

¹⁹⁷Au(¹⁶O,3nγ):2 2011Ka37

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	M. Shamsuzzoha Basunia		NDS 121, 561 (2014)	31-Mar-2014

Target: Enriched (99.95%) ¹⁹⁷Au target (thickness 3.5 mg/cm²); Projectile: ¹⁶O beam, E=88, 94, 100 MeV. Gamma rays were detected by an array of 18 Compton-suppressed clover Ge detectors. Measured E_γ, I_γ, γ-γ coin, DCO ratio. Deduced excited levels, J, π, mean lifetime.

²¹⁰Fr Levels

E(level) [†]	J ^π [‡]	T _{1/2} [#]	Comments
0.0	6 ⁺		
820.1 @ 14	(8 ⁺)	10 ps +4-6	T _{1/2} : 9.6 ps +40-57 in 2011Ka37.
1342.7 @ 21	(9 ⁺)	0.35 ps 6	
1571.9 22	(10)		
1721.3 @ 22	(10)		
1973.6 @ 24	(11)		
2057.8 24	(11)		
2178.3 @ 25	(12)		
2288 3	(12)		
2884 4	(13)		
3081 4	(14)		

[†] From least-squares fit to γ-ray energies.

[‡] In 2011Ka37, assignments are made assuming J^π=7⁺ of first excited state at 208.3 keV and J^π=9⁺ at 524.7-keV level from 316γ (E2) transition (9⁺ to 7⁺).

[#] From Doppler Shift Attenuation Method and line-shape analysis. Systematic uncertainties up to 10% are not included in the quoted uncertainty.

@ Band(A): ΔJ=1 sequence based on 8⁺.

γ(²¹⁰Fr)

DCO values correspond to 90°, 123°, and 148° with gates on stretched quadrupole γ rays of 257 or 820 keV. Numerical values are from an e-mail (January 4, 2012) communication sent by S. Saha to M. Birch and B. Singh (McMaster), XUNDL compilers of this dataset.

E _γ [†]	I _γ	E _i (level)	J _i ^π	E _f	J _f ^π	Mult. [‡]	α [@]	Comments
(84)		2057.8	(11)	1973.6	(11)			E _γ : From level-energy difference.
109.5 20	1.7 5	2288	(12)	2178.3	(12)			
197.4 18	2.40 16	3081	(14)	2884	(13)	D		DCO≈0.5
204.7 18	3.78 22	2178.3	(12)	1973.6	(11)	D		DCO=0.52 15
229.4 19	4.7 7	1571.9	(10)	1342.7	(9 ⁺)	D		DCO=0.54 11
252.2 19	11.8 8	1973.6	(11)	1721.3	(10)	D		DCO=0.55 14
378.4 17	15.8 16	1721.3	(10)	1342.7	(9 ⁺)	D		DCO=0.58 10
401.4 22	2.9 6	1973.6	(11)	1571.9	(10)	D		DCO=0.47 13
486.4 20	6.3 6	2057.8	(11)	1571.9	(10)	D		DCO=0.53 7
522.6 [#] 21	49.6 21	1342.7	(9 ⁺)	820.1	(8 ⁺)	(M1+E2)	0.09 6	DCO=0.35 4 Mult.: ΔJ=1 from DCO.
596.4 24	6.9 9	2884	(13)	2288	(12)	D		DCO≈0.5
606.4 21	10.0 4	2178.3	(12)	1571.9	(10)	Q		DCO=1.1 4
715.6 21	6.7 5	2288	(12)	1571.9	(10)	Q		DCO=1.2 4

Continued on next page (footnotes at end of table)

$^{197}\text{Au}(^{16}\text{O},3n\gamma):2$ [2011Ka37](#) (continued) $\gamma(^{210}\text{Fr})$ (continued)

E_γ [†]	I_γ	$E_i(\text{level})$	J_i^π	E_f	J_f^π	Mult. [‡]	α [@]	Comments
751.8 26	28.1 16	1571.9	(10)	820.1	(8 ⁺)	Q		DCO=1.03 19
820.1 [#] 14	100	820.1	(8 ⁺)	0.0	6 ⁺	(E2)	0.0126	Mult.: Based on lifetime measurements and Weisskopf estimates.
901.2 25	8.5 12	1721.3	(10)	820.1	(8 ⁺)	Q		DCO=1.1 4

[†] Quoted uncertainties are FWHM measured in the experiment.

[‡] From DCO ratios, unless otherwise stated. Mult=D corresponds $\Delta J=1$ transition, except $\Delta J=0$ for 519.6 γ as indicated; mult=Q indicates $\Delta J=2$ transition. Note that for $\Delta J=1$ transitions, quadrupole admixture is also possible.

[#] Excitation function measured in [2011Ka37](#).

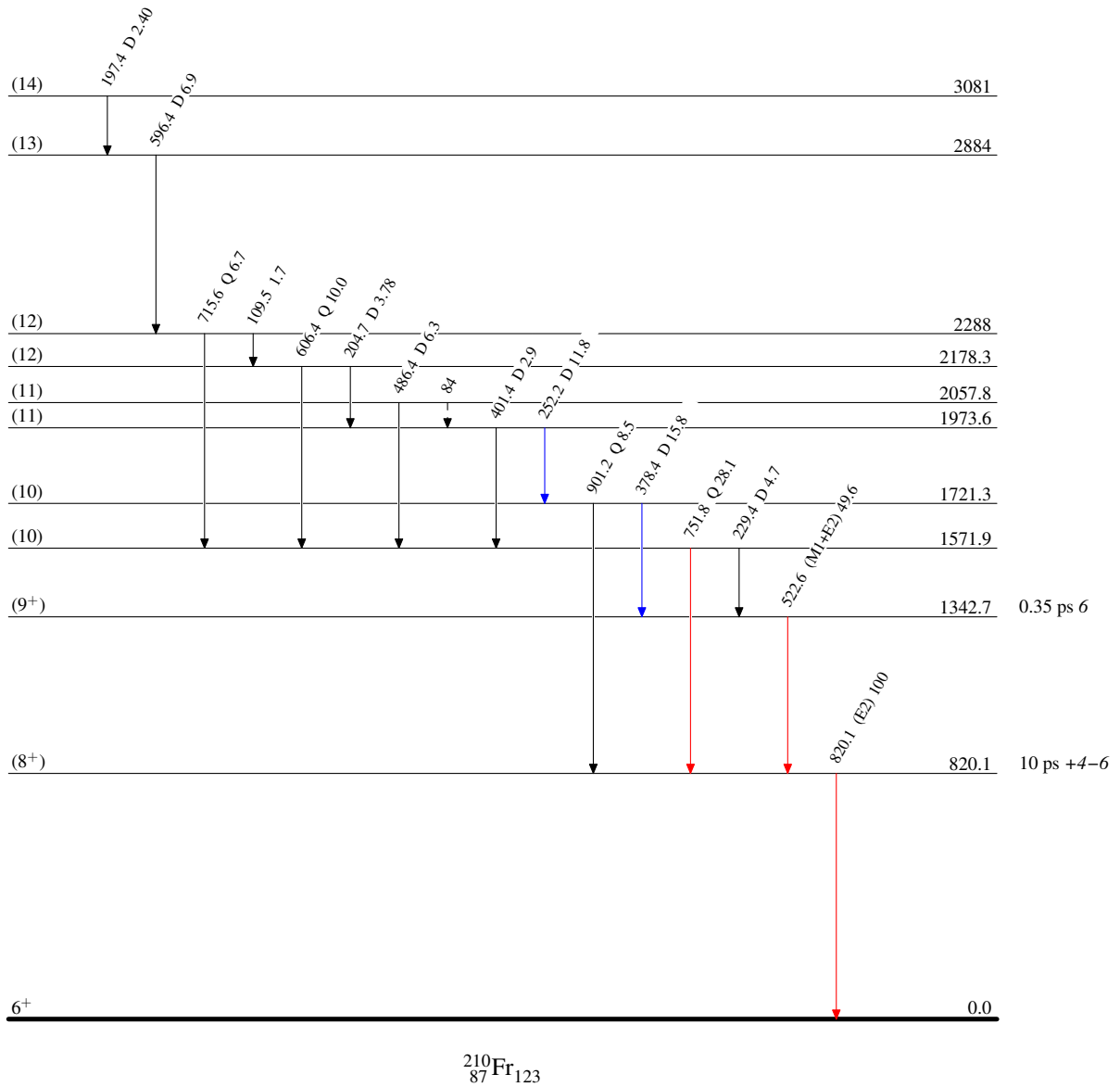
[@] Total theoretical internal conversion coefficients, calculated using the BrIcc code ([2008Ki07](#)) with Frozen orbital approximation based on γ -ray energies, assigned multipolarities, and mixing ratios, unless otherwise specified.

$^{197}\text{Au}(^{16}\text{O},3n\gamma):2$ 2011Ka37

Legend

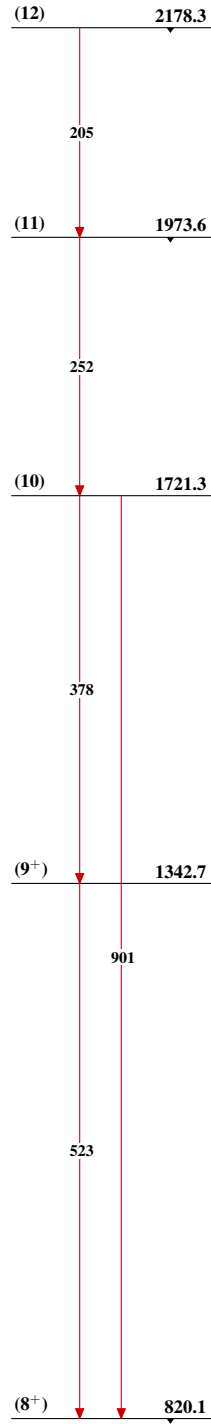
Level Scheme
 Intensities: Relative I_γ

- $I_\gamma < 2\% \times I_\gamma^{\max}$
- $I_\gamma < 10\% \times I_\gamma^{\max}$
- $I_\gamma > 10\% \times I_\gamma^{\max}$
- - - - - γ Decay (Uncertain)



$^{197}\text{Au}(^{16}\text{O},3n\gamma):2$ 2011Ka37

Band(A): $\Delta J=1$ sequence
based on 8^+

 $^{210}_{87}\text{Fr}_{123}$