

**<sup>191</sup>Pt ε decay 1971Pr12,1970Ma10**

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	M. S. Basunia	NDS 195,368 (2024)	1-Dec-2023

Parent: <sup>191</sup>Pt: E=0.0; J<sup>π</sup>=3/2<sup>-</sup>; T<sub>1/2</sub>=2.83 d 2; Q(ε)=1010 4; %ε decay=100

1971Pr12: measured γ-rays; γγ-coin, Ge(Li); conversion electrons; <sup>191</sup>Pt from <sup>190</sup>Pt(n,γ), enriched target 0.40 – 0.76%.

1970Ma10: measured γ-rays; conversion electrons; <sup>191</sup>Pt from <sup>191</sup>Hg decay, using isotopically separated <sup>191</sup>Hg (ISOLDE).

2021Kr02: source obtained from <sup>190</sup>Pt(n,γ), natural Pt target, irradiated at the TRIGA reactor, Oregon State University; measured Eγ, Iγ with high-resolution Ge detectors.

2007La18: measured precise Eγ values of 19 γ rays using difference methods with standard Eγ values from the decays of <sup>182</sup>Ta and <sup>192</sup>Ir. The γ rays were detected by an HPGe detector.

1971Ba45: measured γγ-coin, Ge(Li); conversion electrons, semi; <sup>191</sup>Pt from <sup>191</sup>Hg decay, using isotopically separated <sup>191</sup>Hg (ISOLDE).

1970Sc20: measured γ-rays; γX-coin, Ge(Li)-NaI; <sup>191</sup>Pt from nat Ir(d,2n), chemically separated from Ir.

1972Be01: measured γγ(θ). measured Eγ, Iγ, I(ce), γγ(θ). Deduce levels, spin, parity, ?-mixing. Enriched target.

Others: 1953Sw20, 1954Co29, 1954Gi04, 1955To19, 1955Sm42, 1955Su64, 1957Hu89, 1961Di07, 1961Kr02, 1962Ma18, 1966Bl03, 1969Gu15, 1966Sc04, 1967Sc25, 1969Pl06, 1969Ow02, 1970Pl07, 1970Ba56, 1980Be27, 1981La25, 1991BuZY.

<sup>191</sup>Ir Levels

E(level) <sup>†</sup>	J <sup>π</sup> <sup>‡</sup>	T <sub>1/2</sub> <sup>#</sup>	Comments
0.0 <sup>@</sup>	3/2 <sup>+</sup>	stable	
82.4253 <sup>&amp;</sup> 19	1/2 <sup>+</sup>	4.10 ns 7	T <sub>1/2</sub> : From Adopted Levels. Data of this dataset would yield 3.92 ns 30 from weighted average of 3.85 ns 35 (1955Su64 – (β)(ce)(t)), 3.8 ns 3 (K x-ray)(γ)(t) from τ=5.5 ns 5, 4.1 ns 3 (K x-ray)(ce)(t) from τ=5.9 ns 4 both in 1969Ow02 (also 3.7 ns 6 reported in 1969Ow02 – see (γ,γ'): Mossbauer).
129.426 <sup>@</sup> 3	5/2 <sup>+</sup>	89.7 ps 12	g-factor=+0.244 22 (recalculated by evaluator for adopted T <sub>1/2</sub> =89.7 ps 12), perturbed angular correlation (in 1969Ow02 +0.22 2 for their T <sub>1/2</sub> =99.8 ps 69 from τ=144 ps 10).
171.278 <sup>a</sup> 11	11/2 <sup>-</sup>	4.899 s 23	T <sub>1/2</sub> : From Adopted Levels.
178.9772 <sup>&amp;</sup> 17	3/2 <sup>+</sup>	43 ps 4	T <sub>1/2</sub> : from Adopted Levels.
343.25 <sup>@</sup> 8	7/2 <sup>+</sup>	20.4 ps 8	T <sub>1/2</sub> : Other: 40 ps 12 (1970Ma10 from (ce)(ce)(t)).
351.1921 <sup>&amp;</sup> 20	5/2 <sup>+</sup>	28 ps 4	
390.950 10	7/2 <sup>-</sup>	240 ps 20	T <sub>1/2</sub> : from 1970Ba56, (ce)(ce)(t).
538.9126 <sup>b</sup> 22	3/2 <sup>+</sup>	10.7 ps 7	
587.975 17	3/2 <sup>+</sup> ,5/2 <sup>+</sup>	≈0.3 ps	
624.080 <sup>b</sup> 4	(1/2 <sup>+</sup> )	>9 ps	
658.9196 18	(3/2 <sup>-</sup> )	<0.12 ns	T <sub>1/2</sub> : from 1970Ba56, Auger ce(t).
686.6 5	7/2 <sup>+</sup>	2.7 ps 3	E(level): For 686.6γ placement assigned to <sup>191</sup> Pt ε decay by evaluator.
747.801 <sup>b</sup> 16	(5/2 <sup>+</sup> )		
762.589 4	3/2 <sup>+</sup>		
799.804 16	(5/2 <sup>-</sup> )		
935.71 17	(1/2 <sup>+</sup> ,3/2,5/2 <sup>+</sup> )		

<sup>†</sup> From a least squares fit to γ-ray energies.

<sup>‡</sup> From Adopted Levels.

<sup>#</sup> From Adopted Levels. Data from references of this data set are listed in the comments, if available.

<sup>@</sup> Band(A): 3/2[402].

<sup>&</sup> Band(B): 1/2[400] (possibly mixed with K-2 γ-vibration coupled to 3/2[402]).

<sup>a</sup> Band(C): 11/2[505].

<sup>b</sup> Band(D): 1/2[411].

$^{191}\text{Pt}$   $\varepsilon$  decay **1971Pr12,1970Ma10** (continued) $\varepsilon$  radiations

E(decay)	E(level)	$I\varepsilon^\dagger$	Log $ft$	Comments
(74 4)	935.71	0.018 3	7.37 10	$\varepsilon\text{L}=0.701$ 5; $\varepsilon\text{M}+=0.299$ 6 $\gamma$ -K x-ray coincidence not observed, $\varepsilon\text{K}(935)/\varepsilon\text{K}(539)$ exp $\leq 0.05$ , and $\varepsilon\text{L}(935)/\varepsilon\text{L}(539)$ exp=4.4 7 (1970Sc20); theory with adopted Q( $\varepsilon$ ): 0 and 4.39, respectively.
(210 4)	799.804	0.34 7	7.58 10	$\varepsilon\text{K}=0.678$ 5; $\varepsilon\text{L}=0.239$ 4; $\varepsilon\text{M}+=0.0830$ 13
(247 4)	762.589	0.38 8	7.73 10	$\varepsilon\text{K}=0.709$ 3; $\varepsilon\text{L}=0.2170$ 20; $\varepsilon\text{M}+=0.0741$ 8
(262 4)	747.801	0.32 6	7.87 9	$\varepsilon\text{K}=0.7180$ 23; $\varepsilon\text{L}=0.2105$ 17; $\varepsilon\text{M}+=0.0715$ 7
(323 4)	686.6	0.0008 4	10.17 <sup>1u</sup> 22	$\varepsilon\text{K}=0.594$ 5; $\varepsilon\text{L}=0.297$ 4; $\varepsilon\text{M}+=0.1090$ 14
(351 4)	658.9196	0.85 14	7.76 8	$\varepsilon\text{K}=0.7521$ 11; $\varepsilon\text{L}=0.1860$ 8; $\varepsilon\text{M}+=0.0619$ 3
(386 4)	624.080	2.7 5	7.36 9	$\varepsilon\text{K}=0.7601$ 9; $\varepsilon\text{L}=0.1802$ 6; $\varepsilon\text{M}+=0.05964$ 24
(422 4)	587.975	0.22 4	8.54 8	$\varepsilon\text{K}=0.7667$ 7; $\varepsilon\text{L}=0.1755$ 5; $\varepsilon\text{M}+=0.05779$ 19
(471 4)	538.9126	34 6	6.46 8	$\varepsilon\text{K}=0.7738$ 5; $\varepsilon\text{L}=0.1704$ 4; $\varepsilon\text{M}+=0.05583$ 15 $\varepsilon\text{K}/\varepsilon(\text{exp})=0.817$ 13, $\gamma$ -x-ray coincidence method (1990Bi11).
(619 4)	390.950	$\leq 0.19$	$\geq 9.0$	$\varepsilon\text{K}=0.7873$ 3; $\varepsilon\text{L}=0.16066$ 20; $\varepsilon\text{M}+=0.05208$ 8
(659 4)	351.1921	13.4 21	7.20 7	$\varepsilon\text{K}=0.7897$ 3; $\varepsilon\text{L}=0.15889$ 17; $\varepsilon\text{M}+=0.05140$ 7 $\varepsilon\text{K}/\varepsilon(\text{exp})=0.82$ 3, $\gamma$ -x-ray sum coincidence method (1990Bi11).
(667 4)	343.25	$< 0.017$	$> 10.3^{1u}$	$\varepsilon\text{K}=0.7433$ 7; $\varepsilon\text{L}=0.1920$ 5; $\varepsilon\text{M}+=0.06468$ 19
(831 4)	178.9772	11.4 19	7.49 8	$\varepsilon\text{K}=0.7973$ 2; $\varepsilon\text{L}=0.1534$ 1; $\varepsilon\text{M}+=0.04929$ 4 $\varepsilon\text{K}/\varepsilon(\text{exp})=0.82$ 3, $\gamma$ -x-ray sum coincidence method (1990Bi11).
(881 4)	129.426	$\leq 1.4$	$\geq 8.5$	$\varepsilon\text{K}=0.7989$ 2; $\varepsilon\text{L}=0.15224$ 9; $\varepsilon\text{M}+=0.04885$ 4
(928 4)	82.4253	24 7	7.27 13	$\varepsilon\text{K}=0.8002$ 1; $\varepsilon\text{L}=0.15128$ 8; $\varepsilon\text{M}+=0.04849$ 3
(1010 <sup>‡</sup> 4)	0.0	$\leq 24$	$\geq 7.3$	$\varepsilon\text{K}=0.80224$ 9; $\varepsilon\text{L}=0.14982$ 7; $\varepsilon\text{M}+=0.04793$ 3 I $\varepsilon$ : revised to $\leq 24$ , consistent with % $\varepsilon(\text{g.s.})=11$ 13, branch marked questionable as $\varepsilon$ feeding to the g.s. is not definite.

<sup>†</sup> Absolute intensity per 100 decays.

<sup>‡</sup> Existence of this branch is questionable.

<sup>191</sup>Pt ε decay **1971Pr12,1970Ma10** (continued)

γ(<sup>191</sup>Ir)

I<sub>γ</sub> normalization: %ε(g.s.)=11 13 (≤24), calculated by evaluator from the experimental K x ray intensity (1661 125), the number of atomic K vacancies due to internal conversion electrons (720 33), by use of theoretical εK/ε ratios and a K-fluorescence yield of 0.958 4 (1996Sc06). Normalization calculated from decay scheme assuming ΣI(γ+ce) to g.s.=89 13%.

Kα<sub>2</sub> x ray relative intensity=488 61; Kα<sub>1</sub> x ray relative intensity=840 105; Kβ<sub>1</sub> x ray+Kβ<sub>2</sub> x ray relative intensity=259 32; Kβ<sub>2</sub> x ray+Kβ<sub>4</sub> x ray relative intensity=74 9 (1971Pr12).

K x ray relative intensity=1600; L x ray relative intensity= 450 (1970Sc20).

ce: unless otherwise noted, the adopted Ice values shown in the comments are averages from 1971Ba45, 1970Ma10, and 1971Pr12 values, normalized to 1971Pr12 Ice scale. Data from 1971Ba45 and 1970Ma10 were assumed to be in the same scale, and were multiplied by the average of all Ice given by both 1970Ma10 and 1971Pr12.

<u>E<sub>γ</sub><sup>†</sup></u>	<u>I<sub>γ</sub><sup>d</sup></u>	<u>E<sub>i</sub>(level)</u>	<u>J<sub>i</sub><sup>π</sup></u>	<u>E<sub>f</sub></u>	<u>J<sub>f</sub><sup>π</sup></u>	<u>Mult.&amp;</u>	<u>δ<sup>a</sup></u>	<u>α<sup>bc</sup></u>	<u>Comments</u>
41.93 3	0.00070 9	171.278	11/2 <sup>-</sup>	129.426	5/2 <sup>+</sup>	E3		1.679×10 <sup>4</sup> 25	%I <sub>γ</sub> =5.5×10 <sup>-5</sup> 11 α(L)=1.206×10 <sup>4</sup> 18; α(M)=3.69×10 <sup>3</sup> 5 α(N)=914 13; α(O)=134.8 20; α(P)=0.1439 21 E <sub>γ</sub> : from 1970Ba56. I <sub>γ</sub> : From ce(L2):ce(L3) exp=4.1 8:4.9 8 (1970Ba56 normalized value) and subshell theoretical ICCs. Mult.: from <sup>191</sup> Os β <sup>-</sup> decay (15.4 d).
49.548 4	0.44 5	178.9772	3/2 <sup>+</sup>	129.426	5/2 <sup>+</sup>	M1+E2	0.17 4	11.3 15	%I <sub>γ</sub> =0.035 7 α(L)=8.6 11; α(M)=2.05 28 α(N)=0.50 7; α(O)=0.085 10; α(P)=0.00475 9 E <sub>γ</sub> : Weighted average of 49.59 3 (1970Ma10) and 49.548 3 (1995BuZZ). I <sub>γ</sub> : from adopted I <sub>γ</sub> (96.5γ) and I <sub>γ</sub> (49.6γ)/I <sub>γ</sub> (96.5γ) calculated as the average from: relative I <sub>γ</sub> deduced from ce(L) ratio and adopted α(L); I(γ+ce)(49.6):I(γ+ce)(96.5)=5 1:316 14 from γγ coinc in 1971Pr12 and adopted α. Mult.,δ: from ce(L1):ce(L2):ce(L3) exp=3.0 4:0.98 16:0.7 3 (1970Ma10 normalized value).
82.40 5	60 3	82.4253	1/2 <sup>+</sup>	0.0	3/2 <sup>+</sup>	M1+E2	-0.871 18	10.55 15	%I <sub>γ</sub> =4.7 7 α(K)=5.33 11; α(L)=3.94 8; α(M)=0.993 21 α(N)=0.241 5; α(O)=0.0377 8; α(P)=0.000689 14 E <sub>γ</sub> : Other: 82.46 2 (1972McYW). I <sub>γ</sub> : From 2021Kr02. Other: 61 6 (1971Pr12). δ: from ce(L1):ce(L2):ce(L3) exp=47.4 12:96.5 14:88.3 13. Sign of δ is from Mossbauer oriented nuc (1983Be71). Other: 1967Wa20, Mossbauer.
85.161 4	0.75 9	624.080	(1/2 <sup>+</sup> )	538.9126	3/2 <sup>+</sup>	[M1,E2]		9.37 35	%I <sub>γ</sub> =0.059 11 α(K)=4 4; α(L)=3.8 24; α(M)=0.9 6

<sup>191</sup>Pt ε decay **1971Pr12,1970Ma10** (continued)

									$\gamma(^{191}\text{Ir})$ (continued)	
$E_\gamma$ <sup>†</sup>	$I_\gamma$ <sup>d</sup>	$E_i$ (level)	$J_i^\pi$	$E_f$	$J_f^\pi$	Mult. &	$\delta^a$	$\alpha^{bc}$	Comments	
96.5517 10	39.4 9	178.9772	3/2 <sup>+</sup>	82.4253	1/2 <sup>+</sup>	M1+E2	+0.150 16	6.74 9	$\alpha(\text{N})=0.23$ 15; $\alpha(\text{O})=0.036$ 23; $\alpha(\text{P})=6\text{E}-4$ 4 $E_\gamma$ : Weighted average of 85.161 4 (1995BuZZ) and 85.158 (1971Pr12). $I_\gamma$ : from 1971Pr12. % $I_\gamma=3.1$ 5 $\alpha(\text{K})=5.47$ 8; $\alpha(\text{L})=0.975$ 18; $\alpha(\text{M})=0.227$ 5 $\alpha(\text{N})=0.0556$ 11; $\alpha(\text{O})=0.00973$ 18; $\alpha(\text{P})=0.000681$ 10 $E_\gamma$ : Weighted average of 96.5517 11 (2007La18), 96.5522 (1995BuZZ), 96.544 15 (2021Kr02). Others: 96.517 9 (1971Pr12), 96.56 2 (1972McYW). $I_\gamma$ : Weighted average of 37.9 19 (1970Ma10), 42 2 (1971Pr12), and 39.3 12 (2021Kr02). $\delta$ : from ce(L1):ce(L2):ce(L3) exp=35.5 5:4.8 3:1.9 2. Sign of $\delta$ is from $\gamma(\theta)$ oriented nuc (1981La25). Other: $\delta=+0.10$ +8-18 $\gamma\gamma(\theta)$ (1972Be01). % $I_\gamma=3.0$ 5 $\alpha(\text{K})=2.149$ 31; $\alpha(\text{L})=0.464$ 7; $\alpha(\text{M})=0.1100$ 16 $\alpha(\text{N})=0.0269$ 4; $\alpha(\text{O})=0.00459$ 7; $\alpha(\text{P})=0.000264$ 4 $E_\gamma$ : Unweighted average of 129.400 7 (1971Pr12) and 129.4320 10 (2007La18). Other: 129.48 2 (1972McYW). $I_\gamma$ : weighted average of 38.1 18 (1970Ma10) and 40 4 (1971Pr12). $\delta$ : from adopted gammas. Others: $\delta=0.40$ from ce(L1):ce(L2):ce(L3) exp=105:30:18 (1962Ha24), no uncertainty given, and $\delta=-0.44$ 4 from $\gamma(\theta)$ oriented nuc (1981La25). % $I_\gamma=0.024$ 16 $\alpha(\text{K})=1.2$ 8; $\alpha(\text{L})=0.49$ 16; $\alpha(\text{M})=0.12$ 5 $\alpha(\text{N})=0.029$ 11; $\alpha(\text{O})=0.0047$ 15; $\alpha(\text{P})=1.4\times 10^{-4}$ 10 $E_\gamma$ : Weighted average of 138.516 13 (1995BuZZ) and 138.2 2 (1971Pr12). $I_\gamma$ : from 1971Pr12. % $I_\gamma=0.074$ 16 $\alpha(\text{K})=1.898$ 27; $\alpha(\text{L})=0.311$ 4; $\alpha(\text{M})=0.0715$ 10 $\alpha(\text{N})=0.01759$ 25; $\alpha(\text{O})=0.00311$ 4; $\alpha(\text{P})=0.0002346$ 33 $I_\gamma$ : from 1971Pr12. Mult., $\delta$ : from ce(K) exp=1.6 4 (1971Pr12) yields $\alpha(\text{K})\text{exp}=1.6$ 4. $\delta=0.4$ 5 from ce data. % $I_\gamma<0.00158$ $I_\gamma$ : from 1971Pr12. % $I_\gamma=3.5$ 5	
129.416 16	38.4 17	129.426	5/2 <sup>+</sup>	0.0	3/2 <sup>+</sup>	M1+E2	-0.400 5	2.75 4		
138.515 20	0.3 2	762.589	3/2 <sup>+</sup>	624.080	(1/2 <sup>+</sup> )	[M1,E2]		1.8 6		
140.884 15	0.94 14	799.804	(5/2) <sup>-</sup>	658.9196	(3/2 <sup>-</sup> )	M1		2.301 32		
160	<0.02 <sup>@</sup>	747.801	(5/2) <sup>+</sup>	587.975	3/2 <sup>+</sup> ,5/2 <sup>+</sup>					
172.2181 25	43.8 8	351.1921	5/2 <sup>+</sup>	178.9772	3/2 <sup>+</sup>	M1+E2	+0.072 6	1.301 18		

<sup>191</sup>Pt ε decay **1971Pr12,1970Ma10** (continued)

γ(<sup>191</sup>Ir) (continued)

<u>E<sub>γ</sub><sup>†</sup></u>	<u>I<sub>γ</sub><sup>d</sup></u>	<u>E<sub>i</sub>(level)</u>	<u>J<sub>i</sub><sup>π</sup></u>	<u>E<sub>f</sub></u>	<u>J<sub>f</sub><sup>π</sup></u>	<u>Mult.&amp;</u>	<u>δ<sup>a</sup></u>	<u>α<sup>bc</sup></u>	<u>Comments</u>
178.9796 19	12.74 18	178.9772	3/2 <sup>+</sup>	0.0	3/2 <sup>+</sup>	M1+E2	-0.75 5	0.932 24	α(K)=1.072 15; α(L)=0.1761 25; α(M)=0.0406 6 α(N)=0.00997 14; α(O)=0.001765 25; α(P)=0.0001322 19 E <sub>γ</sub> : Weighted average of 172.2171 30 (2007La18), 172.221 5 (1995BuZZ), 172.224 10 (2021Kr02), and 172.19 2 (1971Pr12). I <sub>γ</sub> : Weighted average of 41.9 20 (1970Ma10), 44 2 (1971Pr12), and 44.1 9 (2021Kr02). Mult.: from ce(K):ce(L1):ce(L2):ce(L3) exp=47.5 8:7.01 11:0.70 5:0.09 3. δ: from γ(θ) oriented nuc (1981La25). Other: from Ice data fit δ=0.07 7. %I <sub>γ</sub> =1.01 15
<sup>x</sup> 186.8 <sup>‡</sup>	<0.4 <sup>@</sup>								α(K)=0.699 25; α(L)=0.1772 30; α(M)=0.0426 8 α(N)=0.01042 19; α(O)=0.001742 28; α(P)=8.43×10 <sup>-5</sup> 32 E <sub>γ</sub> : Weighted average of 178.9791 25 (2007La18), 178.980 3 (1995BuZZ), 178.984 10 (2021Kr02), and 178.96 3 (1971Pr12). Other: 178.91 5 (1972McYW). I <sub>γ</sub> : Weighted average of 12.2 6 (1970Ma10), 12.7 6 (1971Pr12), and 12.8 2 (2021Kr02). δ: from ce(K):ce(L1):ce(L2):ce(L3) exp=8.58 19:1.51 9:0.64 6:0.35 5. Sign of δ is from γγ(θ) (1972Be01) and γ(θ) oriented nuc (1981La25). %I <sub>γ</sub> <0.0316 I <sub>γ</sub> : from 1970Ma10. Other: 0.5 3 (1966BI03). %I <sub>γ</sub> =0.39 6
187.7208 19	4.99 9	538.9126	3/2 <sup>+</sup>	351.1921	5/2 <sup>+</sup>	M1+E2	0.50 16	0.91 6	α(K)=0.72 7; α(L)=0.145 4; α(M)=0.0342 14 α(N)=0.00837 32; α(O)=0.001437 35; α(P)=8.7×10 <sup>-5</sup> 9 E <sub>γ</sub> : weighted average of 187.7200 25 (2007La18), 187.721 3 (1995BuZZ), 187.731 10 (2021Kr02), and 187.69 4 (1971Pr12), and 187.8 1 (1972McYW). I <sub>γ</sub> : weighted average of 5.2 3 (1971Pr12), 5.0 3 (1970Ma10), and 4.96 10 (2021Kr02). δ: from ce(K):ce(L1):ce(L2) exp=3.77 19:0.91 18:0.31 18. Other: δ=+0.10 3, deduced by 1981La25 using its measured δ of 351γ on 1972Be01 γγ(θ). %I <sub>γ</sub> =0.0032 9
196 1	0.04 1	538.9126	3/2 <sup>+</sup>	343.25	7/2 <sup>+</sup>	[E2]		0.370 8	α(K)=0.1788 34; α(L)=0.144 4; α(M)=0.0366 10 α(N)=0.00886 23; α(O)=0.00138 4; α(P)=1.802×10 <sup>-5</sup> 34 I <sub>γ</sub> : from 1971Pr12; seen only in γγ. %I <sub>γ</sub> =0.129 21
208.96 15	1.61 10	747.801	(5/2) <sup>+</sup>	538.9126	3/2 <sup>+</sup>	M1		0.760 11	α(K)=0.627 9; α(L)=0.1020 14; α(M)=0.02348 33 α(N)=0.00577 8; α(O)=0.001023 14; α(P)=7.72×10 <sup>-5</sup> 11

<sup>191</sup>Pt ε decay **1971Pr12,1970Ma10** (continued)

γ(<sup>191</sup>Ir) (continued)

<u>E<sub>γ</sub><sup>†</sup></u>	<u>I<sub>γ</sub><sup>d</sup></u>	<u>E<sub>i</sub>(level)</u>	<u>J<sub>i</sub><sup>π</sup></u>	<u>E<sub>f</sub></u>	<u>J<sub>f</sub><sup>π</sup></u>	<u>Mult. &amp;</u>	<u>δ<sup>a</sup></u>	<u>α<sup>bc</sup></u>	<u>Comments</u>
214 1	0.11 3	343.25	7/2 <sup>+</sup>	129.426	5/2 <sup>+</sup>	M1+E2	-0.342 7	0.665 13	I <sub>γ</sub> : weighted average of 1.6 1 (1970Ma10) and 1.7 3 (1971Pr12). Mult.,δ: from ce(K)=0.93 16 (1971Ba45 normalized value) yields α(K)exp=0.57 10. δ=0.4 6 from ce data. %I <sub>γ</sub> =0.0087 27 α(K)=0.541 10; α(L)=0.0959 19; α(M)=0.0223 4 α(N)=0.00548 11; α(O)=0.000957 19; α(P)=6.62×10 <sup>-5</sup> 13 I <sub>γ</sub> : from 1971Pr12; seen only in γγ. δ: from particle-γ(θ) in Coulomb excitation (2000Be07). %I <sub>γ</sub> =0.84 13 α(K)=0.1335 19; α(L)=0.0897 13; α(M)=0.02266 32 α(N)=0.00550 8; α(O)=0.000862 12; α(P)=1.366×10 <sup>-5</sup> 19 E <sub>γ</sub> : Weighted average of 219.672 5 (2007La18), 219.681 10 (2021Kr02), 219.65 5 (1971Pr12), and 219.68 6 (1972McYW).
219.674 5	10.67 18	390.950	7/2 <sup>-</sup>	171.278	11/2 <sup>-</sup>	E2		0.2522 35	I <sub>γ</sub> : Weighted average of 10.9 6 (1970Ma10), 10.3 5 (1971Pr12), and 10.7 2 (2021Kr02). Mult.: E2(+M1) from ce(K):ce(L1):ce(L2):ce(L3) exp= 1.70 16:0.25 5:0.39 5:0.41 7 yields δ=4.2 3. ΔJ=2 from level scheme. %I <sub>γ</sub> =0.122 20 α(K)=0.532 7; α(L)=0.0864 12; α(M)=0.01989 28 α(N)=0.00489 7; α(O)=0.000866 12; α(P)=6.54×10 <sup>-5</sup> 9 E <sub>γ</sub> : Weighted average of 221.762 5 (2007La18), 221.769 6 (1995BuZZ), 221.766 12 (2021Kr02), and 221.74 8 (1971Pr12).
221.765 4	1.54 11	351.1921	5/2 <sup>+</sup>	129.426	5/2 <sup>+</sup>	(M1)		0.644 9	I <sub>γ</sub> : Weighted average of 1.7 2 (1970Ma10), 1.45 15 (1971Pr12), and 1.51 4 (2021Kr02). Mult.: ce(K)=1.05 12 (1970Ma10 normalized value) yields α(K)exp=0.68 9 gives δ=0.00 22. %I <sub>γ</sub> =0.111 18 α(K)=0.519 7; α(L)=0.0844 12; α(M)=0.01942 27 α(N)=0.00477 7; α(O)=0.000846 12; α(P)=6.39×10 <sup>-5</sup> 9 E <sub>γ</sub> : Weighted average of 223.6717 32 (2007La18), 223.677 9 (1995BuZZ), 223.663 13 (2021Kr02), and 223.67 8 (1971Pr12).
223.672 3	1.40 10	762.589	3/2 <sup>+</sup>	538.9126	3/2 <sup>+</sup>	M1		0.629 9	I <sub>γ</sub> : Weighted average of 1.3 2 (1970Ma10), 1.40 15 (1971Pr12), and 1.50 21 (2021Kr02). Mult.,δ: from ce(K):ce(L1):ce(L2):ce(L3) exp=0.73 6:0.05 4: <0.03: <0.03. Ice data fit gives δ=0.23 26. %I <sub>γ</sub> =0.0032 9 α(K)=0.25 15; α(L)=0.062 4; α(M)=0.0148 4
245 1	0.04 1	587.975	3/2 <sup>+</sup> ,5/2 <sup>+</sup>	343.25	7/2 <sup>+</sup>	[M1,E2]		0.33 16	

<sup>191</sup>Pt ε decay **1971Pr12,1970Ma10** (continued)

γ(<sup>191</sup>Ir) (continued)

$E_\gamma^\dagger$	$I_\gamma^d$	$E_i(\text{level})$	$J_i^\pi$	$E_f$	$J_f^\pi$	Mult.&	$\delta^a$	$\alpha^{bc}$	Comments
267.978 10	10.0 1	658.9196	(3/2 <sup>-</sup> )	390.950	7/2 <sup>-</sup>	E2		0.1336 19	<p><math>\alpha(\text{N})=0.00361</math> 12; <math>\alpha(\text{O})=0.00061</math> 5; <math>\alpha(\text{P})=3.0\times 10^{-5}</math> 20  <math>I_\gamma</math>: from <b>1971Pr12</b>; seen only in <math>\gamma\gamma</math>.  <math>\%I_\gamma=0.79</math> 12  <math>\alpha(\text{K})=0.0800</math> 11; <math>\alpha(\text{L})=0.0405</math> 6; <math>\alpha(\text{M})=0.01015</math> 14  <math>\alpha(\text{N})=0.002465</math> 35; <math>\alpha(\text{O})=0.000391</math> 5; <math>\alpha(\text{P})=8.45\times 10^{-6}</math> 12  <math>E_\gamma</math>: Weighted average of 267.979 10 (<b>2021Kr02</b>) and 267.92 8 (<b>1971Pr12</b>).  <math>I_\gamma</math>: weighted average of 9.7 10 (<b>1971Pr12</b>) and 10.0 1 (<b>2021Kr02</b>). Other: <math>I_\gamma(267.92)+I_\gamma(268.71)=32.4</math> 20 (<b>1970Sc20</b>), 33.0 17 (<b>1970Ma10</b>); <math>I_\gamma(268.7)/I_\gamma(267.9)=2.7</math> 5 (<b>1970Ma10</b>).                      Mult.: E2+(M1) from ce(K):ce(L1):ce(L2):ce(L3) exp= 0.95 6:0.31 15:0.27 15:0.16 6. Ice data fit gives <math>\delta=3.16</math> 14.</p>
268.772 5	21.0 3	351.1921	5/2 <sup>+</sup>	82.4253	1/2 <sup>+</sup>	E2		0.1324 19	<p><math>\%I_\gamma=1.66</math> 25  <math>\alpha(\text{K})=0.0794</math> 11; <math>\alpha(\text{L})=0.0401</math> 6; <math>\alpha(\text{M})=0.01003</math> 14  <math>\alpha(\text{N})=0.002436</math> 34; <math>\alpha(\text{O})=0.000387</math> 5; <math>\alpha(\text{P})=8.39\times 10^{-6}</math> 12  <math>E_\gamma</math>: Weighted average of 268.773 5 (<b>1995BuZZ</b>), 268.767 12 (<b>2021Kr02</b>), and 268.71 8 (<b>1971Pr12</b>).  <math>I_\gamma</math>: weighted average of 20.6 20 (<b>1971Pr12</b>) and 21.0 3 (<b>2021Kr02</b>). Others: see comment on <math>I_\gamma</math> for 267.92<math>\gamma</math>.                      Mult.: E2(+M1) from ce(K):ce(L1):ce(L2):ce(L3) exp= 1.78 14: 0.27 15:0.39 6:0.15 6. Ice data fit gives <math>\delta=4.3</math> 2.</p>
<sup>x</sup> 272.0#	<0.3@								<p><math>\%I_\gamma&lt;0.0237</math>  <math>I_\gamma</math>: from <b>1970Ma10</b>.</p>
308	<0.08@	658.9196	(3/2 <sup>-</sup> )	351.1921	5/2 <sup>+</sup>				<p><math>\%I_\gamma&lt;0.00633</math>  <math>E_\gamma, I_\gamma</math>: As listed in <b>1971Pr12</b>.</p>
343.22 8	0.148 27	343.25	7/2 <sup>+</sup>	0.0	3/2 <sup>+</sup>	(E2)		0.0641 9	<p><math>\%I_\gamma=0.0117</math> 28  <math>\alpha(\text{K})=0.0429</math> 6; <math>\alpha(\text{L})=0.01609</math> 23; <math>\alpha(\text{M})=0.00398</math> 6  <math>\alpha(\text{N})=0.000967</math> 14; <math>\alpha(\text{O})=0.0001561</math> 22; <math>\alpha(\text{P})=4.70\times 10^{-6}</math> 7  <math>E_\gamma</math>: From <b>2021Kr02</b>. Other: 343.2 4 (<b>1971Pr12</b>).  <math>I_\gamma</math>: 0.16 5 (<b>1971Pr12</b>) and 0.143 32 (<b>2021Kr02</b>).                      Mult.: from Coulomb excitation.</p>
351.187 3	44.5 5	351.1921	5/2 <sup>+</sup>	0.0	3/2 <sup>+</sup>	M1+E2	-0.30 2	0.1734 27	<p><math>\%I_\gamma=3.5</math> 5  <math>\alpha(\text{K})=0.1428</math> 23; <math>\alpha(\text{L})=0.02363</math> 35; <math>\alpha(\text{M})=0.00545</math> 8  <math>\alpha(\text{N})=0.001340</math> 19; <math>\alpha(\text{O})=0.0002364</math> 35; <math>\alpha(\text{P})=1.737\times 10^{-5}</math> 28  <math>E_\gamma</math>: Weighted average of 351.1851 20 (<b>2007La18</b>), 351.201 6 (<b>1995BuZZ</b>), 351.185 10 (<b>2021Kr02</b>), 351.17 3 (<b>1971Pr12</b>).                      Other: 351.24 3 (<b>1972McYW</b>).  <math>I_\gamma</math>: Weighted average of 43.5 21 (<b>1970Ma10</b>), 42 5 (<b>1971Pr12</b>), and 44.7 5 (<b>2021Kr02</b>).                      Mult.: from ce(K):ce(L1):ce(L2):ce(L3) exp=6.76 15:1.11 8: &lt;0.1:</p>

<sup>191</sup>Pt ε decay **1971Pr12,1970Ma10** (continued)

γ(<sup>191</sup>Ir) (continued)

$E_\gamma$ †	$I_\gamma$ <sup>d</sup>	$E_i$ (level)	$J_i^\pi$	$E_f$	$J_f^\pi$	Mult. &	$\delta^a$	$\alpha^{bc}$	Comments
359.930 3	74.2 7	538.9126	3/2 <sup>+</sup>	178.9772	3/2 <sup>+</sup>	M1		0.1719 24	<0.03. δ: from γ(θ) oriented nuc (1981La25). %I <sub>γ</sub> =5.9 9 α(K)=0.1423 20; α(L)=0.02285 32; α(M)=0.00525 7 α(N)=0.001291 18; α(O)=0.0002289 32; α(P)=1.735×10 <sup>-5</sup> 24 E <sub>γ</sub> : Weighted average of 359.9282 21 (2007La18), 359.942 6 (1995BuZZ), 359.934 10 (2021Kr02), and 359.88 3 (1971Pr12). Other: 359.94 3 (1972McYW). I <sub>γ</sub> : Weighted average of 73.1 37 (1970Ma10), 75 4 (1971Pr12), 74.7 8 (2021Kr02), and 71.2 20 (1970Sc20). Mult.,α: ce(K):ce(L1):ce(L2):ce(L3) exp=12.9 3:1.86 5:0.10 3: <0.03, outlier in Ice data fit: α(K) and α(L1) exp:theory=0.172 2:0.142 2 and 18.6 56:11.0 2, respectively. δ: from γ(θ) oriented nuc (1981La25). Other values: +0.14 2 γ(θ) (1973II02); +0.08 +6-7 (1976Kr21 evaluation of 1972Be01 γγ(θ)); +0.08 +8-7 γ(θ) (1980Be27).
396.75 7	0.150 19	747.801	(5/2) <sup>+</sup>	351.1921	5/2 <sup>+</sup>	[M1,E2]		0.09 4	%I <sub>γ</sub> =0.0119 23 α(K)=0.07 4; α(L)=0.014 4; α(M)=0.0032 8 α(N)=7.9×10 <sup>-4</sup> 21; α(O)=1.4×10 <sup>-4</sup> 4; α(P)=8.E-6 5 E <sub>γ</sub> : Weighted average of 396.75 7 (2021Kr02) and 396.7 2 (1971Pr12). I <sub>γ</sub> : weighted average of 0.13 4 (1971Pr12) and 0.155 21 (2021Kr02).
404.1 3	0.14 7	747.801	(5/2) <sup>+</sup>	343.25	7/2 <sup>+</sup>				%I <sub>γ</sub> =0.011 6 I <sub>γ</sub> : from 1971Pr12.
409 1	1.2 2	799.804	(5/2) <sup>-</sup>	390.950	7/2 <sup>-</sup>				%I <sub>γ</sub> =0.095 21 I <sub>γ</sub> : from 1971Pr12; seen only in γγ.
409.462 11	100 1	538.9126	3/2 <sup>+</sup>	129.426	5/2 <sup>+</sup>	M1+E2	+0.23 12	0.118 5	%I <sub>γ</sub> =7.9 12 α(K)=0.097 5; α(L)=0.0158 5; α(M)=0.00363 11 α(N)=0.000892 26; α(O)=0.000158 5; α(P)=1.18×10 <sup>-5</sup> 6 E <sub>γ</sub> : Unweighted average of 409.464 5 (2007La18), 409.490 6 (1995BuZZ), 409.453 10 (2021Kr02), and 409.44 2 (1971Pr12). Other: 409.47 3 (1972McYW). I <sub>γ</sub> : From 2021Kr02. Other: 100 5 (1971Pr12). Mult.: from ce(K):ce(L1):ce(L2):ce(L3) exp=11.23 15:1.87 12:0.19 9: <0.04. Ice data fit gives 0 7 % E2. δ: from 1976Kr21 evaluation, using γγ(θ) of 1972Be01, 1969Ow02, and 1973II02.
411.398 9	0.12 3	762.589	3/2 <sup>+</sup>	351.1921	5/2 <sup>+</sup>	[M1,E2]		0.08 4	%I <sub>γ</sub> =0.0095 28 α(K)=0.06 4; α(L)=0.012 4; α(M)=0.0029 8 α(N)=7.1×10 <sup>-4</sup> 19; α(O)=1.2×10 <sup>-4</sup> 4; α(P)=8.E-6 5



<sup>191</sup>Pt ε decay **1971Pr12,1970Ma10** (continued)

γ(<sup>191</sup>Ir) (continued)

<u>E<sub>γ</sub><sup>†</sup></u>	<u>I<sub>γ</sub><sup>d</sup></u>	<u>E<sub>i</sub>(level)</u>	<u>J<sub>i</sub><sup>π</sup></u>	<u>E<sub>f</sub></u>	<u>J<sub>f</sub><sup>π</sup></u>	<u>Mult.&amp;</u>	<u>δ<sup>a</sup></u>	<u>α<sup>bc</sup></u>	<u>Comments</u>
445.109 7	0.75 2	624.080	(1/2 <sup>+</sup> )	178.9772	3/2 <sup>+</sup>	[M1,E2]		0.065 33	E <sub>γ</sub> : From <b>1995BuZZ</b> . Other: 411 ( <b>1971Pr12</b> ). I <sub>γ</sub> : from <b>1971Pr12</b> ; seen only in γγ. %I <sub>γ</sub> =0.059 9 α(K)=0.052 29; α(L)=0.0098 31; α(M)=0.0023 7 α(N)=5.6×10 <sup>-4</sup> 17; α(O)=9.7×10 <sup>-5</sup> 32; α(P)=6.E-6 4 E <sub>γ</sub> : Weighted average of 445.111 8 ( <b>2007La18</b> ), 445.102 7 ( <b>1995BuZZ</b> ), 445.144 18 ( <b>2021Kr02</b> ), and 445.13 8 ( <b>1971Pr12</b> ). I <sub>γ</sub> : Weighted average of 0.82 8 ( <b>1970Ma10</b> ), 0.68 7 ( <b>1971Pr12</b> ), 0.75 2 ( <b>2021Kr02</b> ), and 0.7 1 ( <b>1970Sc20</b> ). %I <sub>γ</sub> <0.00633
448	<0.08 <sup>@</sup>	799.804	(5/2) <sup>-</sup>	351.1921	5/2 <sup>+</sup>				E <sub>γ</sub> ,I <sub>γ</sub> : As listed in <b>1971Pr12</b> . %I <sub>γ</sub> <0.00633
456.485 7	44.2 4	538.9126	3/2 <sup>+</sup>	82.4253	1/2 <sup>+</sup>	M1+E2	-0.32 4	0.0856 18	E <sub>γ</sub> ,I <sub>γ</sub> : As listed in <b>1971Pr12</b> . %I <sub>γ</sub> =3.5 5 α(K)=0.0707 15; α(L)=0.01152 21; α(M)=0.00265 5 α(N)=0.000652 11; α(O)=0.0001152 21; α(P)=8.56×10 <sup>-6</sup> 19 E <sub>γ</sub> : Unweighted average of 456.4753 11 ( <b>2007La18</b> ), 456.493 6 ( <b>1995BuZZ</b> ), 456.500 10 ( <b>2021Kr02</b> ), and 456.47 5 ( <b>1971Pr12</b> ). Other: 456.51 3 ( <b>1972McYW</b> ). I <sub>γ</sub> : from <b>2021Kr02</b> . Others: 42 2 ( <b>1971Pr12</b> ), 42.9 20 ( <b>1970Ma10</b> ) and 42.3 20 ( <b>1970Sc20</b> ). Mult.: from ce(K):ce(L1) exp=2.93 9:0.36 9. δ: from γ(θ) oriented nuc ( <b>1981La25</b> ). Other: δ=0.34 24 from Ice data fit.
458.546 20	0.72 6	587.975	3/2 <sup>+</sup> ,5/2 <sup>+</sup>	129.426	5/2 <sup>+</sup>	[M1,E2]		0.060 30	%I <sub>γ</sub> =0.057 10 α(K)=0.048 27; α(L)=0.0090 29; α(M)=0.0021 6 α(N)=5.2×10 <sup>-4</sup> 16; α(O)=8.9×10 <sup>-5</sup> 30; α(P)=5.7×10 <sup>-6</sup> 33 E <sub>γ</sub> : Weighted average of 458.59 15 ( <b>1971Pr12</b> ) and 458.545 20 ( <b>2021Kr02</b> ). I <sub>γ</sub> : weighted average of 0.54 10 ( <b>1971Pr12</b> ) and 0.74 3 ( <b>2021Kr02</b> ).
479.9417 7	0.66 2	658.9196	(3/2) <sup>-</sup>	178.9772	3/2 <sup>+</sup>	[E1]		0.00869 12	%I <sub>γ</sub> =0.052 8 α(K)=0.00725 10; α(L)=0.001111 16; α(M)=0.000254 4 α(N)=6.19×10 <sup>-5</sup> 9; α(O)=1.079×10 <sup>-5</sup> 15; α(P)=7.47×10 <sup>-7</sup> 10 E <sub>γ</sub> : Weighted average of 479.9416 7 ( <b>2007La18</b> ), 479.955 10 ( <b>2021Kr02</b> ), and 479.95 7 ( <b>1971Pr12</b> ). I <sub>γ</sub> : Weighted average of 0.61 7 ( <b>1970Ma10</b> ), 0.71 7 ( <b>1971Pr12</b> ), 0.65 2 ( <b>2021Kr02</b> ), and 0.72 5 ( <b>1970Sc20</b> ).
494.675 9	0.75 2	624.080	(1/2 <sup>+</sup> )	129.426	5/2 <sup>+</sup>	(E2)		0.02438 34	%I <sub>γ</sub> =0.059 9 α(K)=0.01812 25; α(L)=0.00478 7; α(M)=0.001154 16

<sup>191</sup>Pt ε decay **1971Pr12,1970Ma10** (continued)

$\gamma(^{191}\text{Ir})$  (continued)

$E_\gamma$ †	$I_\gamma$ <sup>d</sup>	$E_i$ (level)	$J_i^\pi$	$E_f$	$J_f^\pi$	Mult. &	$\delta^a$	$\alpha^{bc}$	Comments
538.897 11	182 2	538.9126	3/2 <sup>+</sup>	0.0	3/2 <sup>+</sup>	M1+E2	-0.68 2	0.0467 8	<p><math>\alpha(\text{N})=0.000282</math> 4; <math>\alpha(\text{O})=4.67\times 10^{-5}</math> 7; <math>\alpha(\text{P})=2.046\times 10^{-6}</math> 29  <math>E_\gamma</math>: Weighted average of 494.671 6 (2007La18), 494.650 7 (1995BuZZ), 494.689 10 (2021Kr02), and 494.69 7 (1971Pr12).  <math>I_\gamma</math>: weighted average of 0.75 7 (1971Pr12), 0.76 8 (1970Ma10), and 0.75 2 (2021Kr02).                      Mult.: (M1,E2) from ce(K)=0.031 10 (1971Ba45 normalized value). Ice data fit gives <math>\delta=1.0</math> 5. Decay scheme requires E2.                      %I<math>\gamma</math>=14.4 22  <math>\alpha(\text{K})=0.0383</math> 7; <math>\alpha(\text{L})=0.00649</math> 10; <math>\alpha(\text{M})=0.001502</math> 24  <math>\alpha(\text{N})=0.000369</math> 6; <math>\alpha(\text{O})=6.47\times 10^{-5}</math> 11; <math>\alpha(\text{P})=4.59\times 10^{-6}</math> 8  <math>E_\gamma</math>: Unweighted average of 538.9038 23 (2007La18), 538.921 6 (1995BuZZ), 538.892 10 (2021Kr02), and 538.87 5 (1971Pr12).                      Other: 538.92 3 (1972McYW).  <math>I_\gamma</math>: Weighted average of 186 8 (1970Ma10), 171 9 (1971Pr12), 183 2 (2021Kr02), and 179 8 (1970Sc20).                      Mult.: from ce(K):ce(L1):ce(L2):ce(L3) exp=7.34 19:1.15 9: &lt;0.12: &lt;0.12.  <math>\delta</math>: from <math>\gamma(\theta)</math> oriented nuc (1981La25). Other values: <math>\delta=0.84</math> +21-18 <math>\gamma(\theta)</math> (1980Be27); <math>\delta=0.60</math> 7 from Ice data fit.</p>
541.664 17	5.42 8	624.080	(1/2 <sup>+</sup> )	82.4253	1/2 <sup>+</sup>	(M1)		0.0583 8	<p>%I<math>\gamma</math>=0.43 6  <math>\alpha(\text{K})=0.0484</math> 7; <math>\alpha(\text{L})=0.00767</math> 11; <math>\alpha(\text{M})=0.001762</math> 25  <math>\alpha(\text{N})=0.000433</math> 6; <math>\alpha(\text{O})=7.68\times 10^{-5}</math> 11; <math>\alpha(\text{P})=5.85\times 10^{-6}</math> 8  <math>E_\gamma</math>: Unweighted average of 1.654 7 (1995BuZZ), 541.698 10 (2021Kr02), and 541.64 10 (1971Pr12).  <math>I_\gamma</math>: weighted average of 4.6 5 (1971Pr12) and 5.43 5 (2021Kr02).                      Mult.: from ce(K) exp=0.21 5. Ice data fit gives <math>\delta=0.0</math> 6.                      %I<math>\gamma</math>=0.056 9  <math>\alpha(\text{K})=0.0426</math> 6; <math>\alpha(\text{L})=0.00675</math> 9; <math>\alpha(\text{M})=0.001549</math> 22  <math>\alpha(\text{N})=0.000381</math> 5; <math>\alpha(\text{O})=6.75\times 10^{-5}</math> 9; <math>\alpha(\text{P})=5.14\times 10^{-6}</math> 7  <math>E_\gamma</math>: Weighted average of 568.809 17 (2021Kr02), 568.81 8 (1971Pr12), and 568.855 6 (2007La18).  <math>I_\gamma</math>: weighted average of 0.68 4 (1970Ma10) and 0.66 5 (1971Pr12), and 0.72 2 (2021Kr02).                      Mult.: from ce(K) exp=0.033 6 (1971Ba45 normalized value). Ice data fit gives <math>\delta=0.0</math> 3.</p>
568.850 10	0.71 2	747.801	(5/2 <sup>+</sup> )	178.9772	3/2 <sup>+</sup>	(M1)		0.0513 7	<p>%I<math>\gamma</math>=0.124 19  <math>\alpha(\text{K})=0.00494</math> 7; <math>\alpha(\text{L})=0.000746</math> 10; <math>\alpha(\text{M})=0.0001700</math> 24  <math>\alpha(\text{N})=4.16\times 10^{-5}</math> 6; <math>\alpha(\text{O})=7.26\times 10^{-6}</math> 10; <math>\alpha(\text{P})=5.14\times 10^{-7}</math> 7  <math>E_\gamma</math>: unweighted average of 576.4930 35 (2007La18), 576.523 10 (2021Kr02), and 576.46 8 (1971Pr12).</p>
576.492 18	1.57 2	658.9196	(3/2 <sup>-</sup> )	82.4253	1/2 <sup>+</sup>	E1		0.00591 8	

<sup>191</sup>Pt ε decay **1971Pr12,1970Ma10** (continued)

γ(<sup>191</sup>Ir) (continued)

$E_\gamma$ †	$I_\gamma$ <sup>d</sup>	$E_i$ (level)	$J_i^\pi$	$E_f$	$J_f^\pi$	Mult. &	$\delta^a$	$\alpha^{bc}$	Comments
583.621 7	0.96 3	762.589	3/2 <sup>+</sup>	178.9772	3/2 <sup>+</sup>	(M1)		0.0480 7	<p><math>I_\gamma</math>: Weighted average of 1.6 2 (1970Ma10), 1.47 11 (1971Pr12), 1.57 2 (2021Kr02), and 1.59 7 (1970Sc20).                      Mult.: from ce(K) exp=0.013 4 yields <math>\alpha(K)</math>exp=0.008 3; decay scheme requires parity change and <math>\alpha(K)</math>: E1=0.0049; M2=0.142.                      %<math>I_\gamma</math>=0.076 12  <math>\alpha(K)</math>=0.0399 6; <math>\alpha(L)</math>=0.00631 9; <math>\alpha(M)</math>=0.001447 20  <math>\alpha(N)</math>=0.000356 5; <math>\alpha(O)</math>=6.31×10<sup>-5</sup> 9; <math>\alpha(P)</math>=4.81×10<sup>-6</sup> 7  <math>E_\gamma</math>: Weighted average of 583.617 6 (2007La18), 583.618 11 (1995BuZZ), 583.660 16 (2021Kr02), and 583.61 8 (1971Pr12).  <math>I_\gamma</math>: weighted average of 0.95 7 (1971Pr12) and 0.96 3 (2021Kr02). and 0.93 8 (1970Sc20). Other: 1.39 10 (1970Ma10) – γ line was not well resolved from 587.95γ.                      Mult.: ce(K)=0.036 8 (1971Ba45 after normalization). Ice data fit gives <math>\delta</math>=0.0 8.</p>
587.98 3	1.88 5	587.975	3/2 <sup>+</sup> ,5/2 <sup>+</sup>	0.0	3/2 <sup>+</sup>	(M1)		0.0471 7	<p>%<math>I_\gamma</math>=0.149 23  <math>\alpha(K)</math>=0.0391 5; <math>\alpha(L)</math>=0.00619 9; <math>\alpha(M)</math>=0.001419 20  <math>\alpha(N)</math>=0.000349 5; <math>\alpha(O)</math>=6.19×10<sup>-5</sup> 9; <math>\alpha(P)</math>=4.72×10<sup>-6</sup> 7  <math>E_\gamma</math>: Unweighted average of 588.007 24 (2021Kr02) and 587.95 8 (1971Pr12).  <math>I_\gamma</math>: weighted average of 1.70 13 (1971Pr12), 1.92 10 (1970Ma10), 1.92 8 (1970Sc20), and 1.88 15 (2021Kr02).                      Mult.: ce(K)=0.085 12 (1971Ba45 after normalization). Ice data fit gives <math>\delta</math>=0.0 4.</p>
618.48 7	0.104 18	747.801	(5/2) <sup>+</sup>	129.426	5/2 <sup>+</sup>	[M1,E2]		0.028 13	<p>%<math>I_\gamma</math>=0.0082 19  <math>\alpha(K)</math>=0.023 12; <math>\alpha(L)</math>=0.0040 15; <math>\alpha(M)</math>=9.2×10<sup>-4</sup> 33  <math>\alpha(N)</math>=2.3×10<sup>-4</sup> 8; <math>\alpha(O)</math>=3.9×10<sup>-5</sup> 15; <math>\alpha(P)</math>=2.7×10<sup>-6</sup> 14  <math>E_\gamma</math>: Weighted average of 618.47 7 (2021Kr02) and 618.7 4 (1971Pr12).  <math>I_\gamma</math>: weighted average of 0.11 4 (1971Pr12) and 0.103 11 (2021Kr02).                      %<math>I_\gamma</math>=1.50 23  <math>\alpha(K)</math>=0.0304 32; <math>\alpha(L)</math>=0.0049 4; <math>\alpha(M)</math>=0.00113 9  <math>\alpha(N)</math>=0.000277 22; <math>\alpha(O)</math>=4.9×10<sup>-5</sup> 4; <math>\alpha(P)</math>=3.7×10<sup>-6</sup> 4  <math>E_\gamma</math>: unweighted average of 624.082 7 (1995BuZZ), 624.117 10 (2021Kr02), and 624.06 6 (1971Pr12). Other: 624.14 5 (1972McYW).  <math>I_\gamma</math>: weighted average of 20.5 15 (1970Ma10), 17.6 9 (1971Pr12), 19.1 2 (2021Kr02), and 18.4 10 (1970Sc20).                      Mult.,<math>\delta</math>: from ce(K) exp=0.59 5. Ice data fit gives <math>\delta</math>=0.35 22.                      %<math>I_\gamma</math>=0.028 4  <math>\alpha(K)</math>=0.0140 21; <math>\alpha(L)</math>=0.00277 27; <math>\alpha(M)</math>=0.00065 6</p>
624.086 17	19.0 2	624.080	(1/2) <sup>+</sup>	0.0	3/2 <sup>+</sup>	(M1+E2)	0.40 22	0.037 4	
633.186 14	0.348 13	762.589	3/2 <sup>+</sup>	129.426	5/2 <sup>+</sup>	E2(+M1)	2.3 6	0.0177 25	

<sup>191</sup>Pt ε decay [1971Pr12](#),[1970Ma10](#) (continued)

								$\gamma(^{191}\text{Ir})$ (continued)	
$E_\gamma$ †	$I_\gamma$ <sup>d</sup>	$E_i(\text{level})$	$J_i^\pi$	$E_f$	$J_f^\pi$	Mult. &	$\alpha^{bc}$	Comments	
								$\alpha(\text{N})=0.000160$ 15; $\alpha(\text{O})=2.74\times 10^{-5}$ 28; $\alpha(\text{P})=1.63\times 10^{-6}$ 26 $E_\gamma$ : Unweighted average of 633.166 11 ( <a href="#">1995BuZZ</a> ), 633.213 11 ( <a href="#">2021Kr02</a> ), and 633.18 10 ( <a href="#">1971Pr12</a> ). $I_\gamma$ : Weighted average of 0.37 4 ( <a href="#">1970Ma10</a> ), 0.30 3 ( <a href="#">1971Pr12</a> ), 0.336 16 ( <a href="#">2021Kr02</a> ), 0.38 2 ( <a href="#">1970Sc20</a> ), and 0.36 5 ( <a href="#">1966BI03</a> ). Mult.: from ce(K) exp=0.0049 16 ( <a href="#">1971Ba45</a> normalized value). Ice data fit gives $\delta=2.3$ 6.	
658.76 6	0.213 16	658.9196	(3/2 <sup>-</sup> )	0.0	3/2 <sup>+</sup>	[E1]	0.00450 6	$\%I_\gamma=0.0168$ 28 $\alpha(\text{K})=0.00377$ 5; $\alpha(\text{L})=0.000564$ 8; $\alpha(\text{M})=0.0001285$ 18 $\alpha(\text{N})=3.14\times 10^{-5}$ 4; $\alpha(\text{O})=5.51\times 10^{-6}$ 8; $\alpha(\text{P})=3.95\times 10^{-7}$ 6 $E_\gamma$ : Weighted average of 658.76 6 ( <a href="#">2021Kr02</a> ) and 658.75 15 ( <a href="#">1971Pr12</a> ). $I_\gamma$ : Weighted average of 0.20 4 ( <a href="#">1970Ma10</a> ), 0.19 2 ( <a href="#">1971Pr12</a> ), 0.254 23 ( <a href="#">2021Kr02</a> ), and 0.20 3 ( <a href="#">1970Sc20</a> ). $\%I_\gamma=0.0067$ 12 $\alpha(\text{K})=0.018$ 9; $\alpha(\text{L})=0.0031$ 12; $\alpha(\text{M})=7.1\times 10^{-4}$ 26 $\alpha(\text{N})=1.7\times 10^{-4}$ 6; $\alpha(\text{O})=3.1\times 10^{-5}$ 12; $\alpha(\text{P})=2.1\times 10^{-6}$ 11 $E_\gamma$ : Unweighted average of 680.170 11 ( <a href="#">1995BuZZ</a> ), 680.54 12 ( <a href="#">2021Kr02</a> ), and 680.0 2 ( <a href="#">1971Pr12</a> ). $I_\gamma$ : Weighted average of 0.09 7 ( <a href="#">1970Ma10</a> ), 0.086 17 ( <a href="#">1971Pr12</a> ), 0.066 11 ( <a href="#">2021Kr02</a> ), 0.10 1 ( <a href="#">1970Sc20</a> ), and 0.09 7 ( <a href="#">1966BI03</a> ). $\%I_\gamma=0.00079$ 34 $\alpha(\text{K})=0.00894$ 13; $\alpha(\text{L})=0.001878$ 27; $\alpha(\text{M})=0.000445$ 6 $\alpha(\text{N})=0.0001088$ 15; $\alpha(\text{O})=1.847\times 10^{-5}$ 26; $\alpha(\text{P})=1.018\times 10^{-6}$ 14 $E_\gamma, I_\gamma$ : From <a href="#">1970Sc20</a> ; placement by evaluator. Mult.: from adopted gammas.	
680.24 16	0.085 8	762.589	3/2 <sup>+</sup>	82.4253	1/2 <sup>+</sup>	[M1,E2]	0.022 10		
686.6 5	0.010 4	686.6	7/2 <sup>+</sup>	0.0	3/2 <sup>+</sup>	E2	0.01139 16		
747.76 15	0.046 4	747.801	(5/2) <sup>+</sup>	0.0	3/2 <sup>+</sup>	[M1,E2]	0.017 8	$\%I_\gamma=0.0036$ 6 $\alpha(\text{K})=0.014$ 7; $\alpha(\text{L})=0.0024$ 9; $\alpha(\text{M})=5.6\times 10^{-4}$ 20 $\alpha(\text{N})=1.4\times 10^{-4}$ 5; $\alpha(\text{O})=2.4\times 10^{-5}$ 9; $\alpha(\text{P})=1.7\times 10^{-6}$ 8 $E_\gamma$ : Weighted average of 747.67 12 ( <a href="#">2021Kr02</a> ) and 748.0 2 ( <a href="#">1971Pr12</a> ). $I_\gamma$ : Weighted average of 0.045 10 ( <a href="#">1970Ma10</a> ), 0.052 10 ( <a href="#">1971Pr12</a> ), 0.063 11 ( <a href="#">2021Kr02</a> ), and 0.042 5 ( <a href="#">1970Sc20</a> ). $\%I_\gamma=0.0015$ 5 $E_\gamma, I_\gamma$ : Weighted average of $E_\gamma = 756.6$ 5 and 756.2 8; and $I_\gamma=0.020$ and 0.015 10, from <a href="#">1970Sc20</a> and <a href="#">1970Ma10</a> , respectively.	
756.5 4	0.019 5	935.71	(1/2 <sup>+</sup> , 3/2, 5/2 <sup>+</sup> )	178.9772	3/2 <sup>+</sup>			$\%I_\gamma=0.0135$ 21 $\alpha(\text{K})=0.014$ 6; $\alpha(\text{L})=0.0023$ 9; $\alpha(\text{M})=5.3\times 10^{-4}$ 19 $\alpha(\text{N})=1.3\times 10^{-4}$ 5; $\alpha(\text{O})=2.3\times 10^{-5}$ 9; $\alpha(\text{P})=1.6\times 10^{-6}$ 8 $E_\gamma$ : Weighted average of 762.76 6 ( <a href="#">2021Kr02</a> ) and 762.60 15	
762.74 6	0.171 9	762.589	3/2 <sup>+</sup>	0.0	3/2 <sup>+</sup>	[M1,E2]	0.017 8		

<sup>191</sup>Pt ε decay **1971Pr12,1970Ma10** (continued)

						<u>γ(<sup>191</sup>Ir) (continued)</u>	
<u>E<sub>γ</sub><sup>†</sup></u>	<u>I<sub>γ</sub><sup>d</sup></u>	<u>E<sub>i</sub>(level)</u>	<u>J<sub>i</sub><sup>π</sup></u>	<u>E<sub>f</sub></u>	<u>J<sub>f</sub><sup>π</sup></u>		<u>Comments</u>
						(1971Pr12).	
						I <sub>γ</sub> : Weighted average of 0.17 2 (1970Ma10), 0.15 2 (1971Pr12), 0.190 16 (2021Kr02), 0.16 2 (1970Sc20), and 0.23 8 (1966Bl03).	
806.4 3	0.049 5	935.71	(1/2 <sup>+</sup> ,3/2,5/2 <sup>+</sup> )	129.426	5/2 <sup>+</sup>	%I <sub>γ</sub> =0.0039 7	
853.5 4	0.0132 10	935.71	(1/2 <sup>+</sup> ,3/2,5/2 <sup>+</sup> )	82.4253	1/2 <sup>+</sup>	I <sub>γ</sub> : weighted average of 0.045 10 (1970Ma10), 0.047 9 (1971Pr12), and 0.054 9 (1970Sc20). %I <sub>γ</sub> =0.00104 18	
935.61 27	0.149 7	935.71	(1/2 <sup>+</sup> ,3/2,5/2 <sup>+</sup> )	0.0	3/2 <sup>+</sup>	E <sub>γ</sub> ,I <sub>γ</sub> : Weighted average of E <sub>γ</sub> = 853.6 4 and 853.2 10; I <sub>γ</sub> =0.013 1 and 0.015 10, from 1970Sc20 and 1970Ma10, respectively. %I <sub>γ</sub> =0.0118 18	
						E <sub>γ</sub> : Unweighted average of 935.88 8 (2021Kr02) and 935.33 15 (1971Pr12). I <sub>γ</sub> : Weighted average of 0.16 2 (1970Ma10), 0.15 2 (1971Pr12), 0.162 13 (2021Kr02), 0.14 1 (1970Sc20), and 0.14 2 (1967Sc25).	

<sup>†</sup> From 1971Pr12, unless otherwise noted.

<sup>‡</sup> From 1962Ma18.

<sup>#</sup> From 1962Ha24.

@ Unobserved γ ray.

& From ce data.

<sup>a</sup> Unless otherwise specified, δ values were calculated by BrIcc code using the Ice data.

<sup>b</sup> α(exp): values can be calculated as N×Ice/I<sub>γ</sub>, with N=0.955 18, using Ice and I<sub>γ</sub> in the relative scales given in the table; N determined from δ fitting procedure (see footnote on δ).

<sup>c</sup> [Additional information 1.](#)

<sup>d</sup> For absolute intensity per 100 decays, multiply by 0.079 12.

<sup>x</sup> γ ray not placed in level scheme.

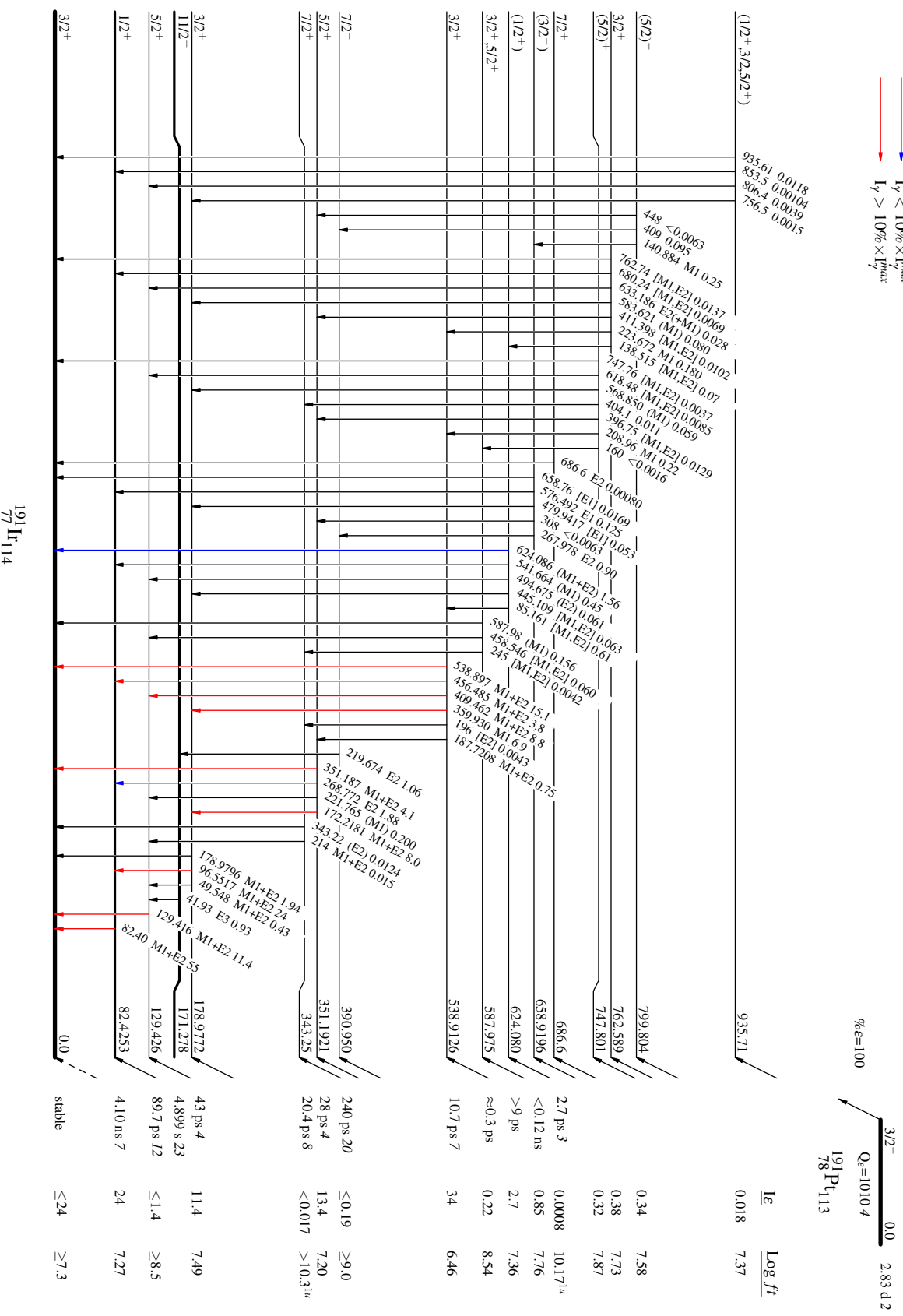
<sup>191</sup>Pt e decay 1971Pt-12,1970Ma10

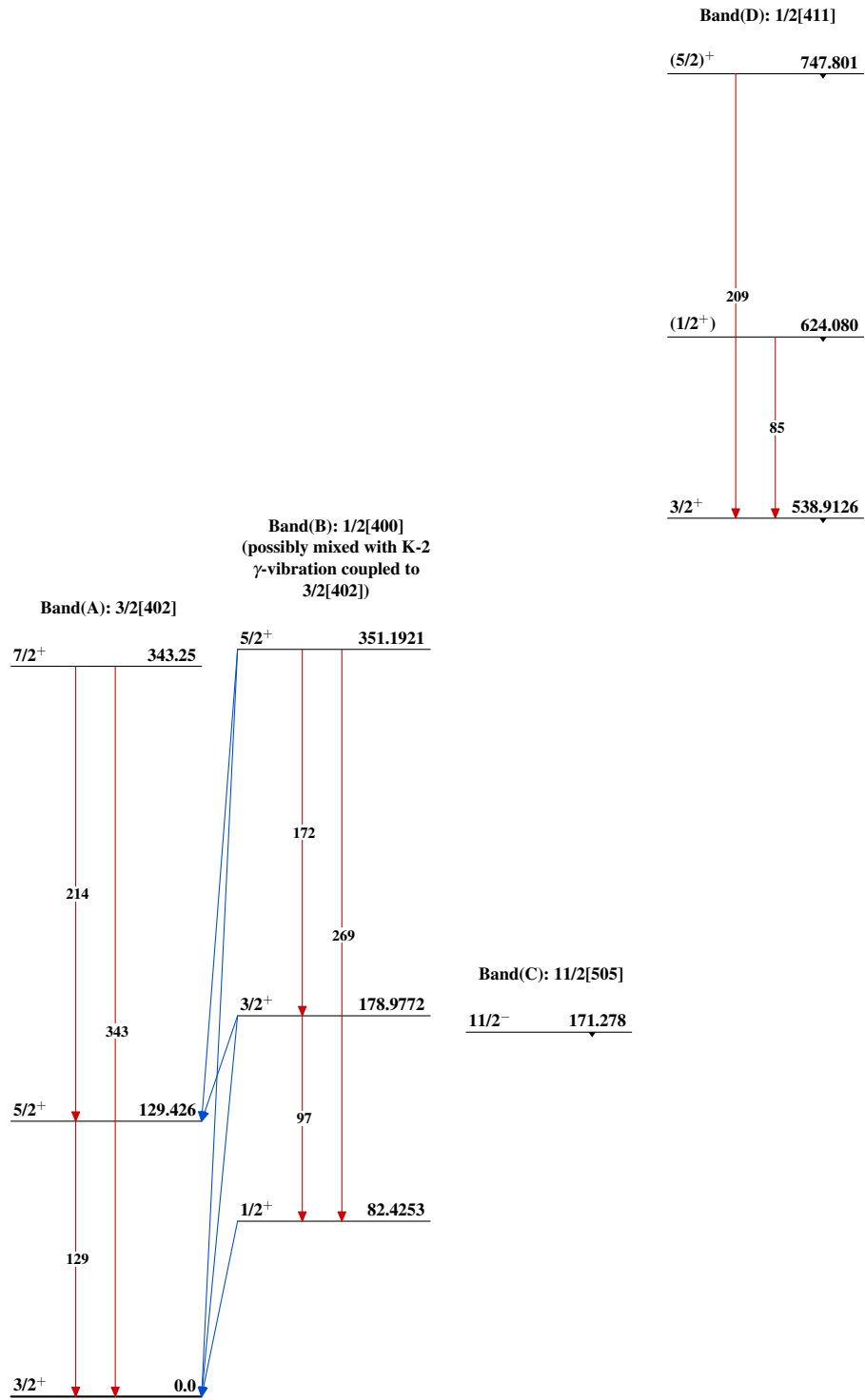
Decay Scheme

Legend

- I<sub>γ</sub> < 2% × I<sub>max</sub>
- I<sub>γ</sub> < 10% × I<sub>max</sub>
- I<sub>γ</sub> > 10% × I<sub>max</sub>

Intensities: I<sub>γ</sub>(%) per 100 parent decays



$^{191}\text{Pt}$   $\epsilon$  decay 1971Pr12,1970Ma10 $^{191}_{77}\text{Ir}_{114}$