Muonic atom 1977WaZT,2007Me09

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Jun Chen and Balraj Singh	NDS 177, 1 (2021)	3-Sep-2021

2007Me09: ^{197}Au(μ^-,ν3nγ): the μ^- beam obtained from π^- beam at 90 MeV/c. Measured γ-ray yields using two HPGe detectors at TRIUMF facility.

1977WaZT: enriched ^{194}Pt target. Transition energies measured in prompt muonic x-ray spectra. Quadrupole radii, isotope shift and isotone shifts deduced from data. Binding energies of the following muonic orbits calculated from data: $1s_{1/2}$, $2p_{1/2}$, $2p_{3/2}$, $3d_{3/2}$, $3d_{5/2}$, $4f_{5/2}$, $4f_{7/2}$, $5g_{7/2}$, and $5g_{9/2}$. Nuclear γ rays observed for the first three excited levels. See also 1979HoZX from the same laboratory.

1974Ba77: natural platinum target. Nuclear γ rays from the first two levels observed.

1973Ev02: ^{197}Au(μ,3nγ), 483.2γ from the first 4^+ level seen in muon capture.

Muonic Lyman (or K) series for gold (2007Me09)

μ x ray	Energy	Intensity in percent
$2p_{1/2}$-$1s_{1/2}$	5591.0	34 *3*
$2p_{3/2}$-$1s_{1/2}$	5763.1	55 *4*
$3p_{1/2}$-$1s_{1/2}$	8085	1.6 *16*
$3p_{3/2}$-$1s_{1/2}$	8128	3.9 *20*

Muonic Balmer (or L) series for gold (2007Me09)

μ x ray	Energy	Intensity in percent
$3d_{3/2}$-$2d_{3/2}$	2302 *2*	4.1 *17*
$3d_{5/2}$-$2d_{3/2}$	2431.2 *2*	46 *4*
$3d_{3/2}$-$2d_{1/2}$	2477.8	30 *3*
$4d_{5/2}$-$2d_{3/2}$	3202 *5*	3.3 *10*
$4d_{3/2}$-$2d_{1/2}$	3356 *5*	3.7 *12*
$5d_{5/2}$-$2d_{1/2}$	3601	1.3 *13*
$5d_{3/2}$-$2d_{1/2}$	3762	1.0 *10*

Muonic Paschen (or M) series for gold (2007Me09)

μ x ray	Energy	Intensity in percent
$4f_{5/2}$-$3d_{3/2}$	870.11 *10*	47.9 *12*
$4f_{7/2}$-$3d_{5/2}$	899.27 *10*	34.7 *12*
$5f_{5/2}$-$3d_{3/2}$	1267 *1*	4.4 *13*
$5f_{7/2}$-$3d_{5/2}$	1299 *1*	1.8 *8*
$6f_{5/2}$-$3d_{3/2}$	1482	0.4 *4*
$6f_{7/2}$-$3d_{5/2}$	1516	0.4 *4*
$7f_{5/2}$-$3d_{3/2}$	1612	0.8 *5*
$7f_{7/2}$-$3d_{5/2}$	1647	0.4 *4*

Muonic Brackett (or N) series for gold (2007Me09)

μ x ray	Energy		Intensity in percent
$5g_{9/2}$-$4f_{7/2}$	400.15 *15*		38.3 *21*
$5g_{7/2}$-$4f_{5/2}$	405.58 *15*		30.6 *21*
$6g_{9/2}$-$4f_{7/2}$	615.5 *4*		6.9 *20*
$6g_{7/2}$-$4f_{5/2}$	621.7 *4*		5.8 *20*
$7g_{9/2}$-$4f_{7/2}$	744.9 *5*	a)	2.9 *29*
$7g_{7/2}$-$4f_{5/2}$	752.1 *5*		2.3 *11*

$8g_{9/2}$-$4f_{7/2}$	829	0.6 *3*
$8g_{7/2}$-$4f_{5/2}$	836	1.3 *6*
$9g_{9/2}$-$4f_{7/2}$	887	0.4 *4*
$9g_{7/2}$-$4f_{5/2}$	895	0.2 *2*

a): 744.9 is same as a γ ray from (n,n′γ)

Muonic x-ray transitions (1977WaZT)

Energy (keV)	transition
211.6 *5*	N=8 to N=6 and N=6 to N=5
265.1 *10*	N=9 to N=6
303.0 *20*	N=10 to N=6
338.1 *10*	N=7 to N=5
389.89 *20*	$5g_{9/2}$ - $4f_{7/2}$
395.14 *20*	$5g_{7/2}$ - $4f_{5/2}$
405.6 *10*	$5f_{5/2}$ - $4d_{3/2}$
418.9 *10*	N=8 to N=5
420.9 *10*	N=8 to N=5
≈ 450	
≈ 463	
476.3 *10*	N=9 to N=5
≈ 557	
599.7 *3*	$6g_{9/2}$ - $4f_{7/2}$
605.9 *3*	N=6 to N=4
726.2 *5*	$7g_{9/2}$ - $4f_{7/2}$
732.8 *5*	N=7 to N=4
814.8 *10*	$4d_{5/2}$ - $3p_{3/2}$
840.31 *30*	$4f_{5/2}$ - $3d_{5/2}$
847.85 *7*	$4f_{7/2}$ - $3d_{5/2}$
875.63 *7*	$4f_{5/2}$ - $3d_{3/2}$
1235.3 *5*	$5f_{7/2}$ - $3d_{5/2}$
1266.8 *5*	$5f_{5/2}$ - $3d_{3/2}$
2120.2 *15*	$3d_{5/2}$ - 2p
2260.8 *5*	$3d_{3/2}$ - 2p
2296.23 *13*	$3d_{5/2}$ - 2p
2420.60 *18*	$3d_{3/2}$ - 2p
3137.5 *15*	
3143.7 *15*	$4d_{5/2}$ - 2p
3496.1 *15*	
5350.8 *15*	$2p_{3/2}$ - 1s (2^+ level)
5520.2 *5*	$2p_{1/2}$ - 1s
5680.2 *4*	$2p_{3/2}$ - 1s
5695.6 *20*	

^{194}Pt Levels

E(level)†	J$^\pi$†
0.0	0^+
328.47	2^+
622.02	2^+
811.29	4^+
1373.8	(5^-)
1411.8	6^+

† From the Adopted Levels. Energies are rounded values.

Muonic atom 1977WaZT,2007Me09 (continued)

$\gamma(^{194}Pt)$

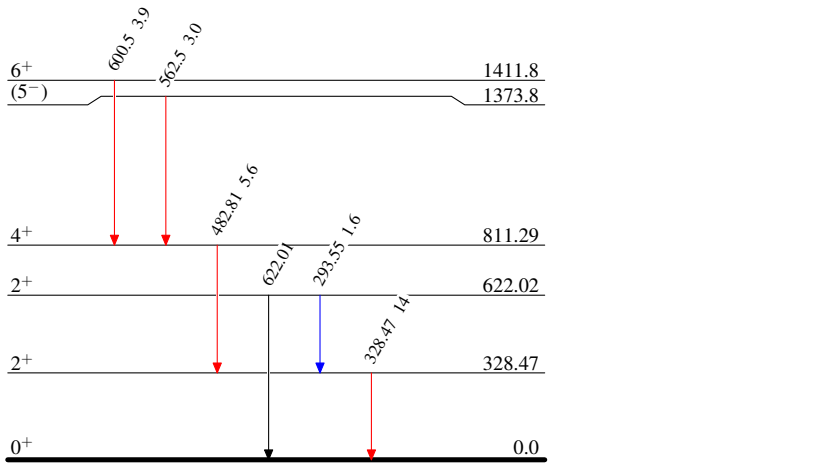
E_γ †	I_γ ‡	E_i(level)	J_i^π	E_f	J_f^π	Comments
293.55	1.6 *8*	622.02	2^+	328.47	2^+	I_γ: other: 6.3/100 muon captures (1974Ba77).
328.47	13.9 *28*	328.47	2^+	0.0	0^+	I_γ: other: 22.5/100 muon captures (1974Ba77).
482.81	5.6 *9*	811.29	4^+	328.47	2^+	I_γ: other: 3.2 *8*/100 muon captures (1973Ev02).
562.5	3.0 *10*	1373.8	(5^-)	811.29	4^+	
600.5	3.9 *14*	1411.8	6^+	811.29	4^+	
622.01		622.02	2^+	0.0	0^+	

† Rounded values from the Adopted dataset.
‡ Percent γ-ray yield (2007Me09).

Muonic atom 1977WaZT,2007Me09

Level Scheme

Intensities: Percent γ-ray yield/muon capture



$^{194}_{78}Pt_{116}$