Coulomb excitation **2000Be07,1986Mc01,1984Mu19**

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

Others: 1956Da40, 1956Hu49, 1957Be56, 1957Mc34, 1958Mc02, 1969Av03, 1970Av02, 1971No01, 1971Pr12, 1986Ko20.

2000Be07: E(^{58}Ni)=155, 180 MeV; E(^{65}Cu)=130 MeV; E(^{32}S)=100 MeV; E(^{16}O)=40 MeV. Natural Ir targets. Measured $\gamma(\theta$,H,t), recoil distance, particle-$\gamma(\theta)$, and g-factor (transient field IMPAC technique; values shown here supersede those in 1996St22). Used particle-triaxial-rotor-model, U(6/4), and U(6/20) supersymmetry models to interpret level structure.

1986Mc01: E(^{40}Ar)=160 MeV; E(^{136}Xe)=617 MeV. Enriched ^{191}Ir targets (99.45%); measured γ-ray yields, particle-γ coin (annular solid-state surface-barrier detector, Ge(Li)); used triaxial rotor model to interpret level structure.

1984Mu19: E(p),E(α)=5.0-6.0 MeV. Natural Ir targets; measured γ-ray yields, $\gamma(\theta)$ (large-volume Compton-suppressed Ge(Li) detector).

1986Ko20: E(^{32}S)=89, 118 MeV; measured $\gamma(\theta$,H), $\gamma(\theta$,H,t), recoil-distance method.

1971Pr12: E(^{16}O)=25 MeV, 40 MeV, 65 MeV. Enriched ^{191}Ir targets (98.6%); measured Eγ, Iγ (Ge(Li)), γ-ray yields.

Some data are from the following articles:

1971No01: E(d)=7.0 MeV; Eα=16.6 MeV.

1970Av02: E(^{16}O)≈40 MeV, $\gamma(\theta)$.

1969Av03: E(^{16}O)=9-30 MeV.

^{191}Ir Levels

B(E2)↑: The values of 1984Mu19 were obtained using B(E2)↑(^{194}Pt 0^+ to 2^+)=1.620 *15* (1978Ba38) for calibration and were renormalized by the evaluator to the currently adopted value 1.649 *15* (2006Si17). The values of 1969Av03 were normalized to 1/(1+α) B(E2)↑=0.75 *4* for 136γ in ^{181}Ta. Most of the quoted B(E2)↑ in this dataset are deduced from the listed B(E2)↓ values listed by the authors.

g-factors, $T_{1/2}$: Data of 1986Ko20 were not used in adopted values: many results are discrepant from all other experiments.

E(level)[a]	J$^\pi$[b]	$T_{1/2}$	Comments
0.0[†]	3/2$^+$		
82.42[‡] *4*	1/2$^+$	4.2 ns *10*	B(E2)↑=0.0662 *15* B(E2)↑: from 1984Mu19. Other values: 0.068 *8* (quoted by 1986Mc01 from 1981HuZU); 0.083 *11* (1971No01); 0.055 *7* (1969Av03). Other: 1971Pr12. $T_{1/2}$: From B(E2)=0.0662 *15* and adopted γ-ray properties.
129.37[†] *4*	5/2$^+$	88.7 ps *21*	B(E2)↑=0.905 *20* g−factor=+0.322 *22* transient field IMPAC measurements (2000Be07). Other: 0.34 *6* (1970Av02), perturbed angular correlation, recalculated by evaluator with adopted $T_{1/2}$=89.9 ps *9*. B(E2)↑: Weighted average of 0.897 *25* (quoted by 1986Mc01 from 1981HuZU), 0.98 *5* (1984Mu19), 0.89 *7* (1971No01), and 0.82 *8* (1969Av03). Other: 0.97 (1957Be56). $T_{1/2}$: Weighted average of 87.9 ps *16* (2000Be07 − τ=126.8 ps *23* − recoil-distance method) and 94 ps *4* (from B(E2)=0.905 *20* and adopted γ properties). Other: 120.4 ps *34* (1986Ko20 − τ=173.7 ps *72*- recoil-distance method).
171.2[&] *10*	11/2$^-$	4.899 s *23*	Additional information 1. $T_{1/2}$: from Adopted Levels.
178.96[‡] *4*	3/2$^+$	42 ps *10*	B(E2)↑=0.102 *6* B(E2)↑: Weighted average of 0.108 *9* (quoted by 1986Mc01 from 1981HuZU), 0.074 *13* (1984Mu19), 0.11 *10* (1971No01). Other: 0.18 *11* (1969Av03); 1971Pr12. $T_{1/2}$: Calculated using B(E2)=0.102 *6* and adopted γ properties.
343.27[†] *6*	7/2$^+$	20.4 ps *8*	B(E2)↑=0.549 *21* g−factor=+0.401 *18* transient field IMPAC measurements (2000Be07). B(E2)↑: Unweighted average of 0.556 *12* (quoted by 1986Mc01 from 1981HuZU), 0.60 *1* (1984Mu19), 0.50 *7* (1971No01), and 0.54 *6* (1969Av03). Other: 1971Pr12.

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Coulomb excitation 2000Be07,1986Mc01,1984Mu19 (continued)

^{191}Ir Levels (continued)

E(level)[a]	J$^{\pi}$[b]	T$_{1/2}$	Comments
			T$_{1/2}$: Weighted average of 20.4 ps *15* (2000Be07, 2004StZZ – τ=29.4 ps *22* – recoil-distance method), 20.3 ps *8*, B(E2)=0.549 *21* and adopted γ-ray properties, and 21.3 ps *30* (1986Ko20 – τ=30.8 ps *44* – recoil-distance measurement).
351.18‡ *4*	5/2$^+$	28 ps *4*	B(E2)↑=0.0170 *6* B(E2)↑: (1984Mu19). Other: 0.030 *8* (quoted by 1986Mc01 from 1981HuZU); 1971Pr12. T$_{1/2}$: From B(E2)↑=0.0170 *6*, adopted 351γ and other γ-ray properties.
390.6@	7/2$^-$		
502.75† *6*	(9/2)$^+$	9.8 ps *6*	B(E2)↑=1.11 *3* (based on B(E2)↓=102 *3**0.00652=0.665 *20* – quoted in 1986Mc01 (Table III) from 1981HuZU). g–factor=+0.53 *5* transient field IMPAC measurements (2000Be07). T$_{1/2}$: Weighted average of 13.4 ps *19* (2000Be07 – τ=19.3 ps *27* – recoil-distance method), 9.6 ps *4*, calculated by evaluator from B(E2)(129 to 502)=1.11 *3* and adopted γ properties, 13.1 ps *32* (1986Ko20 – τ=18.9 ps *46* – recoil-distance measurement).
504.21‡ *11*	(7/2$^+$)		
538.9c *5*	3/2$^+$		
587.9c	3/2$^+$,5/2$^+$		
624.1c	(1/2$^+$)		
653.8@ *11*	(9/2$^-$)		
659.4 *11*	(3/2$^-$)		
686.41# *10*	7/2$^+$	2.7 ps *3*	B(E2)↑=0.117 *11* g–factor=+0.23 *9* transient field IMPAC measurements (2000Be07). B(E2)↑: Unweighted average of 0.126 *4* (quoted by 1986Mc01 from 1981HuZU), 0.13 *1* (1984Mu19), and 0.094 *11* (1971No01). T$_{1/2}$: Calculated by evaluator from B(E2)↑=0.117 *11* and adopted γ ray properties. Other: T$_{1/2}$<2.8 ps (from τ=1.6 ps *25* – 1986Ko20).
748?c	(5/2)$^+$		
762.2c	3/2$^+$		
799.6	(5/2)$^-$		
812.05‡ *12*	(9/2$^+$)		
832.1† *5*	(11/2$^+$)	3.14 ps *19*	g–factor=+0.61 *17* transient field IMPAC measurements (2000Be07). B(E2)↑=0.70 *4* (based on B(E2)↓=72 *4**0.00652=0.469 *26* – quoted by 1986Mc01 in Table III from 1981HuZU). T$_{1/2}$: Calculated by evaluator from B(E2)(343 to 832)=0.70 *4*, adopted 489γ and other γ-ray properties.
946.1#	9/2$^+$		J$^{\pi}$: from band assignment in 1986Mc01.
991.2‡	(11/2$^+$)		
1004.4†	(13/2$^+$)		
1207.03# *18*	11/2$^+$		J$^{\pi}$: from band assignment in 1986Mc01.
1398.0‡ *6*	(13/2$^+$)		
1418.6† *5*	(15/2$^+$)		
1599.4†	(17/2$^+$)		
2112.6†	(19/2$^+$)		
2311.4†	(21/2$^+$)		

† Band(A): 3/2[402] g.s. rotational band.
‡ Band(B): 1/2[400] rotational band (possibly mixed with K-2 γ-vibration Coupled to 3/2[402]).
# Band(C): K=7/2$^+$, K+2 γ-vibration coupled to 3/2[402].

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Coulomb excitation **2000Be07,1986Mc01,1984Mu19** **(continued)**

^{191}Ir Levels (continued)

@ Band(D): K=(7/2$^-$), K-2 γ-vibration coupled to 11/2[505].
& Band(E): 11/2[505] rotational band.
a From a least-squares fit to γ-ray energies with equal weight for the missing uncertainty in Eγ.
b From Adopted Levels.
c From 1984Mu19.

Coulomb excitation 2000Be07,1986Mc01,1984Mu19 **(continued)**

$\gamma(^{191}Ir)$

E_γ †	I_γ †	E_i(level)	J_i^π	E_f	J_f^π	Mult.[a]	δ	α[b]	Comments
(41.8)		171.2	$11/2^-$	129.37	$5/2^+$				
47		129.37	$5/2^+$	82.42	$1/2^+$	[E2]		144.2	α(L)=108.7 *16*; α(M)=27.8 *4*; α(N+..)=7.73 *11* α(N)=6.71 *10*; α(O)=1.015 *15*; α(P)=0.000959 *14*
82.40‡ *5*	0.139 *7*	82.42	$1/2^+$	0.0	$3/2^+$	M1+E2		10.49 *22*	α(K)=5 *4*; α(L)=4 *3*; α(M)=1.1 *8*; α(N+..)=0.31 *21* α(N)=0.26 *19*; α(O)=0.04 *3*; α(P)=0.0006 *5* I_γ: from 1971Pr12.
96.53‡ *5*	13.9 *15*	178.96	$3/2^+$	82.42	$1/2^+$	M1+E2		6.0 *8*	α(K)=3.2 *24*; α(L)=2.2 *13*; α(M)=0.5 *4*; α(N+..)=0.15 *10* α(N)=0.13 *8*; α(O)=0.021 *12*; α(P)=0.0004 *3* I_γ: from 1971Pr12 renormalized to 100 for 343γ. Iγ=6.5 *13* given by 1986Mc01 is inaccurate because of absorber and detector-efficiency corrections.
129.39‡ *4*	94.1 *25*	129.37	$5/2^+$	0.0	$3/2^+$	M1+E2	−0.402 *7*	2.75	α(K)=2.15 *4*; α(L)=0.464 *8*; α(M)=0.1102 *18*; α(N+..)=0.0318 *5* α(N)=0.0270 *5*; α(O)=0.00459 *7*; α(P)=0.000264 *4* δ: particle-$\gamma(\theta)$ (2000Be07). Other: −0.46 *4* from particle-$\gamma(\theta)$ (1970Av02).
152.97# *26*	3.9 *5*	504.21	$(7/2^+)$	351.18	$5/2^+$				
159.47# *2*	10.3 *6*	502.75	$(9/2)^+$	343.27	$7/2^+$				
172.21‡ *5*	12.5 *7*	351.18	$5/2^+$	178.96	$3/2^+$	M1+E2		0.9 *4*	α(K)=0.7 *5*; α(L)=0.21 *4*; α(M)=0.052 *12*; α(N+..)=0.015 *3* α(N)=0.013 *3*; α(O)=0.0021 *4*; α(P)=8.E−5 *6*
178.96‡ *5*	4.4 *4*	178.96	$3/2^+$	0.0	$3/2^+$	M1+E2		0.8 *4*	α(K)=0.6 *4*; α(L)=0.19 *3*; α(M)=0.045 *9*; α(N+..)=0.0129 *23* α(N)=0.0110 *21*; α(O)=0.00181 *23*; α(P)=7.E−5 *5*
213.88# *6*	63.7 *17*	343.27	$7/2^+$	129.37	$5/2^+$	M1+E2	−0.342 *7*	0.668	α(K)=0.543 *8*; α(L)=0.0963 *14*; α(M)=0.0224 *4*; α(N+..)=0.00653 *10* α(N)=0.00550 *8*; α(O)=0.000961 *14*; α(P)=6.64×10^{-5} *10* δ: particle-$\gamma(\theta)$ (2000Be07). Other values: −0.34 *4* or −1.69 *4* (1984Mu19), −0.37 *+10−14* (1970Av02), −0.45 *3* or −0.98 *11* (1981HuZU) particle-$\gamma(\theta)$.
220		390.6	$7/2^-$	171.2	$11/2^-$				
244.6@	0.31& *3*	587.9	$3/2^+,5/2^+$	343.27	$7/2^+$				
263.20# *6*	1.9 *4*	653.8	$(9/2^-)$	390.6	$7/2^-$				
268.75c‡ *8*	5.6c *5*	351.18	$5/2^+$	82.42	$1/2^+$	E2		0.1326	α(K)=0.0796 *12*; α(L)=0.0402 *6*; α(M)=0.01006 *15*; α(N+..)=0.00284 *4* α(N)=0.00244 *4*; α(O)=0.000388 *6*; α(P)=8.40×10^{-6} *12*
268.75c‡ *8*	5.6c *5*	659.4	$(3/2^-)$	390.6	$7/2^-$				
308.2# *2*	3.0 *4*	812.05	$(9/2^+)$	504.21	$(7/2^+)$				
325.2# *5*	7.3 *5*	504.21	$(7/2^+)$	178.96	$3/2^+$				
329.4# *5*	13.9 *7*	832.1	$(11/2^+)$	502.75	$(9/2)^+$				

$^{191}_{77}Ir_{114}$-4

Coulomb excitation 2000Be07,1986Mc01,1984Mu19 **(continued)**

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

E_γ [†]	I_γ [†]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[a]	δ	α[b]	Comments
343.2[‡] *2*	100	343.27	$7/2^+$	0.0	$3/2^+$	E2		0.0641	α(K)=0.0429 *6*; α(L)=0.01609 *23*; α(M)=0.00398 *6*; α(N+..)=0.001128 *16* α(N)=0.000967 *14*; α(O)=0.0001562 *23*; α(P)=4.70×10^{-6} *7*
351.16[‡] *5*	10.5 *6*	351.18	$5/2^+$	0.0	$3/2^+$	M1+E2		0.12 *7*	α(K)=0.10 *6*; α(L)=0.020 *5*; α(M)=0.0046 *10*; α(N+..)=0.0013 *3* α(N)=0.00114 *25*; α(O)=0.00019 *5*; α(P)=1.1×10^{-5} *7*
359.9[@]	1.50[&] *15*	538.9	$3/2^+$	178.96	$3/2^+$				
373.41[#] *7*	116 *3*	502.75	$(9/2)^+$	129.37	$5/2^+$				
375.04[#] *14*	3.8 *8*	504.21	$(7/2^+)$	129.37	$5/2^+$				
406.8[#] *3*		1398.0	$(13/2^+)$	991.2	$(11/2^+)$				
409		799.6	$(5/2)^-$	390.6	$7/2^-$				
409.5[@]	1.43[&] *14*	538.9	$3/2^+$	129.37	$5/2^+$				
414	1.7 *3*	1418.6	$(15/2^+)$	1004.4	$(13/2^+)$				
443	2.0 *4*	946.1	$9/2^+$	502.75	$(9/2)^+$				
456.5[@]	0.36[&] *4*	538.9	$3/2^+$	82.42	$1/2^+$				
458.6[@]	0.18[&] *2*	587.9	$3/2^+$,$5/2^+$	129.37	$5/2^+$				
460.71[#] *13*	5.5 *5*	812.05	$(9/2^+)$	351.18	$5/2^+$				
468.9[#] *5*	2.2 *4*	812.05	$(9/2^+)$	343.27	$7/2^+$				
482.5[#] *5*	2.4 *3*	653.8	$(9/2^-)$	171.2	$11/2^-$				
487	3.7 *7*	991.2	$(11/2^+)$	504.21	$(7/2^+)$				
489	39.3 *12*	832.1	$(11/2^+)$	343.27	$7/2^+$	E2		0.0251	α(K)=0.0186 *3*; α(L)=0.00495 *7*; α(M)=0.001197 *17*; α(N+..)=0.000342 *5* α(N)=0.000292 *4*; α(O)=4.84×10^{-5} *7*; α(P)=2.10×10^{-6} *3*
501.5	20 *1*	1004.4	$(13/2^+)$	502.75	$(9/2)^+$				
520.8[#] *3*	2.1 *3*	1207.03	$11/2^+$	686.41	$7/2^+$				
538.9[@]	1.57[&] *16*	538.9	$3/2^+$	0.0	$3/2^+$				
541.6[@]	0.143[&] *14*	624.1	$(1/2^+)$	82.42	$1/2^+$				
557.08[#] *13*	27.6 *8*	686.41	$7/2^+$	129.37	$5/2^+$	M1+E2	−1.11 *10*	0.0344 *18*	α(K)=0.0279 *16*; α(L)=0.00505 *20*; α(M)=0.00118 *5*; α(N+..)=0.000342 *13* α(N)=0.000289 *11*; α(O)=5.01×10^{-5} *20*; α(P)=3.31×10^{-6} *19* δ: weighted-average of −0.98 *12* (2000Be07) and −1.34 *16* from (1984Mu19) particle-$\gamma(\theta)$.
569.0[@d]	<0.2[&]	748?	$(5/2)^+$	178.96	$3/2^+$				

$^{191}_{77}Ir_{114}$-5

Coulomb excitation **2000Be07,1986Mc01,1984Mu19 (continued)**

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

E_γ [†]	I_γ [†]	E_i(level)	J_i^π	E_f	J_f^π	Mult.[a]	α[b]	Comments
583.2[@]	0.18[&] *2*	762.2	$3/2^+$	178.96	$3/2^+$			
585.9[c#] *7*	5.5[c] *6*	1398.0	$(13/2^+)$	812.05	$(9/2^+)$			
586.5[#] *3*	5.5 *6*	1418.6	$(15/2^+)$	832.1	$(11/2^+)$			E_γ: Other: 586 (1986Mc01).
588.0[@]	0.46[&] *5*	587.9	$3/2^+,5/2^+$	0.0	$3/2^+$			
595	1.7 *3*	1599.4	$(17/2^+)$	1004.4	$(13/2^+)$			
603	2.4 *4*	946.1	$9/2^+$	343.27	$7/2^+$			
624.1[@]	0.28[&] *3*	624.1	$(1/2^+)$	0.0	$3/2^+$			
686.40[#] *14*	20.9 *9*	686.41	$7/2^+$	0.0	$3/2^+$	E2	0.01140	α(K)=0.00895 *13*; α(L)=0.00188 *3*; α(M)=0.000445 *7*; α(N+..)=0.0001284 *18* α(N)=0.0001089 *16*; α(O)=1.85×10^{-5} *3*; α(P)=1.019×10^{-6} *15*
694		2112.6	$(19/2^+)$	1418.6	$(15/2^+)$			
704.2[#] *2*	1.3 *3*	1207.03	$11/2^+$	502.75	$(9/2)^+$			
712		2311.4	$(21/2^+)$	1599.4	$(17/2^+)$			
817	1.7 *4*	946.1	$9/2^+$	129.37	$5/2^+$			

† From 1986Mc01, unless otherwise specified.
‡ From Coulomb excitation data in 1971Pr12.
# From Adopted Gammas.
@ From Fig. 2 in 1984Mu19.
& Deduced value relative to Iγ(343γ)=100 from 140 in Fig. 2 of 1984Mu19, with an estimated uncertainty of 10% based on the other related data in 1984Mu19.
[a] Multipolarities of γ rays with M1 components are from ^{191}Os β^- decay and ^{191}Pt ε decay. Mult of E2 γ-rays come from angular distribution in Coulomb excitation in 1984Mu19, and also in 1981HuZU as quoted by 1986Mc01, but data are not shown in the retrievable sources.
[b] 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.
[c] Multiply placed with undivided intensity.
[d] Placement of transition in the level scheme is uncertain.

$^{191}_{77}Ir_{114}$-6

Coulomb excitation 2000Be07,1986Mc01,1984Mu19

Level Scheme

Intensities: Relative I_γ

& Multiply placed: undivided intensity given

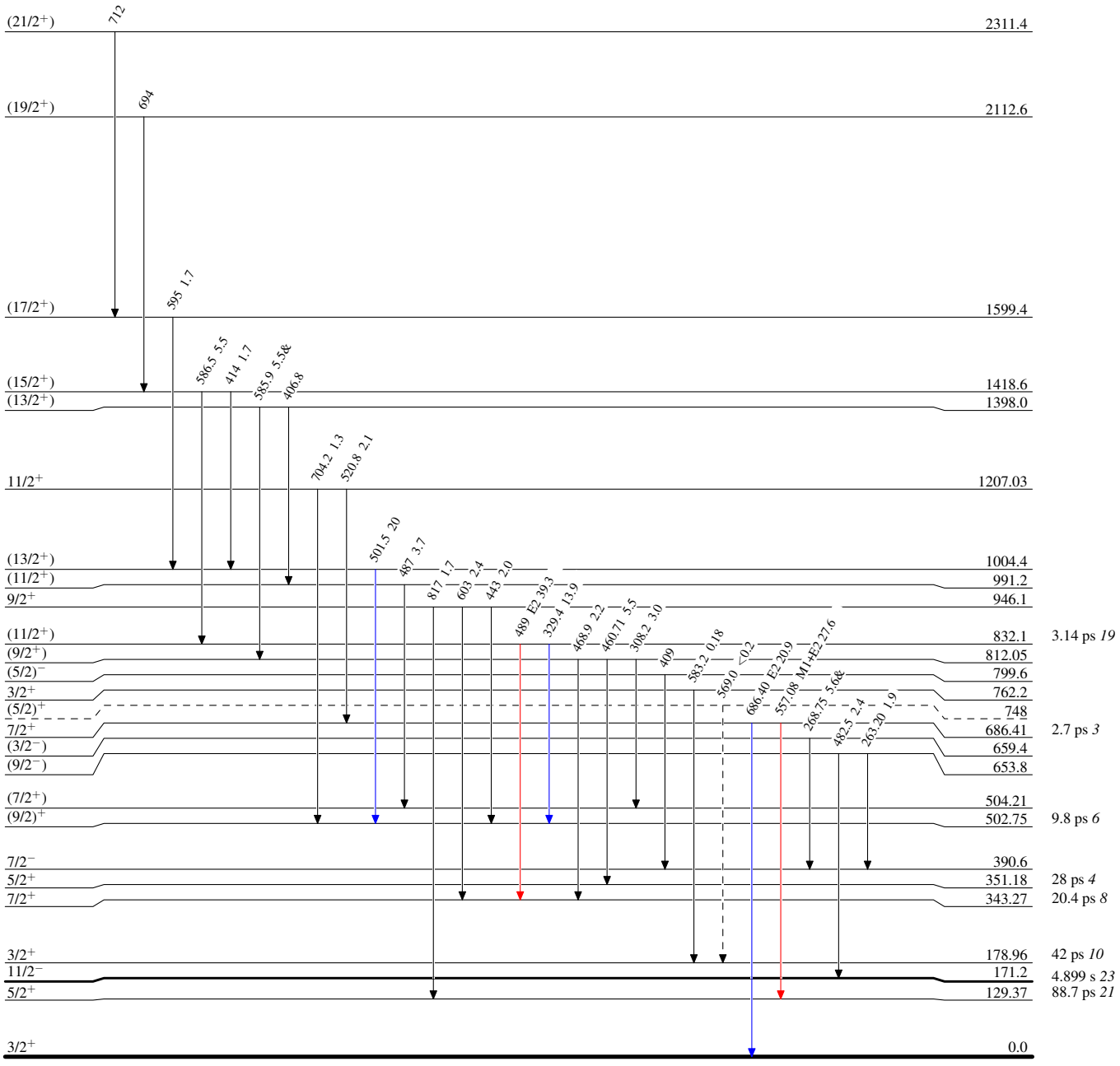
Legend

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

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

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

γ Decay (Uncertain)



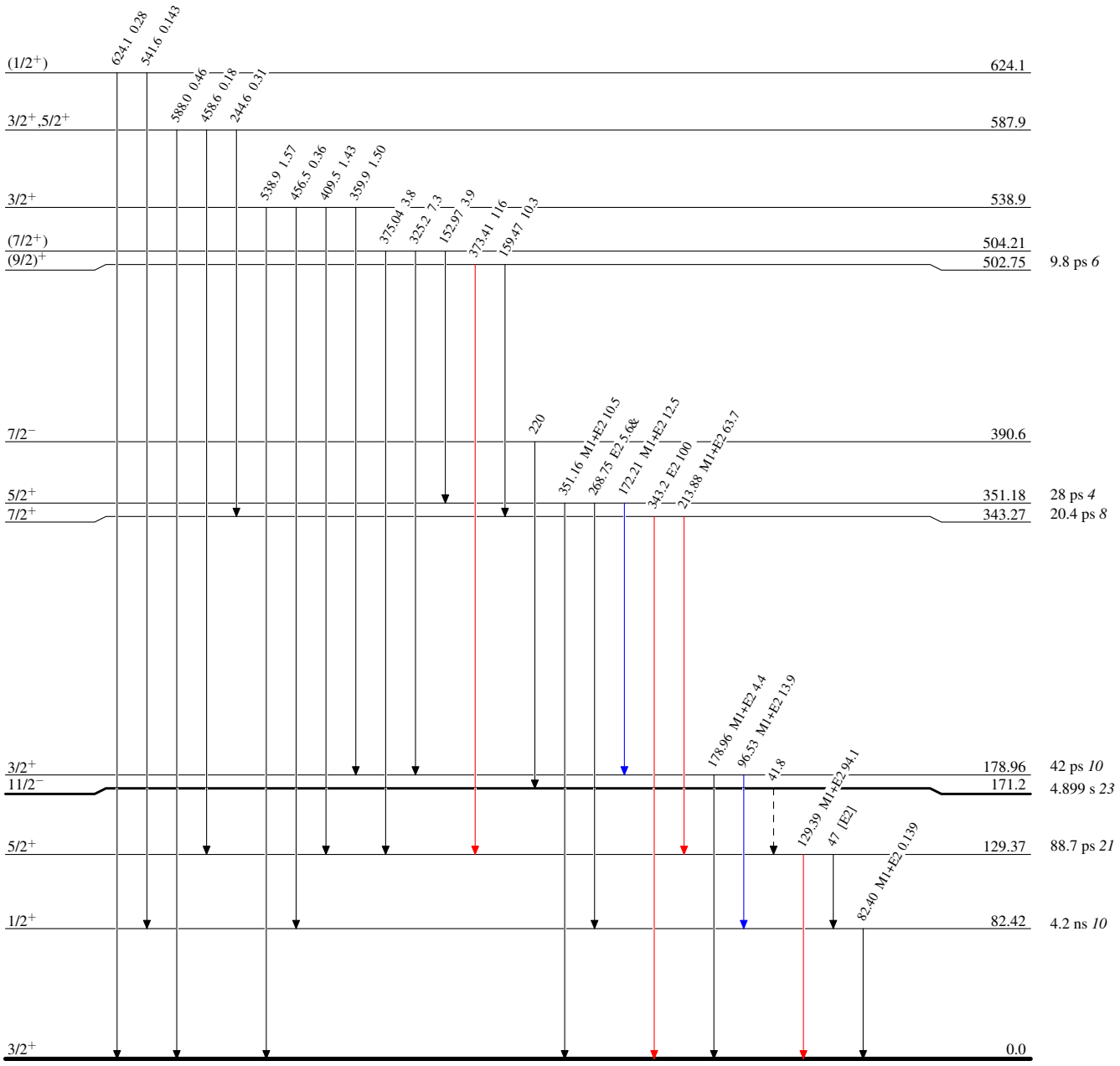
$^{191}_{77}Ir_{114}$

Coulomb excitation 2000Be07,1986Mc01,1984Mu19

Level Scheme (continued)

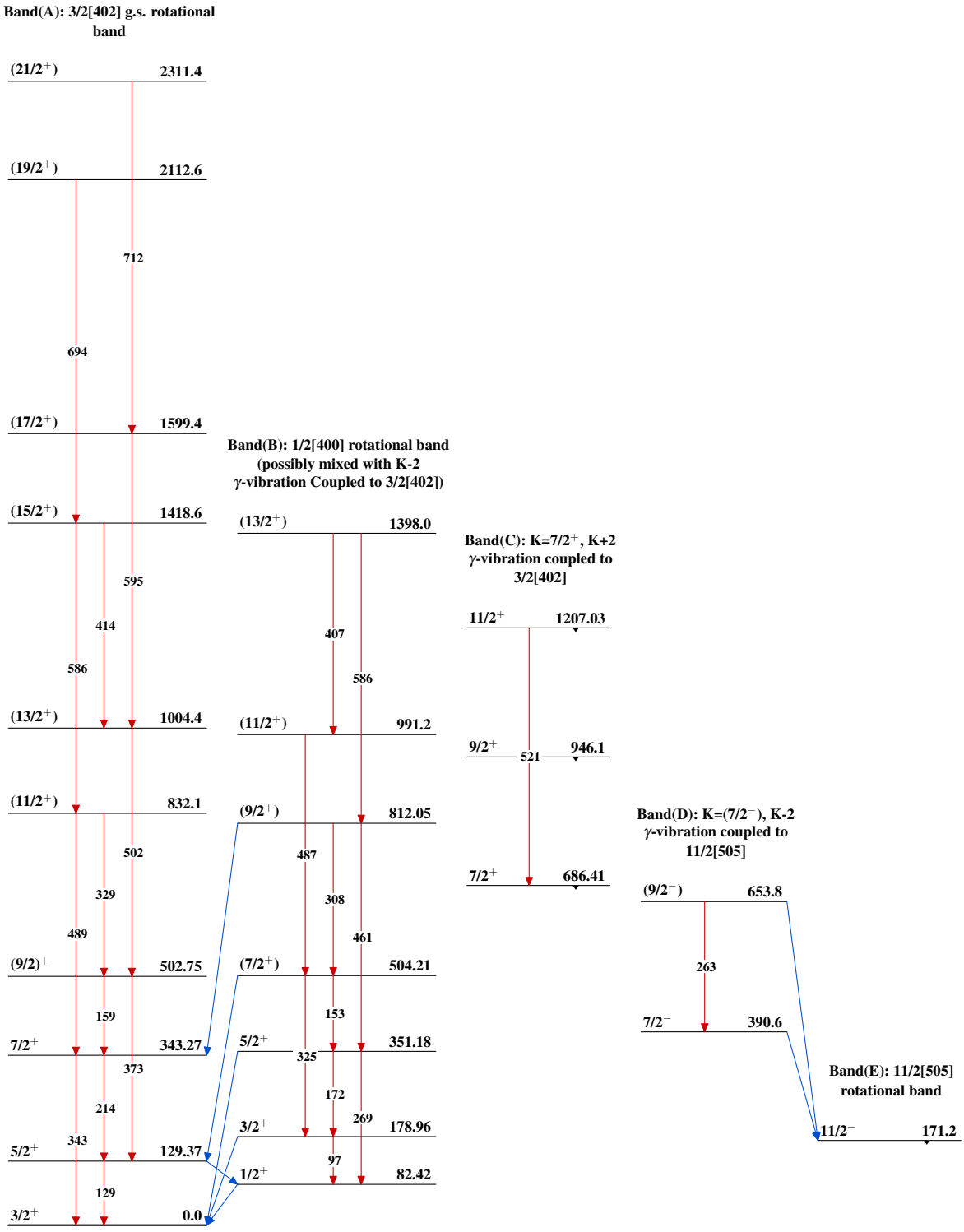
Intensities: Relative I_γ
& Multiply placed: undivided intensity given

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)



$^{191}_{77}Ir_{114}$

Coulomb excitation 2000Be07,1986Mc01,1984Mu19



$^{191}_{77}Ir_{114}$