

$^{194}\text{Pt}(p,2n\gamma)$ 2014Th02

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	M. Shamsuzzoha Basunia		NDS 143, 1 (2017)	31-Mar-2017

E(p)=14 MeV. Target=1.3 mg/cm² thick ^{194}Pt . Measured E γ , I γ , $\gamma\gamma$ -coin, $\gamma(\theta)$ using HORUS array with 12 HPGe detectors at Cologne tandem accelerator facility. Deduced levels, J, π , mixing ratios, B(M1), B(E1). Comparison with predictions of IBFM model calculations.

 ^{193}Au Levels

E(level) [†]	J π [@]	T _{1/2} ^{&}	Comments
0.0	3/2 ⁺		
38.234 17	(1/2) ⁺ &		Additional information 1. E(level): From Adopted Levels.
224.83 9	3/2 ⁺		
258.01 7	5/2 ⁺		
290.20 3	11/2 ⁻ &	3.9 s 3	Additional information 2. E(level): From Adopted Levels.
381.61 7	5/2 ⁺		
508.25 8	7/2 ⁻ &	0.29 ns 2	
538.91 7	7/2 ⁺		
687.44 8	7/2 ⁺		
697.79 10	(15/2) ⁻ &		
789.97 9	9/2 ⁻ &		
808.60 9	9/2 ⁺		
827.99 [‡] 10	3/2 ⁺		J π : 1/2 ⁺ discarded based on correlation analysis of 446 γ and 381 γ cascade.
863.42 15	(13/2) ⁻ &		
890.80 9	9/2 ⁻ &		
929.10 9	9/2 ⁺		
983.61 12	7/2 ⁺		
1085.35 12	(7/2 ⁺)		
1089.65 19			
1105.90 13	7/2 ⁺		J π : 9/2 is also possible from $\gamma\gamma(\theta)$ data, but discarded from γ to 3/2 ⁺ .
1119.01 21	3/2 ⁺		J π : 7/2 with $\delta(861\gamma)=-2.28+49-75$ is also possible, but it is inconsistent with log <i>ft</i> value in decay data.
1131.8 3	9/2 ⁻ , 11/2 ⁻ &		
1153.56 23	11/2 ⁺		
1194.3 4	(13/2) ⁻ &		
1284.95 13	9/2 ⁻ , 11/2 ⁻ &		
1297.35 19	(3/2 to 11/2)		
1300.40 23	(3/2 to 11/2 ⁺)		
1330.91 15	9/2 ⁺		
1343.71 21	(1/2 to 9/2 ⁺)		E(level): 1243.6 listed in table 1 of 2014Th02 is a misprint (communications with 1st Author).
1355.40 17	(11/2 to 15/2 ⁻)		E(level), J π : From Adopted Levels. Level not listed in Table 1 of 2014Th02, however needed for 274.95 γ from 1630 keV level.
1372.9 3	15/2, 17/2 ⁻		
1379.89 [#] 16	11/2 ⁺		
1398.56 24	(13/2) ⁻ &		
1400.4 4	11/2 ⁻ &		
1417.98 15	(5/2, 7/2) ⁺		
1419.1 4	(19/2) ⁻ &		
1463.10 23	(1/2 to 7/2 ⁺)		

Continued on next page (footnotes at end of table)

$^{194}\text{Pt}(\text{p},2\text{n}\gamma)$ [2014Th02](#) (continued) ^{193}Au Levels (continued)

E(level) [†]	J ^π @	Comments
1477.00 22	9/2 ⁺ ,11/2 ⁺ ,13/2 ⁺	J ^π : Best fit to $\gamma\gamma(\theta)$ data is obtained for 13/2 -> 9/2 -> 5/2, yet 9/2 and 11/2 cannot be ruled out.
1496.1 3	(9/2) ⁻ &	
1526.8 3	(9/2,7/2 ⁺)&	
1571.7 3		
1575.79 20	11/2 ⁻ ,13/2 ⁻ &	
1578.00 17	(5/2,7/2 ⁺)&	
1598.6 5		
1630.4 4	11/2 ⁻ ,13/2 ⁻ &	
1655.4 4		J ^π : 2014Th02 propose (3/2 to 11/2). Evaluator's note: 726γ to (9/2 ⁺).
1658.5 3	(1/2 ⁺ to 9/2 ⁺)	
1678.81 19	(3/2 ⁺ to 11/2 ⁺)	
1733.49 22	(15/2 ⁻)&	
1745.1 3		

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

[‡] An uncertain placement of 289.0γ in the literature from this level was not in agreement with the data in [2014Th02](#).

516.7γ in the literature from this level was not observed in $\gamma\gamma$ coincidence spectrum in [2014Th02](#).

@ From [2014Th02](#) based on $\gamma\gamma(\theta)$ results and γ -decay pattern, unless otherwise stated.

& From Adopted Levels.

¹⁹⁴Pt(p,2nγ) **2014Th02** (continued)

γ(¹⁹³Au)

Unplaced γ rays are observed in coincidence spectra with a gated transition.

E _i (level)	J _i ^π	E _γ	I _γ	E _f	J _f ^π	Mult. [†]	δ [†]	Comments
224.83	3/2 ⁺	186.6 2	100 10	38.234	(1/2) ⁺	D		δ(Q/D)=+0.11 15 (2014Th02).
		224.8 2	5 1	0.0	3/2 ⁺			
258.01	5/2 ⁺	219.8 2	6 1	38.234	(1/2) ⁺	Q		δ(O/Q)=+0.02 59.
		258.0 1	100 10	0.0	3/2 ⁺	D+Q	-0.75 11	
381.61	5/2 ⁺	156.8 2	1 1	224.83	3/2 ⁺			
		343.4 2	6 1	38.234	(1/2) ⁺	[E2] [‡]		
		381.6 1	100 10	0.0	3/2 ⁺	D+Q	-2.93 +62-45	δ: Other possible value of -0.07 5 is ruled out by 2014Th02 from comparison with previous ce data.
508.25	7/2 ⁻	126.5	5 2	381.61	5/2 ⁺	[E1] [‡]		
		218.0 1	100 10	290.20	11/2 ⁻	[E2] [‡]		
538.91	7/2 ⁺	157.2 2	2 1	381.61	5/2 ⁺			
		280.9 2	26 4	258.01	5/2 ⁺	D+Q	-0.06 3	
		314.0 2	2 1	224.83	3/2 ⁺			
		538.9 1	100 10	0.0	3/2 ⁺	Q		δ(O/Q)=-0.03 13.
687.44	7/2 ⁺	148.5 3	1 1	538.91	7/2 ⁺			
		305.9 2	9 1	381.61	5/2 ⁺	D+Q	+0.44 +22-19	δ: According to e-mail reply of Jan 17, 2014 from T. Thomas, value of δ should be +0.44 +22-19 as in authors' table 6, if δ(381γ)=-2.93 is correct. Value of δ=+0.22 +22-19 listed in authors' table 1 should be disregarded.
		429.4 1	100 10	258.01	5/2 ⁺	D+Q	-0.19 +2-3	
		462.6 2	13 2	224.83	3/2 ⁺	Q		δ(O/Q)=0.00 20.
		687.5 2	27 1	0.0	3/2 ⁺	[E2] [‡]		
697.79	(15/2) ⁻	407.6 1	100	290.20	11/2 ⁻			
789.97	9/2 ⁻	251.0 2	2 2	538.91	7/2 ⁺	[E1] [‡]		
		281.7 2	20 1	508.25	7/2 ⁻			
		499.8 1	100 10	290.20	11/2 ⁻			
808.60	9/2 ⁺	269.6 2	3 1	538.91	7/2 ⁺	D+Q	-0.13 5	δ: Uncertainty is 0.07 in Table 6 of 2014Th02 .
		427.0 2	3 1	381.61	5/2 ⁺	[E2] [‡]		
		550.6 1	100 10	258.01	5/2 ⁺	Q		δ(O/Q)=-0.03 2.
827.99	3/2 ⁺	446.4 2	52 9	381.61	5/2 ⁺	D+Q	-0.30 7	
		603.2 3	100 10	224.83	3/2 ⁺	D+Q	+0.50 ^a +36-28	
		789.7 2	54 4	38.234	(1/2) ⁺			E _γ : Energy extracted from a doublet.
		828.0 2	81 23	0.0	3/2 ⁺	D+Q	+0.78 +81-45	E _γ : Energy extracted from a triplet, 2014Th02 note. However, only 828.0γ and 825.5γ are listed.
863.42	(13/2) ⁻	165.6 5	>1	697.79	(15/2) ⁻			
		573.2 2	100 10	290.20	11/2 ⁻			
890.80	9/2 ⁻	382.5 2	100 10	508.25	7/2 ⁻			
		600.6 1	84 17	290.20	11/2 ⁻			

¹⁹⁴Pt(p,2n γ) ²⁰¹⁴Th02 (continued) $\gamma(^{193}\text{Au})$ (continued)

<u>E_i(level)</u>	<u>J_i^{π}</u>	<u>E_{γ}</u>	<u>I_{γ}</u>	<u>E_f</u>	<u>J_f^{π}</u>	<u>Mult.[†]</u>	<u>$\delta^{\dagger}$</u>	<u>Comments</u>
929.10	9/2 ⁺	241.7 3	39 10	687.44	7/2 ⁺	D+Q	-0.12 5	
		390.1 3	29 2	538.91	7/2 ⁺	D		$\delta(\text{Q/D})=+0.03$ 8.
		547.5 1	100 10	381.61	5/2 ⁺	Q		$\delta(\text{O/Q})=-0.03$ 7.
		638.9 2	14 5	290.20	11/2 ⁻	[E1] [‡]		
983.61	7/2 ⁺	155.6 4	2 1	827.99	3/2 ⁺			
		444.6 4	10 4	538.91	7/2 ⁺			I _{γ} : 100 10 in table 1 is a misprint (communications with 1st Author).
		725.6 2	100 10	258.01	5/2 ⁺	D+Q	+2.54 +30-25	
		758.8 2	56 4	224.83	3/2 ⁺	Q		$\delta(\text{O/Q})=+0.02$ 21.
1085.35	(7/2 ⁺)	295.4 3	100 10	789.97	9/2 ⁻	[E1] [‡]		
		577.1 2	23 3	508.25	7/2 ⁻	[E1] [‡]		
		703.7 2	37 4	381.61	5/2 ⁺	D+Q	+0.36 ^a +21-19	
		827.5 3	40 5	258.01	5/2 ⁺	D+Q	+0.48 ^a 16	
		860.5 3	63 8	224.83	3/2 ⁺	[E2] [‡]		
1089.65		581.4 2	100	508.25	7/2 ⁻			
1105.90	7/2 ⁺	277.9 2	20 4	827.99	3/2 ⁺	[E2] [‡]		
		567.1 3	59 12	538.91	7/2 ⁺	D+Q	+0.32 +22-19	
		724.3 2	100 10	381.61	5/2 ⁺	D+Q	+0.40 11	
		847.8 3	35 7	258.01	5/2 ⁺	D+Q	+0.28 5	
1119.01	3/2 ⁺	861.0 2	100	258.01	5/2 ⁺	M1+E2	+1.33 40	δ : Other possible value of +0.35 8 is ruled out by ²⁰¹⁴ Th02 from comparison with previous ce data of ¹⁹⁷⁴ ViZS (193HG EC Decay).
1131.8	9/2 ⁻ ,11/2 ⁻	341.8 3	100	789.97	9/2 ⁻			
1153.56	11/2 ⁺	344.9 3	63 13	808.60	9/2 ⁺	D		$\delta(\text{Q/D})=-0.02$ 5.
		614.7 3	100 10	538.91	7/2 ⁺	Q		$\delta(\text{O/Q})=+0.03$ 9.
1194.3	(13/2 ⁻)	404.3 3	100	789.97	9/2 ⁻			
1284.95	9/2 ⁻ ,11/2 ⁻	394.0 3	100	890.80	9/2 ⁻			
		776.6 2	35 7	508.25	7/2 ⁻			
		994.9 2	54 11	290.20	11/2 ⁻			
1297.35	(3/2 to 11/2)	207.7 3	19 4	1089.65				
		789.1 2	100 10	508.25	7/2 ⁻			
1300.40	(3/2 to 11/2 ⁺)	215.1 3	100 10	1085.35	(7/2 ⁺)			
		612.9 3	13 5	687.44	7/2 ⁺			
1330.91	9/2 ⁺	347.3 3	100 10	983.61	7/2 ⁺	D+Q	-0.45 24	δ : From Figure caption A.2. A value of $\delta=-0.20$ 13 in Table 1 is a misprint (communications with 1st Author).
		401.8 3	95 19	929.10	9/2 ⁺			
		522.3 3	53 11	808.60	9/2 ⁺			
		643.5 3	89 18	687.44	7/2 ⁺			
		949.3 3	28 6	381.61	5/2 ⁺			
1343.71	(1/2 to 9/2 ⁺)	962 3	19 6	381.61	5/2 ⁺			
		1085.7 2	100 10	258.01	5/2 ⁺			
1372.9	15/2,17/2 ⁻	675.1 3	100	697.79	(15/2) ⁻			

¹⁹⁴Pt(p,2nγ) 2014Th02 (continued)

γ(¹⁹³Au) (continued)

E _i (level)	J ^π _i	E _γ	I _γ	E _f	J ^π _f	Mult. [†]	δ [‡]	Comments
1379.89	11/2 ⁺	571.3 2	100 10	808.60	9/2 ⁺	D		δ(Q/D)=+0.05 7.
		692.5 3	98 20	687.44	7/2 ⁺	Q		δ(O/Q)=-0.05 8.
		840.9 3	77 15	538.91	7/2 ⁺	[E2] [‡]		
1398.56	(13/2) ⁻	535.1 3	100 10	863.42	(13/2) ⁻			
		700.8 3	49 20	697.79	(15/2) ⁻			
1400.4	11/2 ⁻	537.0 3	100	863.42	(13/2) ⁻			
1417.98	(5/2,7/2) ⁺	434.4 3	58 12	983.61	7/2 ⁺			
		488.9 3	64 13	929.10	9/2 ⁺			
		590.0 3	67 17	827.99	3/2 ⁺			
		609.3 3	32 6	808.60	9/2 ⁺			
		879.1 3	100 10	538.91	7/2 ⁺			
1419.1	(19/2) ⁻	721.3 3	100	697.79	(15/2) ⁻	Q		δ(O/Q)=+0.09 12.
1463.10	(1/2 to 7/2 ⁺)	572.3 3	100 10	890.80	9/2 ⁻	[E1] [‡]		
		635.1 3	21 5	827.99	3/2 ⁺			
1477.00	9/2 ⁺ ,11/2 ⁺ ,13/2 ⁺	668.4 2	100	808.60	9/2 ⁺			δ(Q/D)=+0.28 17 for J(1477)=9/2, +0.47 8 for J(1477)=11/2; δ(O/Q)=+0.02 9 for J(1477)=13/2.
1496.1	(9/2) ⁻	364.3 3	100 10	1131.8	9/2 ⁻ ,11/2 ⁻	D+Q	-0.53 +10-11	
		706.2 3	32 6	789.97	9/2 ⁻			
1526.8	(9/2,7/2 ⁺)	987.9 3	100	538.91	7/2 ⁺			
1571.7		274.4 3	100 10	1297.35	(3/2 to 11/2)			
		482.1 3	17 3	1089.65				
1575.79	11/2 ⁻ ,13/2 ⁻	290.8 3	30 6	1284.95	9/2 ⁻ ,11/2 ⁻			
		712.5 3	10 3	863.42	(13/2) ⁻			
		877.9 3	100 10	697.79	(15/2) ⁻			
1578.00	(5/2,7/2) ⁺	472.1 2	100 10	1105.90	7/2 ⁺			
		750.0 2	17 6	827.99	3/2 ⁺			
1598.6		404.3 3	100	1194.3	(13/2) ⁻			
1630.4	11/2 ⁻ ,13/2 ⁻	932.6 3	100	697.79	(15/2) ⁻			
1655.4		726.3 3	100	929.10	9/2 ⁺			
1658.5	(1/2 ⁺ to 9/2 ⁺)	1276.9 3	100	381.61	5/2 ⁺			
1678.81	(3/2 ⁺ to 11/2 ⁺)	695.2 2	100 10	983.61	7/2 ⁺			
		870.2 3	68 18	808.60	9/2 ⁺			
1733.49	(15/2) ⁻	360.5 4	30 8	1372.9	15/2,17/2 ⁻			
		869.9 3	100 10	863.42	(13/2) ⁻			
		1035.9 3	60 12	697.79	(15/2) ⁻			
1745.1		1236.8 3	100	508.25	7/2 ⁻			

[†] From γγ(θ) data (2014Th02), except otherwise noted.

[‡] 2014Th02 assume from selection rule of G-ray transition. 2014Th02 list in parentheses, however, the evaluator list in square brackets.

[#] γ in coin with 407-keV gate.

$^{194}\text{Pt}(\text{p},2\text{n}\gamma)$ **2014Th02 (continued)**

$\gamma(^{193}\text{Au})$ (continued)

@ γ in coin with 573-keV gate.

& γ in coin with 675-keV gate.

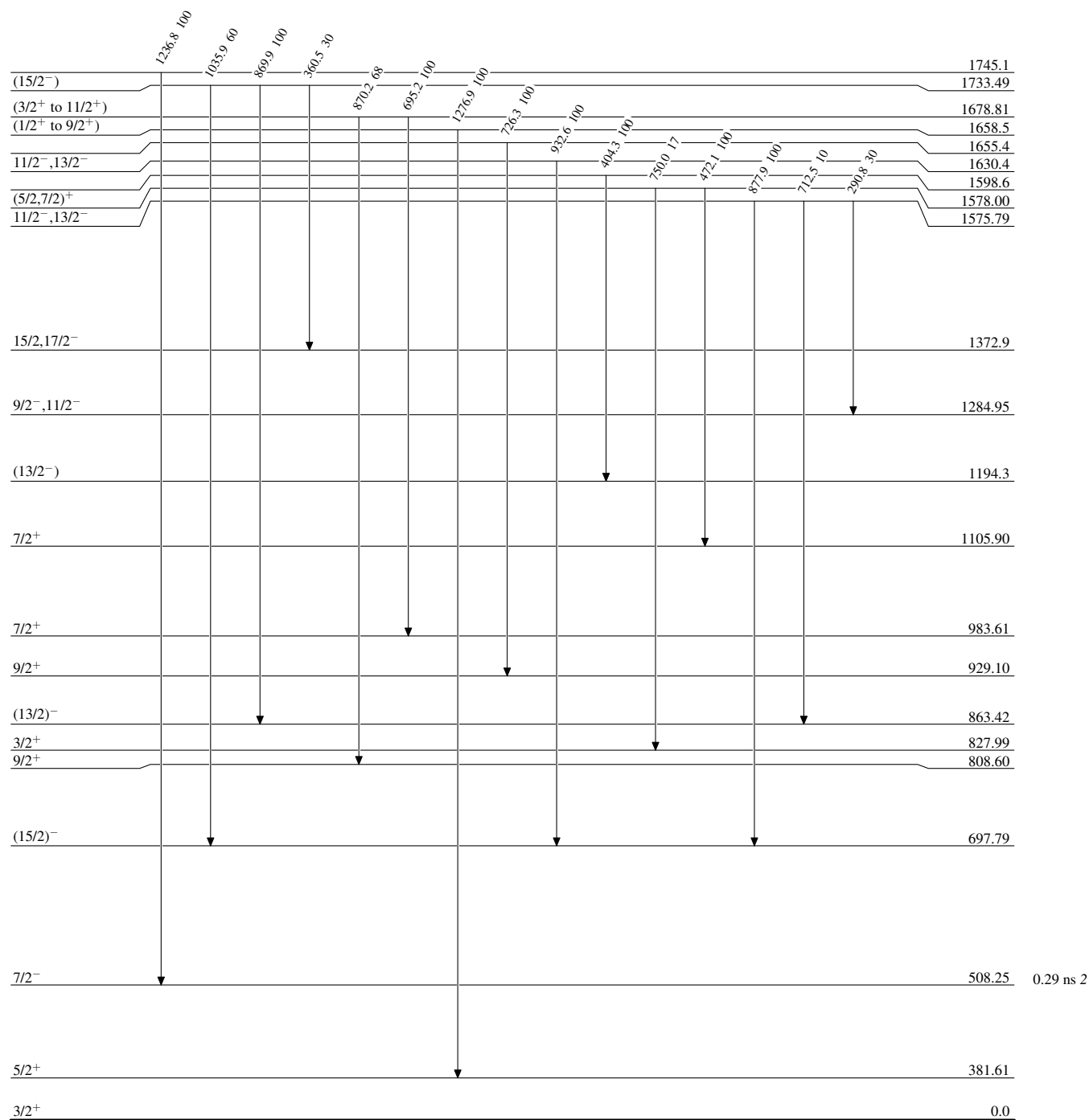
^a **2014Th02** list value in parentheses to indicate that angular correlation analysis did not yield a distinct δ value.

^x γ ray not placed in level scheme.

$^{194}\text{Pt}(\text{p},2\text{n}\gamma)$ 2014Th02

Level Scheme

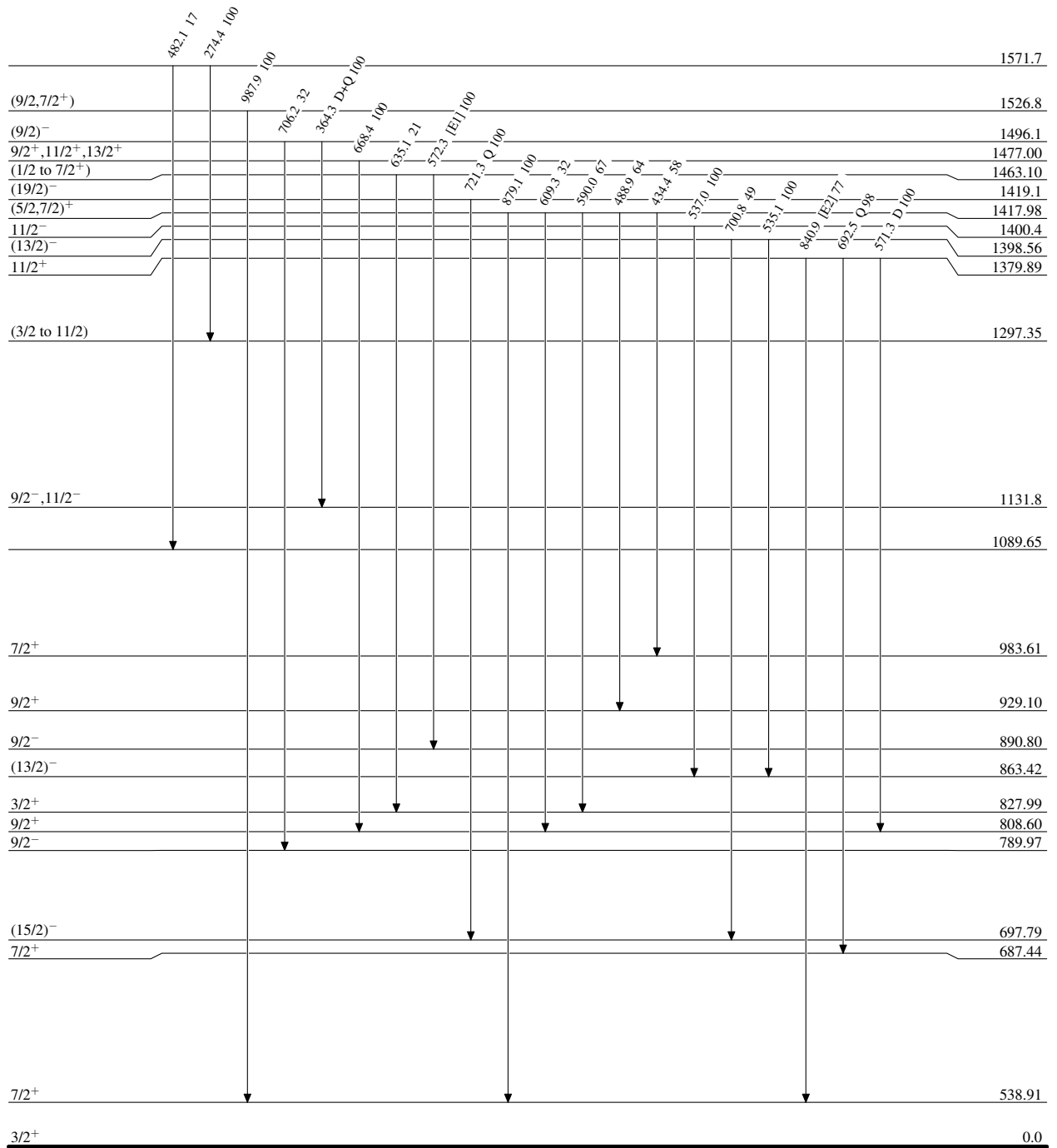
Intensities: Relative photon branching from each level



$^{194}\text{Pt}(p,2n\gamma)$ 2014Th02

Level Scheme (continued)

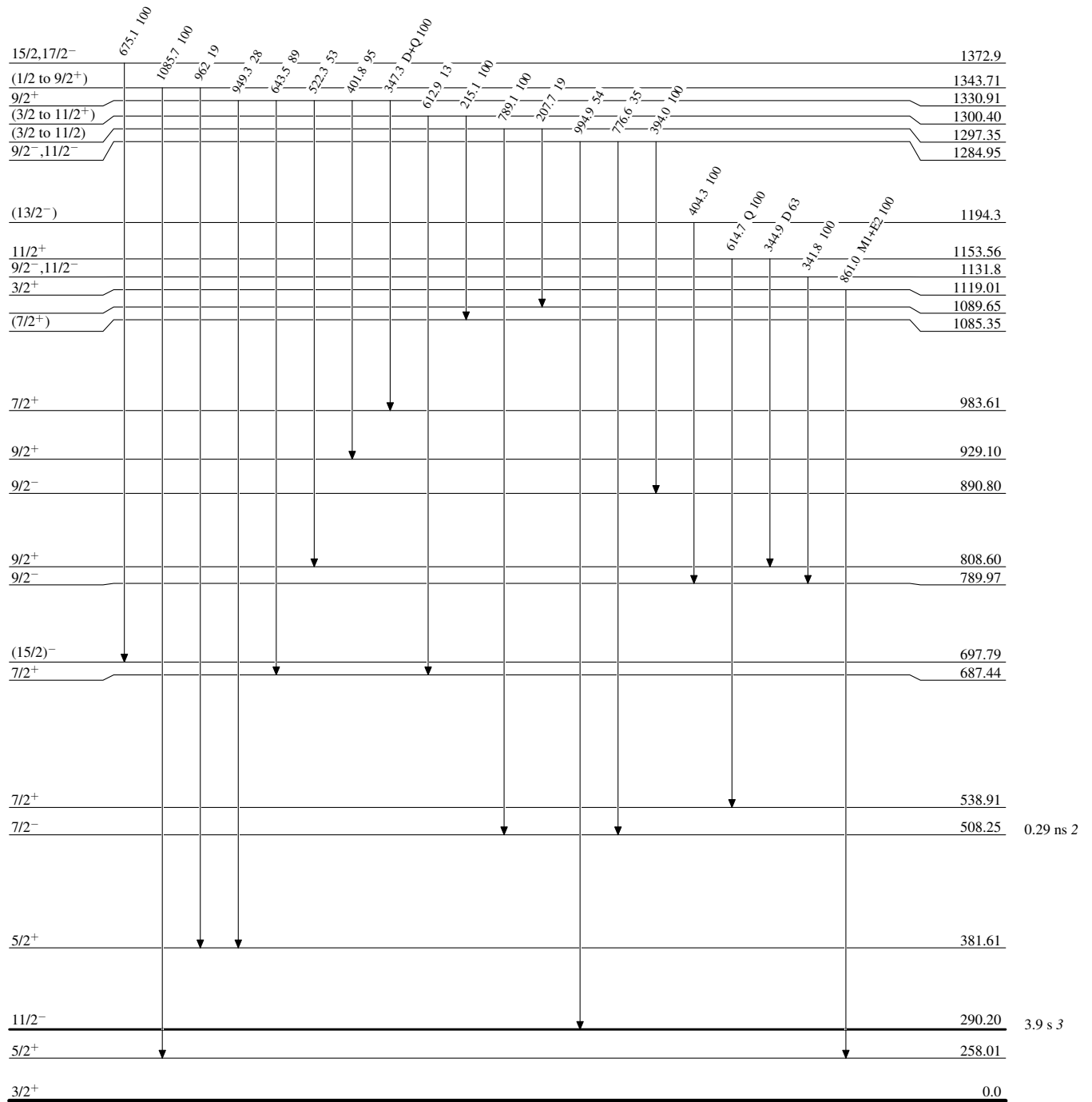
Intensities: Relative photon branching from each level



$^{194}\text{Pt}(p,2n\gamma)$ 2014Th02

Level Scheme (continued)

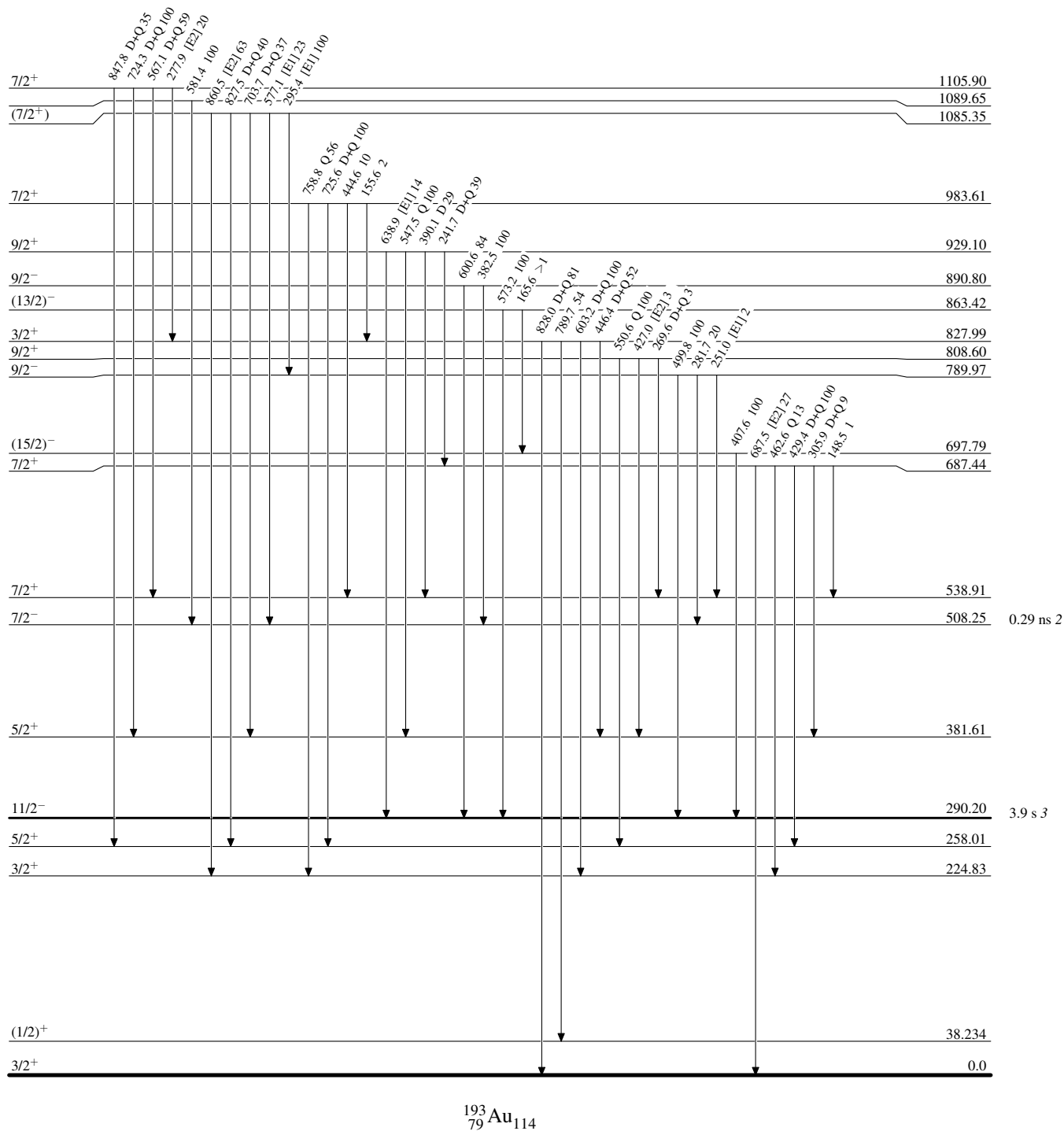
Intensities: Relative photon branching from each level



$^{194}\text{Pt}(p,2n\gamma)$ 2014Th02

Level Scheme (continued)

Intensities: Relative photon branching from each level

 $^{193}_{79}\text{Au}_{114}$

$^{194}\text{Pt}(p,2n\gamma)$ 2014Th02

Level Scheme (continued)

Intensities: Relative photon branching from each level

