^{197}Au(^{16}O,3nγ):1 2011Ka37

History

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

Target: Enriched (99.95%) ^{197}Au target (thickness 3.5 mg/cm^2); Projectile: ^{16}O beam, E=88, 94, 100 MeV. Gamma rays were detected by an array of 18 Compton-suppressed clover Ge detectors. Measured Eγ, Iγ, γ-γ coin, DCO ratio. Deduced excited levels, J, π, mean lifetime.

^{210}Fr Levels

E(level)[†]	J$^\pi$[‡]	T$_{1/2}$[#]	Comments
0.0	6$^+$		
208.3 *14*	(7$^+$)		
524.7 *25*	(9$^+$)		J$^\pi$: (4 to 8)$^+$ in Adopted Levels.
728 *4*	(9$^-$)	41 ns *2*	
985[@] *4*	(11)		
1505 *5*	(11)		
1686 *5*	(12)		
1730 *5*	(12)		
1802[@] *5*	(12)		
2073 *5*	(13)		
2407 *5*	(12)		
2523[@] *5*	(13)		
2609 *6*	(13)		
2852[@] *5*	(14)		
2951 *6*	(13)		
3358[@] *5*	(15)		
3442 *6*	(15)		
3647[@] *6*	(16)		
3765[@] *6*	(17)		
4252[@] *6*	(18)		
4538[@] *6*	(19)		
5291[@] *7*	(20)		

[†] From least-squares fit to γ-ray energies.
[‡] In 2011Ka37, assignments are made assuming J$^\pi$=7$^+$ of first excited state at 208.3 keV and J$^\pi$=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 11.

γ(^{210}Fr)

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 compilars of this dataset.

Continued on next page (footnotes at end of table)

^{197}Au(^{16}O,3nγ):1 2011Ka37 (continued)

$\gamma(^{210}Fr)$ (continued)

E_γ[†]	I_γ	E_i(level)	J_i^π	E_f	J_f^π	Mult.[‡]	α[@]	Comments
(72)		1802	(12)	1730	(12)			E_γ: From level-energy difference.
118.6 *18*	10.0 *10*	3765	(17)	3647	(16)	D		DCO=0.57 *14*
203.4 *23*	41.2 *25*	728	(9^-)	524.7	(9^+)	(E1)	0.085 *3*	DCO=0.98 *10* Mult.: ΔJ=0 transition from DCO.
208.3 *14*	7.4 *22*	208.3	(7^+)	0.0	6^+			
225.4 *17*	3.5 *5*	1730	(12)	1505	(11)	D		DCO=0.51 *12*
256.9[#] *19*	100	985	(11)	728	(9^-)	Q		Mult.: (E2) in 2011Ka37, based on analogy with transitions in ^{208}Fr. Evaluator assigned Q.
270.7 *15*	2.5 *5*	2073	(13)	1802	(12)	D		DCO≈0.5
285.9 *15*	7.90 *24*	4538	(19)	4252	(18)	D		DCO=0.55 *24*
289.3 *20*	15.5 *3*	3647	(16)	3358	(15)	D		DCO=0.49 *11*
316.4 *20*	15.1 *17*	524.7	(9^+)	208.3	(7^+)	(E2)	0.124 *3*	DCO=1.08 *21* Mult.: ΔJ=2 from DCO and from comparison with 632γ, 847γ transitions of (9^+ to 7^+) in ^{208}Fr, ^{212}Fr, respectively.
329.7 *19*	16.6 *17*	2852	(14)	2523	(13)	D		DCO=0.58 *20*
486.2 *19*	8.1 *8*	4252	(18)	3765	(17)	D		DCO=0.48 *17*
505.3 *17*	5.3 *7*	3358	(15)	2852	(14)	D		DCO=0.6 *3*
519.6 *20*	25.8 *13*	1505	(11)	985	(11)	D		DCO=1.13 *28* Mult.: ΔJ=0 transition.
544.2 *21*	7.6 *11*	2951	(13)	2407	(12)	D		DCO=0.55 *11*
589.2 *21*	5.2 *11*	3442	(15)	2852	(14)	D		DCO=0.48 *16*
700.5 *24*	13.4 *20*	1686	(12)	985	(11)	D		DCO=0.62 *12*
721.1 *22*	42.9 *9*	2523	(13)	1802	(12)	D		DCO=0.47 *13*
753.9 *17*	4.5 *9*	5291	(20)	4538	(19)	D		DCO≈0.5
792.6 *22*	17 *3*	2523	(13)	1730	(12)	D		DCO=0.50 *16*
816.8[#] *26*	50 *3*	1802	(12)	985	(11)	D		DCO=0.55 *10*
834.7 *23*	25.8 *21*	3358	(15)	2523	(13)	Q		DCO=1.13 *16*
902.4 *25*	10.6 *16*	2407	(12)	1505	(11)	D		DCO=0.6 *3*
923.4 *25*	5.2 *13*	2609	(13)	1686	(12)	D		DCO=0.53 *18*

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

[‡] From DCO ratios, unless otherwise stated. Mult=D corresponds ΔJ=1 transition, except ΔJ=0 for 519.6γ as indicated; mult=Q indicates ΔJ=2 transition. Note that for ΔJ=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.

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Level Scheme

Intensities: Relative I_γ

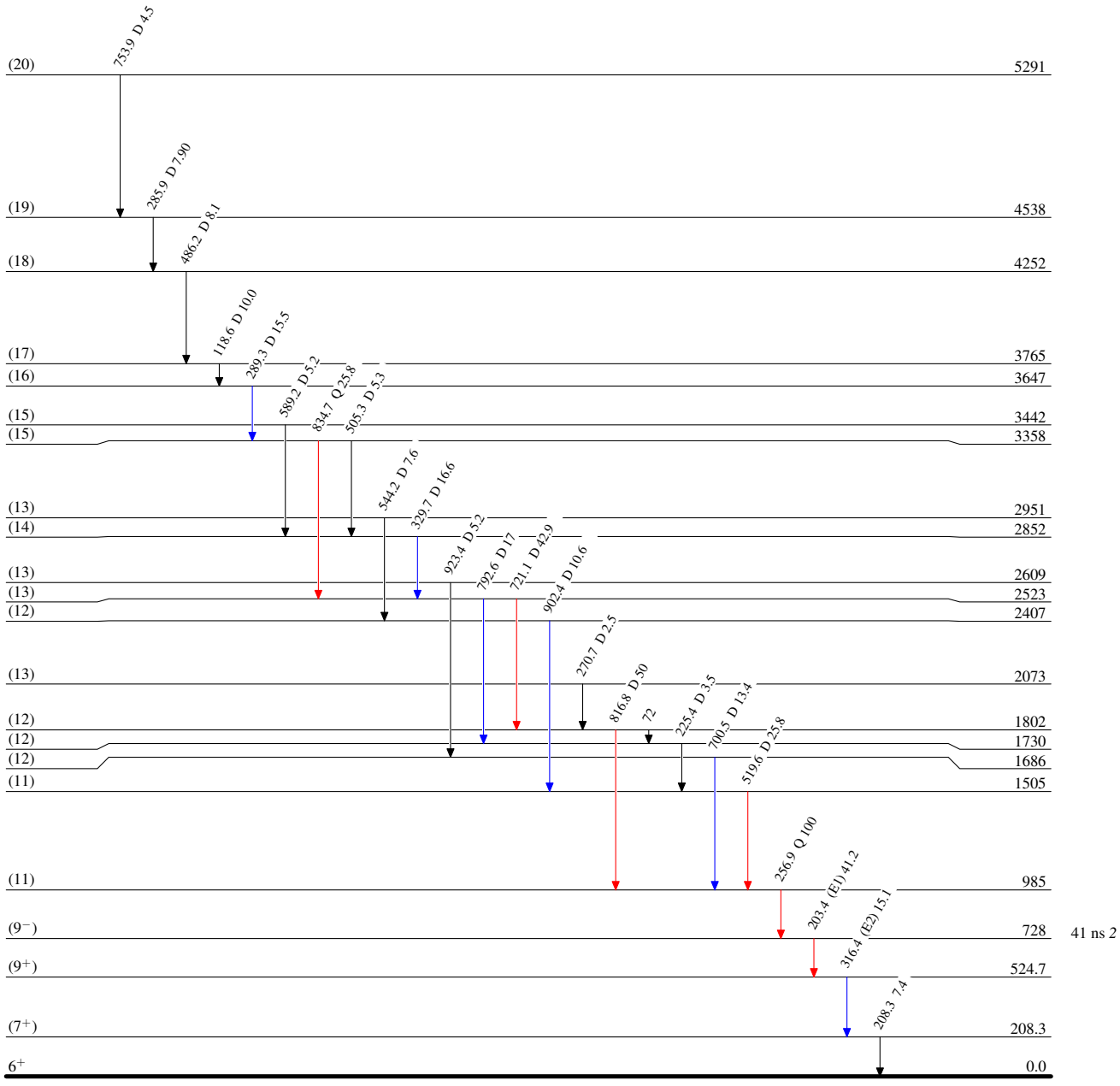
Legend

$I_\gamma < 2\% \times I_\gamma^{max}$

$I_\gamma < 10\% \times I_\gamma^{max}$

$I_\gamma > 10\% \times I_\gamma^{max}$

γ Decay (Uncertain)



$^{210}_{87}Fr_{123}$

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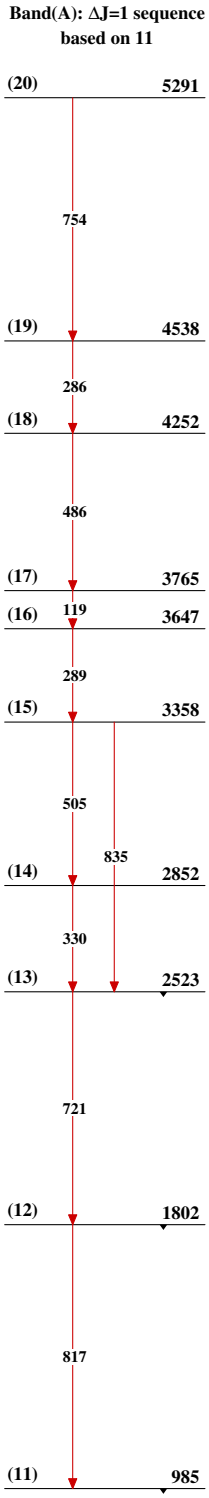

$^{210}_{87}Fr_{123}$