger} I7$ 100 469.83 $(3/2^+,5/2^+)$ 45.80 $429 I$ $0.5 2$ 687.62 $(3/2^+,5/2,7/2)$ 259.0 $5/2^ 436^{\dagger} I$ $\leq 1^{\ddagger}$ 519.22 $3/2^ 83.38$ $3/2^ 469.82$ $22.1 I6$ 469.83 $(3/2^+,5/2^+)$ 0.0 $5/2^+$ $487 I$ 2.25 487.1 $1/2^ 0.0$ $5/2^+$ $519.2^{\dagger} 2$ 40.3 519.22 $3/2^ 0.0$ $5/2^+$ $519.2^{\dagger} 2$ 32.124 691.59 $(1/2^+,3/2,5/2$	330.9 5	3.7 4	469.83	$(3/2^+, 5/2^+)$	138.9	9/2+
$404 I$ $32 II$ 487.1 $1/2^ 83.38 3/2^ 417.3 5$ $9.7 I4$ 887.2 $469.83 (3/2^+,5/2^+)$ $423.910^{\ddagger} I7$ 100 $469.83 (3/2^+,5/2^+)$ $45.80 7/2^+$ $429 I$ $0.5 2$ $687.62 (3/2^+,5/2,7/2)$ $259.0 5/2^ 436^{\dagger} I$ $\leq 1^{\ddagger}$ $519.22 3/2^ 83.38 3/2^ 469.8 2$ $22.1 I6$ $469.83 (3/2^+,5/2^+)$ $0.0 5/2^+$ $487 I$ $2.2 5 487.1 1/2^ 0.0 5/2^+$ $519.2^{\dagger} 2$ $40.3 519.22 3/2^ 0.0 5/2^+$ $547.7 5$ $8.3 7 686.6 138.9 9/2^+$ $574.8 5 6.9 8 620.77 45.80 7/2^+$ $599.0 5 18.8 I6 1219.85 (5/2^+,7/2,9/2^+) 620.77 608.2 2 32.1 24 691.59 (1/2^+,3/2,5/2^-) 83.38 3/2^ 616 I$ $2.2 4 1085.95 469.83 (3/2^+,5/2^+)$ $620.8 2 2 32.2 I7 620.77 0.0 5/2^+$ $641.8 5 9.5 II 687.62 (3/2^+,5/2,7/2) 45.80 7/2^+$ $687.62 45 4 687.62 (3/2^+,5/2,7/2) 0.0 5/2^+$ $691.6 2 20.7 I6 691.59 (1/2^+,3/2,5/2^-) 0.0 5/2^+$ $750.0 2 26.2 I8 1219.85 (5/2^+,7/2,9/2^+) 469.83 (3/2^+,5/2^+)$ $887.3 5 5.1 6 887.2 0.0 5/2^+$ $1040.2 2 33 5 1085.95$	383.2 5	1.7 7	383.2	$(3/2, 5/2, 7/2^{-})$	0.0	5/2+
417.3 59.7 14887.2469.83 $(3/2^+, 5/2^+)$ 423.910 [‡] 17100469.83 $(3/2^+, 5/2^+)$ 45.80 $7/2^+$ 429 10.5 2687.62 $(3/2^+, 5/2, 7/2)$ 259.0 $5/2^-$ 436 [†] 1 $\leq 1^{\ddagger}$ 519.22 $3/2^-$ 83.38 $3/2^-$ 469.8 222.1 16469.83 $(3/2^+, 5/2^+)$ 0.0 $5/2^+$ 487 12.2 5487.1 $1/2^-$ 0.0 $5/2^+$ 519.2 [†] 240 3519.22 $3/2^-$ 0.0 $5/2^+$ 547.7 58.3 7686.6138.9 $9/2^+$ 574.8 56.9 8620.7745.80 $7/2^+$ 599.0 518.8 161219.85 $(5/2^+, 7/2, 9/2^+)$ 620.77608.2 232.1 24691.59 $(1/2^+, 3/2, 5/2^-)$ 83.38616 12.2 41085.95469.83 $(3/2^+, 5/2^+)$ 620.8 223.2 17620.770.0 $5/2^+$ 641.8 59.5 11687.62 $(3/2^+, 5/2, 7/2)$ 45.8067.6 245.4687.62 $(3/2^+, 5/2, 7/2)$ 0.0 $5/2^+$ 691.6 220.7 16691.59 $(1/2^+, 3/2, 5/2^-)$ 0.0 $5/2^+$ 750.0 226.2 181219.85 $(5/2^+, 7/2, 9/2^+)$ 469.83 $(3/2^+, 5/2^+)$ 887.3 55.1 6887.20.0 $5/2^+$ 1040.2 233 51085.9545.80 $7/2^+$	404 1	32 11	487.1	1/2-	83.38	3/2-
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	417.3 5	9.7 14	887.2		469.83	$(3/2^+, 5/2^+)$
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	423.910 [‡] <i>17</i>	100	469.83	$(3/2^+, 5/2^+)$	45.80	7/2+
$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	429 1	0.5 2	687.62	$(3/2^+, 5/2, 7/2)$	259.0	5/2-
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	436 1	≤1 [#]	519.22	3/2-	83.38	3/2-
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	469.8 2	22.1 16	469.83	$(3/2^+, 5/2^+)$	0.0	5/2+
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	487 <i>1</i>	2.2 5	487.1	1/2-	0.0	5/2+
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	519.2 [†] 2	40 3	519.22	3/2-	0.0	5/2+
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	547.7 5	8.3 7	686.6		138.9	9/2+
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	574.8 <i>5</i>	6.9 8	620.77		45.80	7/2+
$ \begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	599.0 5	18.8 <i>16</i>	1219.85	$(5/2^+, 7/2, 9/2^+)$	620.77	
616 I 2.2 4 1085.95469.83 $(3/2^+, 5/2^+)$ 620.8 2 23.2 $I7$ 620.770.0 $5/2^+$ 641.8 5 9.5 II 687.62 $(3/2^+, 5/2, 7/2)$ 45.80 $7/2^+$ 687.6 2 45 4 687.62 $(3/2^+, 5/2, 7/2)$ 0.0 $5/2^+$ 691.6 2 20.7 $I6$ 691.59 $(1/2^+, 3/2, 5/2^-)$ 0.0 $5/2^+$ 750.0 2 26.2 $I8$ 1219.85 $(5/2^+, 7/2, 9/2^+)$ 469.83 $(3/2^+, 5/2^+)$ 887.3 5 5.1 6 887.20.0 $5/2^+$ 1040.2 2 33 5 1085.9545.80 $7/2^+$	608.2 2	32.1 24	691.59	$(1/2^+, 3/2, 5/2^-)$	83.38	3/2-
	616 <i>1</i>	2.2 4	1085.95		469.83	$(3/2^+, 5/2^+)$
$ \begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	620.8 2	23.2 17	620.77		0.0	5/2+
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	641.8 5	9.5 11	687.62	$(3/2^+, 5/2, 7/2)$	45.80	7/2+
691.62 20.776 691.59 $(1/2^+, 3/2, 5/2^-)$ $0.0^- 5/2^+$ 750.02 26.278 1219.85 $(5/2^+, 7/2, 9/2^+)$ 469.83 $(3/2^+, 5/2^+)$ 887.35 5.16 887.2 $0.0^- 5/2^+$ 1040.22 335 1085.95 $45.80^- 7/2^+$	687.6 2	45 4	687.62	$(3/2^+, 5/2, 7/2)$	0.0	5/2+
750.02 $26.2.78$ 1219.85 $(5/2^+, 7/2, 9/2^+)$ 469.85 $(5/2^+, 5/2^+)$ 887.35 $5.1.6$ 887.2 $0.0.5/2^+$ 1040.22 33.5 1085.95 $45.80.7/2^+$	691.6 Z	20.7 10	691.59	$(1/2^+, 3/2, 5/2^-)$	0.0	$5/2^{+}$
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	/50.0 2	26.2 18	1219.85	$(5/2^{\circ}, 1/2, 9/2^{\circ})$	469.83	$(3/2^+, 5/2^+)$
1040.2.2 55.5 1085.95 45.80 7/2	007.5 5	3.10	007.2		45.80	3/2* 7/2+
	1040.2 2	-# 1	1063.93		45.60	1/2
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1081 /	5" 1	1219.85	$(5/2^+, 7/2, 9/2^+)$	138.9	9/2
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1085.9 2	25 4	1085.95		0.0	$\frac{3}{2}$
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1131.3 3	12.1 I3 127 I5	1021.1	(5/2 + 7/2) 0/2 +)	409.83	$(3/2^{-}, 3/2^{+})$
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	11/4.2 3	67.8	1219.83	(3/2, 1/2, 9/2) (5/2+7/2, 0/2+)	43.80	1/2 5/2+
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1448 6 2	26 4 10	1217.0J 1202 24	(3/2, 7/2, 7/2)	45.80	$\frac{3}{2}}{7}$
1494.6 5 7.1 9 1494.44 0.0 5/2+	1494.6 5	7.1 9	1494.44		0.0	5/2+

 † Seen only in coin spectrum.

[‡] From 1979Bo26. [#] From γγ.



From

 $^{103}_{43}\mathrm{Tc}_{60}\text{--}3$