

$^{235}\text{U}(\text{d},\text{t}\gamma)$ 2013Ko37

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	S. Ota	NDS 207,351 (2026)	1-Dec-2023

2013Ko37: E=11 MeV. Target=3.5 mg/cm² at 99.7% purity. Measured E γ , I γ , (particle) γ -coin, $\gamma\gamma$ -coin using MINIBALL at the Cologne tandem accelerator, Germany. Deduced levels, J, π , B(E2) and B(E1) ratios. Discussed two-phonon $\gamma\gamma$ vibrations and particle-transfer strengths.

 ^{234}U Levels

E(level)&	J π^a	Comments
0.0 [†]	0 ⁺	
43.7 [†] 7	2 ⁺	
143.7 [†] 8	4 ⁺	
296.4 [†] 11	6 ⁺	
786.5 [‡] 8	1 ⁻	
849.5 [‡] 10	3 ⁻	
926.9 [@] 7	2 ⁺	B(E2)(926.7)/B(E2)(883.2)=0.74.
968.5 [@] 8	3 ⁺	B(E2)(924.7)/B(E2)(824.7)=2.12.
990.1 [#] 10	2 ⁻	
1023.8 [@] 9	4 ⁺	B(E2)(980.2)/B(E2)(880.3)=0.17.
1024.2 [#] 9	3 ⁻	
1070.1 [#] 10	4 ⁻	
1091.3 [@] 11	5 ⁺	
1126.6 11	2 ⁺	
1127.8 [#] 11	5 ⁻	B(E1)(984.2)/B(E1)(831.3)=0.16.
1165.4 9	3 ⁺	
1172.3 [@] 12	6 ⁺	
1473.3 12		
1496.0 11		
1554.7 9		
1693.1 11	5 ⁻	
1723.2 10	3 ⁻	
1750.1 15	6 ⁻	
1886.9 8	4 ⁺	B(E2)(959.9)/B(E2)(918.3)=0.34. B(E2)(959.9)/B(E2)(863.1)=0.49. B(E2)(918.3)/B(E2)(863.1)=1.5.
1960.0 7	3 ⁽⁺⁾	B(E2)(1032.5)/B(E2)(991.0)=1.9. B(E1)(935.5)/B(E1)(889.3)=3.5.
2043.7 14		

[†] Band(A): The g.s. band.

[‡] Band(B): Octupole band based on 1⁻.

[#] Band(C): Octupole band based on 2⁻.

[@] Band(D): γ band.

& From a least-square fit to E γ by evaluator.

^a As proposed by 2013Ko37.

$^{235}\text{U}(\text{d,t}\gamma)$ **2013Ko37 (continued)** $\gamma(^{234}\text{U})$

Several revised and new transition assignments are made by [2013Ko37](#) from detailed $\gamma\gamma$ -coin data.

E_γ	$E_i(\text{level})$	J_i^π	E_f	J_f^π	Comments
^x 130.8					
152.5	296.4	6 ⁺	143.7	4 ⁺	
197.2	1165.4	3 ⁺	968.5	3 ⁺	
^x 200.7					
236.7	1960.0	3 ⁽⁺⁾	1723.2	3 ⁻	
^x 272.3					
^x 313.4					
332.1	1886.9	4 ⁺	1554.7		E_γ : This γ was previously placed from a 2068.8 level by 1986Ar05 in ^{234}Pa β^- -decay. The new level assignment is based on $\gamma\gamma$ coincidence (see figure 2 of 2013Ko37).
369.2	1496.0		1126.6	2 ⁺	
^x 385.1					
^x 390.2					
^x 427.7					
^x 479.7					
520.7	1693.1	5 ⁻	1172.3	6 ⁺	
546.4	1473.3		926.9	2 ⁺	
^x 564.6					
569.2	1496.0		926.9	2 ⁺	E_γ : This γ was also previously placed from a 1537 level by 1986Ar05 in ^{234}Pa β^- -decay, which is not confirmed here. The new level assignment is based on $\gamma\gamma$ coincidence (see figure 2 of 2013Ko37). In table III of 2013Ko37 , initial level should be 1496.1 not 1554.5.
585.9	1554.7		968.5	3 ⁺	E_γ : This γ was previously placed from a 1927.5 level by 1986Ar05 in ^{234}Pa β^- -decay. The new level assignment is based on $\gamma\gamma$ coincidence (see figure 2 of 2013Ko37).
601.6	1693.1	5 ⁻	1091.3	5 ⁺	
^x 622.7					
627.8	1554.7		926.9	2 ⁺	E_γ : This γ was previously placed from a 1125.3 level by 1986Ar05 in ^{234}Pa β^- -decay. The new level assignment is based on $\gamma\gamma$ coincidence (see figure 2 of 2013Ko37).
^x 645.9					
^x 654.3					
658.8	1750.1	6 ⁻	1091.3	5 ⁺	
^x 664.6					
669.6	1693.1	5 ⁻	1023.8	4 ⁺	
^x 684.9					
^x 692.2					
699.1	1723.2	3 ⁻	1024.2	3 ⁻	
706.0	849.5	3 ⁻	143.7	4 ⁺	
^x 715.6					
721.2	1886.9	4 ⁺	1165.4	3 ⁺	
^x 727.8					
733.0	1723.2	3 ⁻	990.1	2 ⁻	
^x 738.3					
742.7	786.5	1 ⁻	43.7	2 ⁺	
^x 760.2					
786.6	786.5	1 ⁻	0.0	0 ⁺	
^x 795.0					
805.7	849.5	3 ⁻	43.7	2 ⁺	
^x 818.4					
824.7	968.5	3 ⁺	143.7	4 ⁺	

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$^{235}\text{U}(\text{d,t}\gamma)$ **2013Ko37 (continued)** $\gamma(^{234}\text{U})$ (continued)

E_γ	$E_i(\text{level})$	J^π_i	E_f	J^π_f	Comments
831.3	1127.8	5 ⁻	296.4	6 ⁺	
^x 843.4					
863.1	1886.9	4 ⁺	1023.8	4 ⁺	E_γ : This γ was previously placed from a 1811.6 level by 1986Ar05 in ^{234}Pa β^- -decay. The new level assignment is based on γ - γ coincidence (see figure 2 of 2013Ko37).
875.9	1172.3	6 ⁺	296.4	6 ⁺	
880.3 [†]	1023.8	4 ⁺	143.7	4 ⁺	
880.3 [†]	1024.2	3 ⁻	143.7	4 ⁺	
883.2	926.9	2 ⁺	43.7	2 ⁺	
889.3	1960.0	3 ⁽⁺⁾	1070.1	4 ⁻	
918.3	1886.9	4 ⁺	968.5	3 ⁺	E_γ : This γ was previously placed from a 1214.7 level by 1986Ar05 in ^{234}Pa β^- -decay. The new level assignment is based on γ - γ coincidence (see figure 2 of 2013Ko37).
924.7	968.5	3 ⁺	43.7	2 ⁺	
925.9	1070.1	4 ⁻	143.7	4 ⁺	
926.7	926.9	2 ⁺	0.0	0 ⁺	
935.5	1960.0	3 ⁽⁺⁾	1024.2	3 ⁻	
946.2	990.1	2 ⁻	43.7	2 ⁺	
947.5	1091.3	5 ⁺	143.7	4 ⁺	
959.9	1886.9	4 ⁺	926.9	2 ⁺	E_γ : This γ was previously placed from a 1809.7 or 1811.6 level by 1986Ar05 in ^{234}Pa β^- -decay. The new level assignment is based on γ - γ coincidence (see figure 2 of 2013Ko37).
^x 965.4					
980.2	1023.8	4 ⁺	43.7	2 ⁺	E_γ : This γ was also previously placed from 1023.8, 3 ⁻ (doublet) level by 1986Ar05 in ^{234}Pa β^- -decay. The new level assignment is based on γ - γ coincidence (see figure 2 of 2013Ko37).
984.2	1127.8	5 ⁻	143.7	4 ⁺	
991.0	1960.0	3 ⁽⁺⁾	968.5	3 ⁺	
1032.5	1960.0	3 ⁽⁺⁾	926.9	2 ⁺	E_γ : This γ was previously placed from a 2101.4 level by 1986Ar05 in ^{234}Pa β^- -decay. The new level assignment is based on γ - γ coincidence (see figure 2 of 2013Ko37).
1053.6	2043.7		990.1	2 ⁻	
1082.7	1126.6	2 ⁺	43.7	2 ⁺	
1121.0	1165.4	3 ⁺	43.7	2 ⁺	
^x 1126.0					
^x 1151.0					
^x 1161.7					
^x 1171.2					
^x 1218.6					
^x 1515.8					
^x 1668.6					
^x 1695.1					
^x 1699.1					
1743.7	1886.9	4 ⁺	143.7	4 ⁺	
^x 1771.4					
^x 1778.7					
^x 1791					
^x 1796.3					
^x 1807.2					
1816.7	1960.0	3 ⁽⁺⁾	143.7	4 ⁺	
^x 1851.2					
^x 1862.4					
^x 1895.5					
^x 1895.6					

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²³⁵U(d,tγ) 2013Ko37 (continued)						
$\gamma(^{234}\text{U})$ (continued)						
E $_{\gamma}$	E $_i$ (level)	J $^{\pi}_i$	E $_f$	J $^{\pi}_f$	Mult.	Comments
^x 1906.5						
1917.5	1960.0	3 ⁽⁺⁾	43.7	2 ⁺		
1960.1	1960.0	3 ⁽⁺⁾	0.0	0 ⁺	(M3)	E $_{\gamma}$: This γ is placed from a 2101.4 level by 1986Ar05 in ²³⁴ Pa β^- -decay. The new level assignment is based on γ - γ coincidence (see figure 2 of 2013Ko37), Unlikely M3 transition.
^x 2019.4						
^x 2111.0						
^x 2124.9						
^x 2131.5						
^x 2145.5						
^x 2168.6						
^x 2237.8						
^x 2283.7						
^x 2303.5						
^x 2315.7						

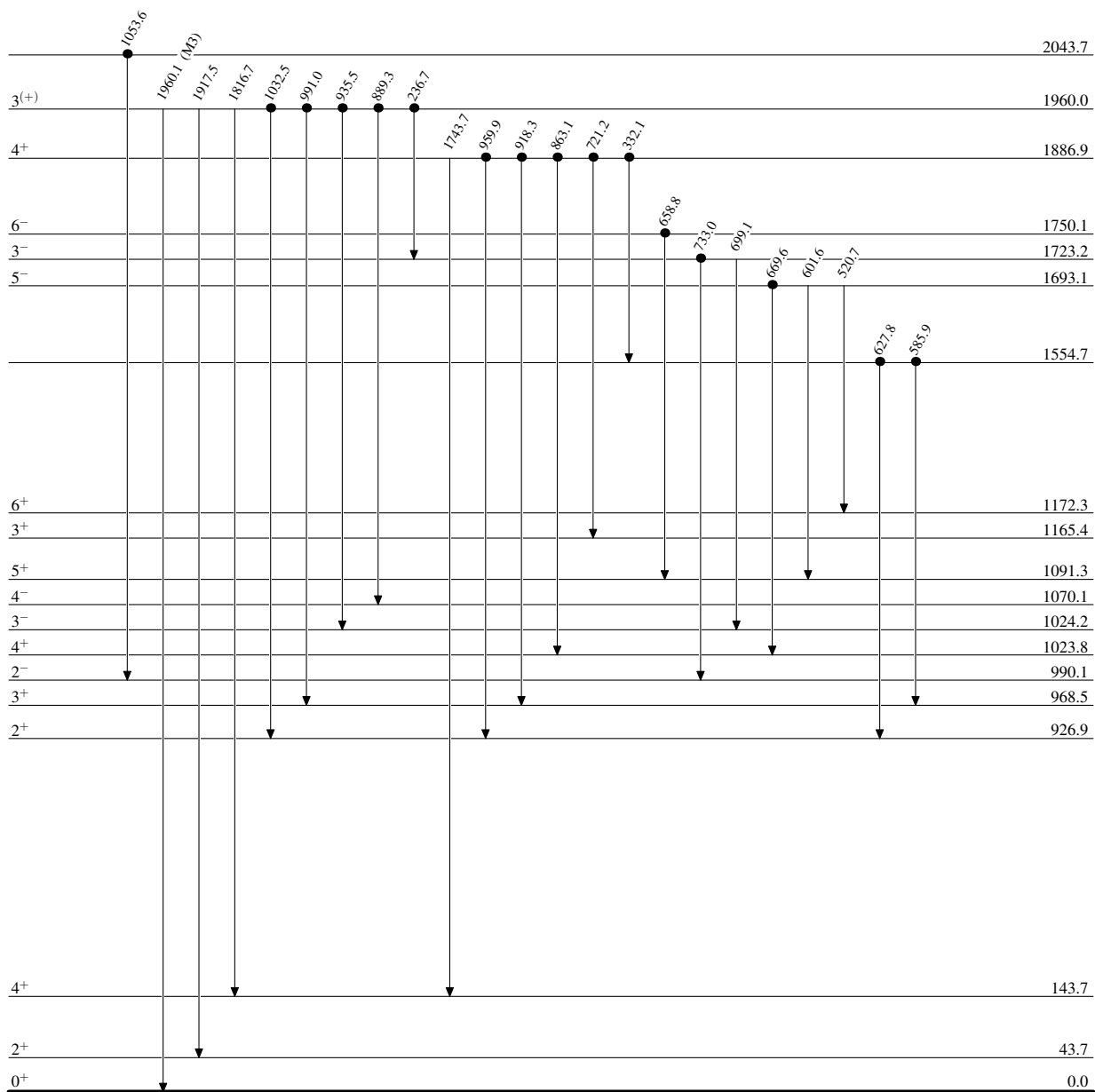
[†] Multiply placed.
^x γ ray not placed in level scheme.

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Legend

Level Scheme

● Coincidence

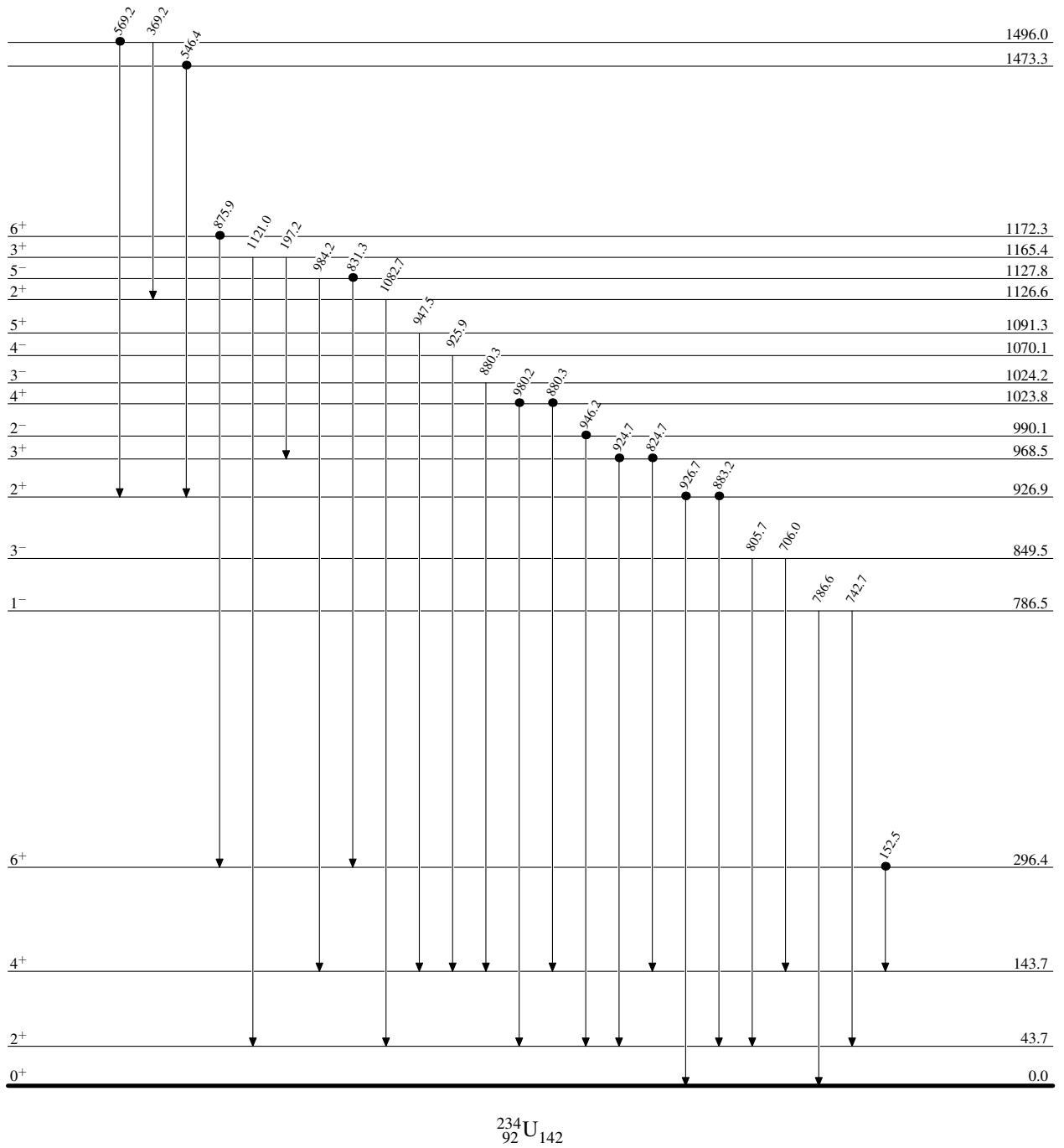
 $^{234}_{92}\text{U}_{142}$

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Legend

Level Scheme (continued)

● Coincidence

 $^{234}_{92}\text{U}_{142}$

