## $^{182}$Ir ε decay (15.0 min) 2007Ca04,1994Ki01,1972Ak03

History

| Type | Author | Citation | Literature Cutoff Date |
|---|---|---|---|
| Full Evaluation | Balraj Singh | ENSDF | 11-Jul-2022 |

Parent: $^{182}$Ir: E=0.0; $J^\pi=3^+$; $T_{1/2}$=15.0 min *10*; Q(ε)=5560 *30*; %ε+%$β^+$ decay=100.0

$^{182}$Ir-$J^\pi$,$T_{1/2}$: from $^{182}$Ir Adopted Levels.

$^{182}$Ir-Q(ε): From 2021Wa16.

2007Ca04: $^{182}$Ir isotope obtained from successive decay of mass separated $^{182}$Au isotope ($^{182}$Au-$^{182}$Pt-$^{182}$Ir chain) produced in Pt(p,xn) reaction at ISOLDE facility using ISOCELE mass separator. Measured Eγ, Iγ, γγ. Conversion electrons were measured in coin with γ rays using $^{182}$Hg source decaying by $^{182}$Hg-$^{182}$Au-$^{182}$Pt-$^{182}$Ir chain and a Si(Li) detector system.

1994Ki01: Measured Eγ, Iγ, γγ, γγ(θ); $^{182}$Ir produced in $^{168}$Er($^{19}$F,5n) reaction at E=103-110 MeV.

1972Ak03: Measured Eγ, Iγ, γγ, $T_{1/2}$.

1972HuZL: Measured Eγ, Iγ, ce.

1970BrZP: measured level lifetime by γγ(t) and γce(t).

1970FiZZ: Measured Eγ, Iγ, ce. 1970FiZZ and 1972HuZL are from the same laboratory, the latter is a thesis by one of the authors of the conference report 1970FiZZ. It would appear that 1972HuZL supersedes 1970FiZZ. The first author of 1970FiZZ report is also a co-author on 1972Ak03, but the latter seems an independent study at a different laboratory.

1975Ho03, 1970Du09: measured β-strength functions with total absorption γ-ray spectra. Measured spectrum extends up to about 4.5 MeV.

1961Di04: measured γ, $T_{1/2}$, $^{182}$Ir isotopic identification in reactions: $^{175}$Lu($^{12}$C,5n); $^{169}$Tm($^{16}$O,3n).

Level scheme is from 2007Ca04 and 1994Ki01. From the work of 1972Ak03, 1972HuZL and 1970FiZZ, only about ten γ rays were assigned amongst seven excited states, even though about 70 γ rays were reported.

### $^{182}$Os Levels

A 1277.8 level proposed by 1994Ki01 has been omitted here with the revised placement (from 2007Ca04) of 483.8γ from 1523 level.

| E(level)[†] | $J^\pi$[#] | $T_{1/2}$ | Comments |
|---|---|---|---|
| 0.0[@] | $0^+$ | | |
| 126.89[@] *8* | $2^+$ | 813 ps *11* | $T_{1/2}$: from γγ(t) (1970BrZP). Other: 0.95 ns *10* (1972HuZL,1970ErZY). |
| 400.30[@] *9* | $4^+$ | | |
| 794.01[@] *12* | $6^+$ | | |
| 890.62[&] *8* | $2^+$ | | |
| 1039.05[&] *10* | $3^+$ | | $J^\pi$: γγ(θ) data consistent only with spin 3. |
| 1159.88[b] *12* | $2^+$ | | |
| 1190.30[&] *10* | $4^+$ | | $J^\pi$: γγ(θ) data consistent only with spin 4. |
| 1378.25[b] *11* | $4^+$ | | |
| 1393.20[‡] *13* | $(2^+)$ | | |
| 1399.30[&] *12* | $5^+$ | | |
| 1471.73[a] *11* | $(3^-)$ | | |
| 1522.73[‡] *13* | $(2^+,3,4^+)$ | | |
| 1537.40[‡] *19* | $(1^+$ to $4^+)$ | | |
| 1588.54[&] *20* | $6^+$ | | |
| 1617.42[‡] *13* | $(3,4)^+$ | | |
| 1627.39[a] *14* | $(3^+,4,5^+)$ | | $J^\pi$: 2007Ca04 assign $4^-$, but there seems no basis for negative parity from measurements. |
| 1640.89[‡] *12* | $(2^+,3,4^+)$ | | |
| 1654.02[a] *14* | $5^-$ | | |

Continued on next page (footnotes at end of table)

## $^{182}$Ir ε decay (15.0 min) 2007Ca04,1994Ki01,1972Ak03 (continued)

### $^{182}$Os Levels (continued)

| E(level)[†] | Jπ[#] | Comments |
|---|---|---|
| 1669.42[‡] *16* | (4+) | |
| 1676.60[‡] *22* | (1,2) | |
| 1734.85[‡] *17* | 5− | |
| 1756.17[a] *24* | 6− | E(level): level population reported by 1994Ki01, not by 2007Ca04. |
| 1768.90[‡] *22* | (1,2) | |
| 1785.44[‡] *18* | (3+,4,5+) | |
| 1813.2?[‡] *4* | | |
| 1844.41?[‡] *22* | | |
| 1876.42[‡] *24* | | |
| 1895.34[‡] *20* | 5− | |
| 1899.21[‡] *23* | (2+,3,4+) | |
| 2025.09[‡] *23* | (1+ to 4+) | |
| 2059.4?[‡] *4* | | |
| 2147.46[‡] *24* | (4+,5,6+) | |

[†] From least-squares fit to Eγ data.
[‡] Level population in $^{182}$Ir ε decay proposed only by 2007Ca04.
[#] From Adopted Levels.
[@] Band(A): $K^\pi=0^+$, g.s. band.
[&] Band(B): $K^\pi=2^+$, γ band.
[a] Band(C): Octupole band.
[b] Band(D): $K^\pi=0^+$ band. See 2001Ga02 for discussion of excited $0^+$ bands in some even-even nuclei, where the conclusion is that these are probably not β-vibrational bands.

### ε,β+ radiations

| E(decay) | E(level) | Iβ+ [#] | Iε[#] | Log *ft*[‡] | I(ε+β+)[†#] | Comments |
|---|---|---|---|---|---|---|
| (3.41×10$^3$ *3*) | 2147.46 | <0.1 | <0.5 | >7.7 | <0.6 | av Eβ=1080 *14*; εK=0.653 *5*; εL=0.1097 *9*; εM+=0.0343 *3*<br>I(ε+β+): 0.5 *1* from intensity balance. |
| (3.50×10$^3$[@] *3*) | 2059.4? | <0.06 | <0.19 | >8.1 | <0.25 | av Eβ=1119 *14*; εK=0.638 *6*; εL=0.1071 *9*; εM+=0.0335 *3*<br>I(ε+β+): 0.20 *5* from intensity balance. |
| (3.53×10$^3$ *3*) | 2025.09 | <0.1 | <0.4 | >7.8 | <0.5 | av Eβ=1135 *14*; εK=0.632 *6*; εL=0.1061 *9*; εM+=0.0332 *3*<br>I(ε+β+): 0.4 *1* from intensity balance. |
| (3.66×10$^3$ *3*) | 1899.21 | <0.2 | <0.5 | >7.7 | <0.7 | av Eβ=1191 *14*; εK=0.610 *6*; εL=0.1023 *10*; εM+=0.0320 *3*<br>I(ε+β+): 0.6 *1* from intensity balance. |
| (3.66×10$^3$ *3*) | 1895.34 | | <0.4 | >9.6[1u] | <0.4 | av Eβ=1193 *14*; εK=0.610 *6*; εL=0.1022 *10*; εM+=0.0320 *3*<br>I(ε+β+): 0.3 *1* from intensity balance. |
| (3.68×10$^3$ *3*) | 1876.42 | <0.3 | <0.8 | >7.5 | <1.1 | av Eβ=1202 *14*; εK=0.606 *6*; εL=0.1016 *10*; εM+=0.0318 *3*<br>I(ε+β+): 0.9 *2* from intensity balance. |
| (3.72×10$^3$[@] *3*) | 1844.41? | <0.2 | <0.5 | >7.7 | <0.7 | av Eβ=1216 *14*; εK=0.601 *6*; εL=0.1006 *10*; εM+=0.0315 *3*<br>I(ε+β+): 0.6 *1* from intensity balance. |
| (3.75×10$^3$[@] *3*) | 1813.2? | <0.1 | <0.3 | >8.0 | <0.4 | av Eβ=1230 *14*; εK=0.595 *6*; εL=0.0997 *10*; εM+=0.0312 |

Continued on next page (footnotes at end of table)

## $^{182}$Ir ε decay (15.0 min) 2007Ca04,1994Ki01,1972Ak03 (continued)

ε,β+ radiations (continued)

| E(decay) | E(level) | Iβ+ # | Iε# | Log ft‡ | I(ε+β+)†# | Comments |
|---|---|---|---|---|---|---|
| | | | | | | *3* |
| | | | | | | I(ε+β+): 0.3 *1* from intensity balance. |
| (3.77×10$^3$ *3*) | 1785.44 | <0.3 | <0.8 | >7.5 | <1.1 | av Eβ=1243 *14*; εK=0.590 *6*; εL=0.0988 *10*; εM+=0.0309 *3* |
| | | | | | | I(ε+β+): 1.0 *1* from intensity balance. |
| (3.79×10$^3$ *3*) | 1768.90 | <0.2 | <0.6 | >7.7 | <0.8 | av Eβ=1250 *14*; εK=0.587 *6*; εL=0.0983 *10*; εM+=0.0307 *3* |
| | | | | | | I(ε+β+): 0.7 *1* from intensity balance. |
| (3.80×10$^3$@ *3*) | 1756.17 | <0.2 | <0.5 | >7.8 | <0.7 | av Eβ=1256 *14*; εK=0.585 *6*; εL=0.0979 *10*; εM+=0.0306 *3* |
| | | | | | | I(ε+β+): 0.5 *2* from intensity balance. |
| (3.83×10$^3$ *3*) | 1734.85 | <0.1 | <0.8 | >9.3$^{1u}$ | <0.9 | av Eβ=1247 *13*; εK=0.712 *4*; εL=0.1233 *7*; εM+=0.03878 *20* |
| | | | | | | I(ε+β+): 0.8 *1* from intensity balance. |
| (3.88×10$^3$ *3*) | 1676.60 | <0.2 | <0.5 | >7.8 | <0.7 | av Eβ=1292 *14*; εK=0.571 *6*; εL=0.0955 *10*; εM+=0.0299 *3* |
| | | | | | | I(ε+β+): 0.6 *1* from intensity balance. |
| (3.89×10$^3$ *3*) | 1669.42 | <0.3 | <0.6 | >7.7 | <0.9 | av Eβ=1295 *14*; εK=0.569 *6*; εL=0.0953 *10*; εM+=0.0298 *3* |
| | | | | | | I(ε+β+): 0.8 *1* from intensity balance. |
| (3.91×10$^3$ *3*) | 1654.02 | <0.1 | <0.6 | >9.4$^{1u}$ | <0.7 | av Eβ=1282 *13*; εK=0.704 *4*; εL=0.1217 *7*; εM+=0.03825 *20* |
| | | | | | | I(ε+β+): 0.6 *1* from intensity balance. |
| (3.92×10$^3$ *3*) | 1640.89 | <0.7 | <1.5 | >7.3 | <2.2 | av Eβ=1308 *14*; εK=0.564 *6*; εL=0.0944 *10*; εM+=0.0295 *3* |
| | | | | | | I(ε+β+): 2.0 *2* from intensity balance. |
| (3.93×10$^3$ *3*) | 1627.39 | <0.5 | <1.1 | >7.4 | <1.6 | av Eβ=1314 *14*; εK=0.562 *6*; εL=0.0940 *10*; εM+=0.0294 *3* |
| | | | | | | I(ε+β+): 1.4 *2* from intensity balance. |
| (3.94×10$^3$ *3*) | 1617.42 | <0.8 | <1.8 | >7.2 | <2.6 | av Eβ=1318 *14*; εK=0.560 *6*; εL=0.0936 *10*; εM+=0.0293 *3* |
| | | | | | | I(ε+β+): 2.3 *3* from intensity balance. |
| (3.97×10$^3$@ *3*) | 1588.54 | <0.2 | <0.3 | >8.0 | <0.5 | av Eβ=1332 *14*; εK=0.555 *6*; εL=0.0928 *10*; εM+=0.0290 *3* |
| | | | | | | I(ε+β+): 0.4 *1* from intensity balance. |
| (4.02×10$^3$ *3*) | 1537.40 | <0.4 | <0.8 | >7.6 | <1.2 | av Eβ=1355 *14*; εK=0.546 *6*; εL=0.0912 *10*; εM+=0.0285 *3* |
| | | | | | | I(ε+β+): 1.0 *2* from intensity balance. |
| (4.04×10$^3$ *3*) | 1522.73 | <1.0 | <2.0 | >7.2 | <3.0 | av Eβ=1361 *14*; εK=0.543 *6*; εL=0.0907 *10*; εM+=0.0284 *3* |
| | | | | | | I(ε+β+): 2.6 *4* from intensity balance. |
| (4.09×10$^3$ *3*) | 1471.73 | <1.2 | <2.1 | >7.2 | <3.3 | av Eβ=1384 *14*; εK=0.534 *6*; εL=0.0892 *10*; εM+=0.0279 *3* |
| | | | | | | I(ε+β+): 3.0 *3* from intensity balance. |
| (4.16×10$^3$@ *3*) | 1399.30 | <0.7 | <1.1 | >7.5 | <1.8 | av Eβ=1417 *14*; εK=0.521 *6*; εL=0.0870 *9*; εM+=0.0272 *3* |
| | | | | | | I(ε+β+): 1.6 *2* from intensity balance. |
| (4.17×10$^3$ *3*) | 1393.20 | <0.7 | <1.2 | >7.5 | <1.9 | av Eβ=1420 *14*; εK=0.520 *6*; εL=0.0868 *9*; εM+=0.0271 *3* |
| | | | | | | I(ε+β+): 1.7 *2* from intensity balance. |
| (4.18×10$^3$ *3*) | 1378.25 | <1.2 | <2.3 | >7.2 | <3.5 | av Eβ=1427 *14*; εK=0.517 *6*; εL=0.0863 *9*; εM+=0.0270 *3* |
| | | | | | | I(ε+β+): 2.9 *4* from intensity balance. |
| (4.37×10$^3$ *3*) | 1190.30 | <1.8 | <2.5 | >7.2 | <4.3 | av Eβ=1512 *14*; εK=0.484 *6*; εL=0.0807 *9*; εM+=0.0252 *3* |
| | | | | | | I(ε+β+): 3.8 *5* from intensity balance. |
| (4.40×10$^3$ *3*) | 1159.88 | <1.4 | <2.2 | >7.3 | <3.6 | av Eβ=1526 *14*; εK=0.479 *6*; εL=0.0799 *9*; εM+=0.0250 *3* |
| | | | | | | I(ε+β+): 3.0 *4* from intensity balance. |
| (4.52×10$^3$ *3*) | 1039.05 | <3.0 | <3.7 | >7.0 | <6.7 | av Eβ=1581 *14*; εK=0.459 *5*; εL=0.0764 *9*; εM+=0.0239 *3* |
| | | | | | | I(ε+β+): 6.0 *7* from intensity balance. |
| (4.67×10$^3$ *3*) | 890.62 | <3.2 | <3.5 | >7.1 | <6.7 | av Eβ=1649 *14*; εK=0.434 *5*; εL=0.0722 *9*; εM+=0.0226 *3* |
| | | | | | | I(ε+β+): 6.0 *7* from intensity balance. |
| (4.77×10$^3$@ *3*) | 794.01 | <0.6 | <0.7 | >7.8 | <1.3 | av Eβ=1694 *14*; εK=0.419 *5*; εL=0.0696 *8*; εM+=0.0218 *3* |
| | | | | | | I(ε+β+): 1.1 *2* from intensity balance. |

Continued on next page (footnotes at end of table)

## $^{182}$Ir ε decay (15.0 min) 2007Ca04,1994Ki01,1972Ak03 (continued)

### ε,β+ radiations (continued)

| E(decay) | E(level) | Iβ+ # | Iε# | Log *ft*‡ | I(ε+β+)†# | Comments |
|---|---|---|---|---|---|---|
| (5.16×10$^3$ *3*) | 400.30 | <17 | <14 | >6.6 | <31 | av Eβ=1874 *14*; εK=0.360 *5*; εL=0.0597 *8*; εM+=0.01865 *23*<br>I(ε+β+): 28 *3* from intensity balance. |
| (5.43×10$^3$ *3*) | 126.89 | <21 | <14 | >6.6 | <35 | av Eβ=2001 *14*; εK=0.323 *4*; εL=0.0536 *7*; εM+=0.01673 *20*<br>I(ε+β+): 25 *10* from intensity balance. |

† From intensity balance. These are considered as upper limits since a large gap of about 3.5 MeV exists between Q(ε) value and highest populated levels. Higher energy levels may have been missed due to unobserved transitions.
‡ All values are considered as lower limits only, see comment for I(γ+ce).
# Absolute intensity per 100 decays.
@ Existence of this branch is questionable.

## $^{182}$Ir ε decay (15.0 min) 2007Ca04,1994Ki01,1972Ak03 (continued)

### γ($^{182}$Os)

Iγ normalization: I(γ+ce)(γ rays to g.s.)=100. No ε,β$^+$ feeding to g.s. is expected.
γγ coincidences are from data of 2007Ca04.
The following 30 γ rays reported variously in earlier studies (1972Ak03,1972HuZL and 1970FiZZ) have been omitted here due to lack of confirmation in the detailed study by 2007Ca04 using a mass-separated source of $^{182}$Au decaying by $^{182}$Pt and then to $^{182}$Ir:
The γ rays reported by 1972Ak03 (and also 1972HuZL): 142.3 *5* (1.7 *5*), 155.0 *5* (1.3 *4*), 167.0 *5* (1.4 *2*), 236.0 *5* (5.4 *11*), 252.0 *5* (2.5 *3*), 264.0 *5* (2.3 *5*), 289.4 *6* (2.2 *3*), 295.0 *8* (0.45 *10*), 334.0 *5* (2.4 *2*), 401.0 *8* (0.8 *2*), 415.0 *7* (1.1 *1*), 430.0 *7* (2.7 *3*), 546.0 *7* (0.7 *1*), 549.6 *7* (1.0 *2*), 779.9 *7* (1.5 *2*), 933.0 *8* (0.7 *1*), 939.0 *8* (1.8 *3*), 1110.0 *7* (1.3 *2*).
The γ rays reported by 1972HuZL (and also 1972Ak03): 142.4 *3* (2.2 *4*), 154.7 *3* (1.7 *2*), 166.0 *3* (1.5 *2*), 236.3 *3* (21.0 *20*), 252.1 *3* (1.1 *1*), 264.8 *4* (1.3 *2*), 289.0 *3* (2.5 *3*), 295.2 *4* (2.6 *3*), 335.4 *5* (2.8 *3*), 400.3 *3* (7.7 *8*), 415.3 *4* (1.3 *2*), 430.0 *4* (2.7 *3*), 545.7 *5* (0.6 *1*), 549.2 *5* (0.8 *1*), 778.0 *5* (1.5 *2*), 932.5 *5* (0.9 *2*), 939.3 *4* (3.4 *4*), 1110.9 *5* (1.1 *2*). For 236.3γ, α(K)exp≈0.14, K/L≈1.6 from 1972HuZL suggests E2, but the assignment of this γ to $^{182}$Ir decay is suspect.
The γ rays reported by 1972Ak03 (and also 1970FiZZ): 137.0 *5* (3.2 *6*), 307.0 *8* (0.6 *1*), 344.0 *5* (2.4 *2*), 352.0 *6* (1.0 *2*), 401.0 *8* (0.8 *2*), 690.0 *8* (1.1 *2*), 779.9 *7* (1.5 *2*), 1546.0 *6* (2.7 *4*).
The γ rays reported by 1970FiZZ (and also 1972Ak03): 136.2 *2* (1.1 *1*), 306.8 *2* (0.7 *1*), 343.2 *3* (0.8 *1*), 351.6 *3* (0.7 *1*), 400.0 *3* (1.1 *4*), 690.2 *2* (0.8 *1*), 779.9 *3* (1.6 *3*), 1549.0 *10* (1.4 *2*).
The γ reported by 1972HuZL only: 107.0 *3* (6.7 *6*).
The γ rays reported by 1972Ak03 only: 397.0 *7* (2.4 *2*), 953.0 *10* (1.4 *2*), 1118.0 *6* (5.9 *10*).
Eγ, Iγ, α(K)exp values from 1972HuZL have been taken from 1978LeZA (1978 Table of Isoropes) and 1988Fi05 evaluation of A=182 nuclei.
$A_2$ and $A_4$ coefficients are from γγ(θ) data of 1994Ki01.

| $E_\gamma$[†] | $I_\gamma$[‡][d] | $E_i$(level) | $J_i^\pi$ | $E_f$ | $J_f^\pi$ | Mult.[b] | δ | α[c] | Comments |
|---|---|---|---|---|---|---|---|---|---|
| 102.1[#] *3* | 0.18 *6* | 1756.17 | 6$^-$ | 1654.02 | 5$^-$ | (M1+E2) | −0.4 *3* | 5.1 *3* | α(K)=3.9 *7*; α(L)=0.9 *4*; α(M)=0.23 *9*<br>α(N)=0.055 *21*; α(O)=0.009 *3*; α(P)=0.00045 *9*<br>Mult.,δ: from Adopted Gammas. |
| 126.9 *1* | 87 *8* | 126.89 | 2$^+$ | 0.0 | 0$^+$ | E2 | | 1.70 | α(L1)exp+α(L2)exp=0.48 *6* (2007Ca04); α(L3)exp=0.34 *4* (2007Ca04)<br>α(K)=0.516 *8*; α(L)=0.897 *15*; α(M)=0.229 *4*<br>α(N)=0.0549 *9*; α(O)=0.00815 *13*; α(P)=4.77×10$^{-5}$ *7*<br>α(K)= 0.521 *16*; α(L)= 0.90 *3*; α(M)= 0.229 *7*; α(N+..)= 0.0690 *21*<br>$I_\gamma$: unweighted average of 111 *4* (2007Ca04), 76.9 *19* (1994Ki01), 84 *8* (1972Ak03) and 77 *4* (1972HuZL).<br>(α(L1)exp+α(L2)exp)/α(L3)exp=1.40 *7* (2007Ca04).<br>$E_\gamma$: 126.8 *7* (1972Ak03), 127.1 *3* (1972HuZL). |
| 148.1[#] *3* | 0.09 *4* | 1039.05 | 3$^+$ | 890.62 | 2$^+$ | [M1,E2] | | 1.4 *5* | α(K)=0.9 *6*; α(L)=0.35 *11*; α(M)=0.09 *3*; α(N+..)=0.024 *8*<br>α(N)=0.021 *7*; α(O)=0.0032 *9*; α(P)=0.00010 *8* |
| 159.2[@][e] *3* | 0.45 *12* | 1813.2? | | 1654.02 | 5$^-$ | [D,E2] | | 0.8 *7* | |
| 182.3 *2* | 0.86 *10* | 1654.02 | 5$^-$ | 1471.73 | (3$^-$) | [E2] | | 0.456 | α(K)=0.216 *3*; α(L)=0.182 *3*; α(M)=0.0459 *7* |





$^{182}_{76}Os_{106}$-5

## $^{182}$Ir ε decay (15.0 min) 2007Ca04,1994Ki01,1972Ak03 (continued)

### γ($^{182}$Os) (continued)

| $E_\gamma$ [†] | $I_\gamma$ [‡d] | $E_i$(level) | $J_i^\pi$ | $E_f$ | $J_f^\pi$ | Mult.[b] | α[c] | Comments |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | α(N)=0.01104 *17*; α(O)=0.001662 *25*; α(P)=1.99×10$^{-5}$ *3*<br>$I_\gamma$: from Iγ(182.3γ)/Iγ(1253.6γ)=0.78 *3* in 1994Ki01 and Iγ(1253.6)=1.11 *10* in 2007Ca04. Iγ(182.3γ)/Iγ(1253.6γ)=1.20 *16* in 2007Ca04, 0.78 *3* in 1994Ki01 and 0.37 *15*, 0.47 *12*, 0.63 *11* in in-beam γ-ray studies suggests that the relative intensity of 1.33 *18* in 2007Ca04 for 182.3γ is overestimated.<br>$I_\gamma$: 1.37 *6* (1994Ki01), 2.2 *4* (1972Ak03), 2.6 *3* (1972HuZL).<br>$E_\gamma$: 179.8 *3* (1972HuZL), 181.6 *5* (1972Ak03). |
| 197.6 *3* | 0.45[a] *11* | 1669.42 | (4$^+$) | 1471.73 | (3$^-$) | [E1] | 0.068 | Eγ=197.2 *4*, Iγ=1.00 *10* (1972HuZL). |
| 218.5 *3* | 0.27 *8* | 1378.25 | 4$^+$ | 1159.88 | 2$^+$ | [E2] | 0.247 | α(K)=0.1346 *20*; α(L)=0.0851 *13*; α(M)=0.0214 *4*<br>α(N)=0.00514 *8*; α(O)=0.000782 *12*; α(P)=1.281×10$^{-5}$ *19*<br>$I_\gamma$: from 1994Ki01. Other: ≤0.2 (2007Ca04) from γγ coin. |
| 227.9 *3* | 0.43 *9* | 1627.39 | (3$^+$,4,5$^+$) | 1399.30 | 5$^+$ | | | $I_\gamma$: 0.48 *11* (1994Ki01), 2.6 *3* (1972Ak03), 1.50 *20* (1972HuZL).<br>$E_\gamma$: 227.7 *5* (1972Ak03), 228.2 *3* (1972HuZL). |
| 249.1[@] *3* | 0.98 *13* | 1876.42 | | 1627.39 | (3$^+$,4,5$^+$) | [D,E2] | 0.24 *20* | |
| 254.7 *3* | 0.37 *13* | 1654.02 | 5$^-$ | 1399.30 | 5$^+$ | [E1] | 0.0363 | α(K)=0.0301 *5*; α(L)=0.00480 *7*; α(M)=0.001098 *16*<br>α(N)=0.000266 *4*; α(O)=4.44×10$^{-5}$ *7*; α(P)=2.78×10$^{-6}$ *4*<br>$I_\gamma$: 0.28 *7* (1994Ki01). |
| 273.5 *1* | 100.0 *22* | 400.30 | 4$^+$ | 126.89 | 2$^+$ | E2 | 0.1209 | α(K)=0.0749 *11*; α(L)=0.0349 *5*; α(M)=0.00867 *13*<br>α(N)=0.00209 *3*; α(O)=0.000322 *5*; α(P)=7.41×10$^{-6}$ *11*<br>$I_\gamma$: 100 (1994Ki01,1972Ak03,1972HuZL).<br>$E_\gamma$: 273.0 *4* (1972Ak03), 273.0 *2* (1972HuZL). |
| 281.5 *3* | 0.40[a] *10* | 1471.73 | (3$^-$) | 1190.30 | 4$^+$ | [E1] | 0.0285 | α(K)=0.0236 *4*; α(L)=0.00374 *6*; α(M)=0.000855 *12*<br>α(N)=0.000207 *3*; α(O)=3.47×10$^{-5}$ *5*; α(P)=2.21×10$^{-6}$ *4*<br>$I_\gamma$: 0.44 *4* (1994Ki01), 1.1 *2* (1972Ak03), 1.10 *15* (1972HuZL).<br>$E_\gamma$: 282.0 *7* (1972Ak03), 281.6 *4* (1972HuZL). |
| 299.8 *3* | 0.44 *8* | 1190.30 | 4$^+$ | 890.62 | 2$^+$ | [E2] | 0.092 | α(K)=0.06; α(L)=0.024; α(M)=0.0060<br>α(N)=0.00146; α(O)=0.00022; α(P)=0.5×10$^{-5}$<br>$I_\gamma$: 0.30 *11* (1994Ki01), 0.77 *8* (1972HuZL).<br>$E_\gamma$: 299.0 *5* (1972HuZL); γ not In 1972Ak03. |
| 332.0[@] *3* | 0.73 *10* | 1522.73 | (2$^+$,3,4$^+$) | 1190.30 | 4$^+$ | [D,E2] | 0.11 *9* | |
| 360.0 *3* | 0.48[a] *15* | 1399.30 | 5$^+$ | 1039.05 | 3$^+$ | [E2] | 0.0538 | α(K)=0.0372 *6*; α(L)=0.01263 *18*; α(M)=0.00309 *5*<br>α(N)=0.000747 *11*; α(O)=0.0001177 *17*; α(P)=3.83×10$^{-6}$ *6*<br>$I_\gamma$: 0.53 *7* (1994Ki01). |
| 386.1[@] *3* | 0.25[a] *8* | 1785.44 | (3$^+$,4,5$^+$) | 1399.30 | 5$^+$ | [D,E2] | 0.07 *6* | |
| 393.8 *1* | 6.26 *23* | 794.01 | 6$^+$ | 400.30 | 4$^+$ | E2 | 0.0422 | α(K)exp=0.025 *5* (2007Ca04)<br>α(K)=0.0300 *5*; α(L)=0.00932 *14*; α(M)=0.00227 *4*<br>α(N)=0.000548 *8*; α(O)=8.70×10$^{-5}$ *13*; α(P)=3.12×10$^{-6}$ *5*<br>α(K)= 0.0303 *9*; α(L)= 0.0095 *3*; α(M)= 0.00229 *7*; α(N+..)= 0.000681 *20*<br>$I_\gamma$: 11.8 *5* (1994Ki01), 5.5 *10* (1972Ak03) and 7.6 *8* (1972HuZL).<br>α(K)exp: other: 0.038 *12* (1972HuZL).<br>$E_\gamma$: 393.0 *5* (1972Ak03), 393.3 *3* (1972HuZL). |





$^{182}_{76}Os_{106}$-6

## $^{182}$Ir ε decay (15.0 min) 2007Ca04,1994Ki01,1972Ak03 (continued)

### γ($^{182}$Os) (continued)

| $E_\gamma$ [†] | $I_\gamma$ [‡ d] | $E_i$(level) | $J_i^\pi$ | $E_f$ | $J_f^\pi$ | Mult. [b] | α [c] | Comments |
|---|---|---|---|---|---|---|---|---|
| 398.3 [#] *3* | 0.28 *7* | 1588.54 | $6^+$ | 1190.30 | $4^+$ | [E2] | 0.0409 | α(K)=0.0292 *4*; α(L)=0.00897 *13*; α(M)=0.00218 *3*<br>α(N)=0.000527 *8*; α(O)=8.37×10$^{-5}$ *12*; α(P)=3.04×10$^{-6}$ *5*<br>Eγ=405.0 *4*, Iγ=0.95 *10* (1972HuZL). |
| 405.4 [e] *3* | 0.49 [a] *11* | 2059.4? | | 1654.02 | $5^-$ | | | |
| 432.7 *2* | 2.11 *16* | 1471.73 | $(3^-)$ | 1039.05 | $3^+$ | [E1] | 0.01051 | α(K)=0.00877 *13*; α(L)=0.001341 *19*; α(M)=0.000305 *5*<br>α(N)=7.40×10$^{-5}$ *11*; α(O)=1.254×10$^{-5}$ *18*; α(P)=8.50×10$^{-7}$ *12*<br>$I_\gamma$: 2.35 *6* (1994Ki01).<br>$I_\gamma$: 2.0 *3* (1972Ak03), 2.20 *25* (1972HuZL).<br>$E_\gamma$: 433.0 *7* (1972Ak03), 432.8 *4* (1972HuZL). |
| 437.2 *3* | 0.28 [a] *8* | 1627.39 | $(3^+,4,5^+)$ | 1190.30 | $4^+$ | | | $I_\gamma$: 0.61 *4* (1994Ki01). |
| 450.8 [@] *2* | 1.0 *2* | 1640.89 | $(2^+,3,4^+)$ | 1190.30 | $4^+$ | | | |
| 463.9 *3* | 0.48 *4* | 1654.02 | $5^-$ | 1190.30 | $4^+$ | [E1] | 0.00901 | α(K)=0.00753 *11*; α(L)=0.001145 *16*; α(M)=0.000261 *4*<br>α(N)=6.32×10$^{-5}$ *9*; α(O)=1.073×10$^{-5}$ *15*; α(P)=7.34×10$^{-7}$ *11*<br>$E_\gamma$,$I_\gamma$: from 1994Ki01. γ not reported by 2007Ca04 and 1972HuZL, but reported by 1972Ak03 and 1970FiZZ.<br>$I_\gamma$: 0.7 *1* (1972Ak03), 0.6 *1* (1970FiZZ).<br>$E_\gamma$: 465.0 *8* (1972Ak03), 464.7 *4* (1970FiZZ). |
| 478.9 [@] *3* | 0.55 *9* | 1669.42 | $(4^+)$ | 1190.30 | $4^+$ | | | |
| 483.8 *2* | 1.10 *15* | 1522.73 | $(2^+,3,4^+)$ | 1039.05 | $3^+$ | [E2] | 0.0247 | α(K)=0.0185 *3*; α(L)=0.00479 *7*; α(M)=0.001152 *17*<br>α(N)=0.000279 *4*; α(O)=4.50×10$^{-5}$ *7*; α(P)=1.96×10$^{-6}$ *3*<br>Placement from 2004Ca07. 1994Ki01 placed a weak 483.7γ from 1277.8 level.<br>$I_\gamma$: 0.18 *4* (1994Ki01), 0.9 *1* (1972Ak03), 1.20 *15* (1972HuZL).<br>$E_\gamma$: 484.0 *8* (1972Ak03), 483.0 *5* (1972HuZL). |
| 498.3 *3* | 0.57 *14* | 1537.40 | $(1^+$ to $4^+)$ | 1039.05 | $3^+$ | | | Eγ=498.0 *8*, Iγ=2.1 *2* (1972Ak02); Eγ=498.0 *4*, Iγ=1.1 *2* (1970FiZZ). |
| 544.4 [@] *2* | 1.09 *11* | 1734.85 | $5^-$ | 1190.30 | $4^+$ | | | |
| 581.1 *1* | 4.7 *3* | 1471.73 | $(3^-)$ | 890.62 | $2^+$ | [E1] | 0.00559 | α(K)=0.00468 *7*; α(L)=0.000700 *10*; α(M)=0.0001589 *23*<br>α(N)=3.86×10$^{-5}$ *6*; α(O)=6.58×10$^{-6}$ *10*; α(P)=4.62×10$^{-7}$ *7*<br>Mult.: M1+E2 from α(K)exp≈0.033 (1972HuZL) is inconsistent with Δ($J^\pi$).<br>$I_\gamma$: 5.00 *14* (1994Ki01), 2.7 *9* (1972Ak03), 4.2 *6* (1972HuZL).<br>$E_\gamma$: 581.9 *7* (1972Ak03), 581.4 *4* (1972HuZL). |
| 584.3 *3* | 0.76 [a] *15* | 1378.25 | $4^+$ | 794.01 | $6^+$ | [E2] | 0.01569 | α(K)=0.01212 *17*; α(L)=0.00274 *4*; α(M)=0.000651 *10*<br>α(N)=0.0001579 *23*; α(O)=2.58×10$^{-5}$ *4*; α(P)=1.295×10$^{-6}$ *19*<br>$I_\gamma$: 1.03 *15* (1994Ki01). |
| 588.3 *2* | 2.20 [a] *20* | 1627.39 | $(3^+,4,5^+)$ | 1039.05 | $3^+$ | | | $I_\gamma$: 3.30 *8* (1994Ki01), 1.50 *20* (1972HuZL).<br>$E_\gamma$: 589.0 *5* (1972HuZL); γ not In 1972Ak03. |
| 595.1 [@] *3* | 0.63 *10* | 1785.44 | $(3^+,4,5^+)$ | 1190.30 | $4^+$ | | | |
| 601.7 *2* | 1.01 *14* | 1640.89 | $(2^+,3,4^+)$ | 1039.05 | $3^+$ | | | Eγ=602.0 *8*, Iγ=0.9 *3* (1972Ak03); Eγ=602.4 *5*, Iγ=1.00 *15* (1972HuZL). |
| 605.2 *3* | 0.47 *10* | 1399.30 | $5^+$ | 794.01 | $6^+$ | [M1,E2] | 0.027 *13* | α(K)=0.022 *12*; α(L)=0.0039 *14*; α(M)=0.0009 *3*<br>α(N)=0.00022 *8*; α(O)=3.7×10$^{-5}$ *14*; α(P)=2.5×10$^{-6}$ *13*<br>$I_\gamma$: 0.98 *6* (1994Ki01). |
| 630.2 [@] *3* | 0.54 [a] *8* | 1669.42 | $(4^+)$ | 1039.05 | $3^+$ | | | |





$^{182}_{76}Os_{106}$-7

## $^{182}$Ir ε decay (15.0 min) 2007Ca04,1994Ki01,1972Ak03 (continued)

### γ($^{182}$Os) (continued)

| $E_\gamma$ [†] | $I_\gamma$ [‡d] | $E_i$(level) | $J_i^\pi$ | $E_f$ | $J_f^\pi$ | Mult.[b] | δ | α[c] | Comments |
|---|---|---|---|---|---|---|---|---|---|
| 632.0 *2* | 2.4 *3* | 1522.73 | (2$^+$,3,4$^+$) | 890.62 | 2$^+$ | | | | Eγ=631.7 *6*, Iγ=1.5 *2* (1972Ak03); Eγ=632.3 *4*, Iγ=2.0 *3* (1972HuZL). |
| 638.7 *1* | 3.51 *18* | 1039.05 | 3$^+$ | 400.30 | 4$^+$ | (E2) | | 0.01280 | α(K)=0.01001 *14*; α(L)=0.00214 *3*; α(M)=0.000506 *7*<br>α(N)=0.0001227 *18*; α(O)=2.02×10$^{-5}$ *3*; α(P)=1.072×10$^{-6}$ *15*<br>δ(Q/D)≥+68 from (639γ)(273γ)(θ): $A_2$=−0.01 *16*, $A_4$=−0.15 *19*.<br>$I_\gamma$: 2.3 *3* (1994Ki01) 2.7 *3* (1972Ak03), 2.30 *23* (1972HuZL).<br>$E_\gamma$: 638.8 *6* (1972Ak03), 638.9 *4* (1972HuZL). |
| 646.8 *2* | 2.03[a] *21* | 1537.40 | (1$^+$ to 4$^+$) | 890.62 | 2$^+$ | | | | Eγ=648.0 *6*, Iγ=1.7 *2* (1972Ak03); Eγ=647.3 *4*, Iγ=1.70 *17* (1972HuZL). |
| 705.2[@] *3* | 0.31[a] *8* | 1895.34 | 5$^-$ | 1190.30 | 4$^+$ | | | | |
| 746.2 *3* | 0.95[a] *10* | 1785.44 | (3$^+$,4,5$^+$) | 1039.05 | 3$^+$ | | | | Eγ=747.0 *8*, Iγ=0.8 *2* (1972Ak03); Eγ=747.1 *2*, Iγ=0.9 *1* (1970FiZZ). |
| 750.2 *2* | 1.25 *13* | 1640.89 | (2$^+$,3,4$^+$) | 890.62 | 2$^+$ | | | | Eγ=749.2 *8*, Iγ=1.0 *2* (1972Ak03); Eγ=751.1 *5*, Iγ=1.50 *20* (1972HuZL). Eγ=750.0 *2*, Iγ=1.6 *2* (1970FiZZ). |
| 759.6 *2* | 2.07 *15* | 1159.88 | 2$^+$ | 400.30 | 4$^+$ | | | | $I_\gamma$: 1.90 *6* (1994Ki01), 1.70 *20* (1972HuZL).<br>$E_\gamma$: 760.0 *4* (1972HuZL); γ not In 1972Ak03.<br>(759γ)(273γ)(θ): $A_2$=+0.33 *13*, $A_4$=+0.04 *15*. |
| 763.7 *1* | 13.6 *5* | 890.62 | 2$^+$ | 126.89 | 2$^+$ | (E0)+E2+M1 | −10 *+3−11* | 0.00878 *19* | α(K)exp=0.0095 *20* (2007Ca04)<br>α(K)=0.00702 *16*; α(L)=0.001354 *25*; α(M)=0.000317 *6*<br>α(N)=7.70×10$^{-5}$ *14*; α(O)=1.284×10$^{-5}$ *24*; α(P)=7.54×10$^{-7}$ *18*<br>$q^2$(E0/E2)=0.36 *31*, X(E0/E2)=0.009 *8* (2007Ca04).<br>Mult.: E0+M1+E2 or abnormal M1+E2; E0 component is small as indicated by α(K)exp value.<br>$I_\gamma$: 7.0 *4* (1994Ki01), 12.0 *10* (1972Ak03) and 12.5 *10* (1972HuZL).<br>$E_\gamma$: 763.4 *3* (1972Ak03), 764.4 *3* (1972HuZL).<br>δ: from (764γ)(127γ)(θ): $A_2$=0.00 *4*, $A_4$=+0.26 *5*. The ce data (1972HuZL) give M1+E2 with δ=1.4 *+11−8*.<br>α(K)exp: other: 0.011 *3* (1972HuZL). |
| 790.0 *1* | 9.6[a] *5* | 1190.30 | 4$^+$ | 400.30 | 4$^+$ | E2+M1 | −7.6 *+15−27* | 0.00826 *17* | α(K)=0.00663 *14*; α(L)=0.001255 *22*; α(M)=0.000293 *5*<br>α(N)=7.13×10$^{-5}$ *13*; α(O)=1.191×10$^{-5}$ *21*; α(P)=7.13×10$^{-7}$ *15*<br>$I_\gamma$: 12.9 *4* (1994Ki01), 10.2 *10* (1972Ak03), 7.4 *7* (1972HuZL). |





$^{182}_{76}Os_{106}$-8

## $^{182}$Ir ε decay (15.0 min) 2007Ca04,1994Ki01,1972Ak03 (continued)

### γ($^{182}$Os) (continued)

| $E_\gamma$ [†] | $I_\gamma$ [‡d] | $E_i$(level) | $J_i^\pi$ | $E_f$ | $J_f^\pi$ | Mult.[b] | δ | α[c] | Comments |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | $E_\gamma$: 790.1 *4* (1972Ak03), 790.0 *3* (1972HuZL).<br>Mult.,δ: from (790γ)(273γ)(θ): $A_2$=−0.07 *5*, $A_4$=+0.14 *6*. The ce data (1972HuZL) give M1+E2 with δ<2.<br>α(K)exp=0.025 *8* (1972HuZL), 0.014 *4* (for Iγ=12.9 in 1994Ki01). |
| 794.6 *3* | 0.41[a] *10* | 1588.54 | $6^+$ | 794.01 | $6^+$ | [M1,E2] | | 0.014 *6* | α(K)=0.012 *6*; α(L)=0.0019 *7*; α(M)=0.00044 *16*<br>α(N)=0.00011 *4*; α(O)=1.8×10$^{-5}$ *7*; α(P)=1.3×10$^{-6}$ *6*<br>$I_\gamma$: 0.77 *8* (1994Ki01). |
| 837.3 *3* | 0.90 *8* | 1876.42 | | 1039.05 | $3^+$ | | | | Eγ=838.0 *7*, Iγ=1.4 *3* (1972Ak03); Eγ=838.0 *5*, Iγ=1.00 *15* (1972HuZL). |
| 860.0 *3* | 0.52 *8* | 1654.02 | $5^-$ | 794.01 | $6^+$ | | | | $I_\gamma$: 0.96 *4* (1994Ki01). |
| 875.8[@] *3* | 0.18[a] *5* | 1669.42 | $(4^+)$ | 794.01 | $6^+$ | | | | |
| 890.6 *1* | 13.2 *5* | 890.62 | $2^+$ | 0.0 | $0^+$ | E2 | | 0.00627 | α(K)exp=0.0071 *15* (2007Ca04)<br>α(K)=0.00508 *8*; α(L)=0.000921 *13*; α(M)=0.000214 *3*<br>α(N)=5.21×10$^{-5}$ *8*; α(O)=8.75×10$^{-6}$ *13*; α(P)=5.45×10$^{-7}$ *8*<br>$I_\gamma$: 6.5 *2* (1994Ki01), 15.0 *15* (1972Ak03), 13.1 *10* (1972HuZL).<br>$E_\gamma$: 890.8 *4* (1972Ak03), 891.0 *4* (1972HuZL).<br>α(K)exp: other: 0.011 *4* (1972HuZL). |
| 912.1 *1* | 21.5 *7* | 1039.05 | $3^+$ | 126.89 | $2^+$ | E2+M1 | +5.6 *3* | 0.00623 *10* | α(K)exp=0.007 *2* (2007Ca04)<br>α(K)=0.00506 *8*; α(L)=0.000900 *13*; α(M)=0.000209 *3*<br>α(N)=5.08×10$^{-5}$ *8*; α(O)=8.56×10$^{-6}$ *13*; α(P)=5.45×10$^{-7}$ *9*<br>Mult.,δ: from (912γ)(127γ)(θ): $A_2$=−0.07 *4*, $A_4$=−0.07 *4*. ce data give M1+E2 with δ<1.<br>$I_\gamma$: 17.5 *3* (1994Ki01), 23 *3* (1972Ak03), 20.3 *10* (1972HuZL).<br>$E_\gamma$: 912.3 *4* (1972Ak03), 912.3 *3* (1972HuZL).<br>α(K)exp: other: 0.0105 *25* (1972HuZL). |
| 941.2[@] *3* | 0.30 *8* | 1734.85 | $5^-$ | 794.01 | $6^+$ | | | | |
| 962.2[#] *3* | 0.25 *9* | 1756.17 | $6^-$ | 794.01 | $6^+$ | | | | |
| 977.7 *2* | 1.22 *11* | 1378.25 | $4^+$ | 400.30 | $4^+$ | E0+M1+E2 | | 0.16 *2* | α(K)exp=0.13 *2* (2007Ca04)<br>$q^2$(E0/E2)=30 *5*, X(E0/E2)=1.24 *20* (2007Ca04).<br>Total conversion coefficient from α(K)exp=0.13 *2* (2007Ca04), multiplied by a factor of 1.2 to account for other shells.<br>δ: −11 +4 (1994Ki01) from (978γ)(273γ)(θ): $A_2$=−0.09 *12*, $A_4$=+0.12 *12*; lower uncertainty not given. Evaluators′ estimate from $A_2$ and $A_4$ values of 1994Ki01 gives −2.5>δ>+0.45.<br>$I_\gamma$: 1.21 *10* (1994Ki01), 1.6 *2* (1972Ak03), 1.4 *2* (1972HuZL).<br>$E_\gamma$: 977.1 *8* (1972Ak03), 977.1 *4* (1972HuZL). |





$^{182}_{76}Os_{106}$-9

## $^{182}$Ir ε decay (15.0 min) 2007Ca04,1994Ki01,1972Ak03 (continued)

### γ($^{182}$Os) (continued)

| $E_\gamma$ [†] | $I_\gamma$ [‡d] | $E_i$(level) | $J_i^\pi$ | $E_f$ | $J_f^\pi$ | Mult.[b] | δ | α[c] | Comments |
|---|---|---|---|---|---|---|---|---|---|
| 985.7[@] *3* | 0.42 *9* | 2025.09 | (1$^+$ to 4$^+$) | 1039.05 | 3$^+$ | | | | |
| 993.3[@e] *3* | 0.40[a] *12* | 1393.20 | (2$^+$) | 400.30 | 4$^+$ | | | | |
| 999.0 *1* | 4.20 *20* | 1399.30 | 5$^+$ | 400.30 | 4$^+$ | (E2+M1) | +19 +*8*−*4* | 0.00499 | α(K)exp≤0.008 (2007Ca04)<br>α(K)=0.00407 *6*; α(L)=0.000708 *10*; α(M)=0.0001639 *24*<br>α(N)=3.99×10$^{-5}$ *6*; α(O)=6.74×10$^{-6}$ *10*; α(P)=4.37×10$^{-7}$ *7*<br>δ: from (999γ)(273γ)(θ): $A_2$=−0.09 *5*, $A_4$=−0.05 *6*.<br>$I_\gamma$: 5.6 *2* (1994Ki01), 3.3 *4* (1972Ak03), 3.6 *4* (1972HuZL).<br>$E_\gamma$: 999.9 *5* (1972Ak03), 999.2 *3* (1972HuZL). |
| 1008.6[@] *3* | 0.39 *7* | 1899.21 | (2$^+$,3,4$^+$) | 890.62 | 2$^+$ | | | | |
| 1033.0 *2* | 2.71 *12* | 1159.88 | 2$^+$ | 126.89 | 2$^+$ | E0+M1+E2 | | 0.064 *10* | α(K)exp=0.053 *8* (2007Ca04)<br>$q^2$(E0/E2)=12.9 *21*, X(E0/E2)=0.60 *10* (2007Ca04).<br>Total conversion coefficient from α(K)exp=0.053 *8* (2007Ca04), multiplied by a factor of 1.2 to account for other shells.<br>$I_\gamma$: 1.20 *4* (1994Ki01), 2.3 *4* (1972Ak03), 2.1 *3* (1972HuZL).<br>$E_\gamma$: 1033.4 *6* (1972Ak03), 1033.3 *5* (1972HuZL).<br>δ(Q/D)=+46 from (1033γ)(127γ)(θ): $A_2$=−0.09 *16*, $A_4$=+0.24 *16*. |
| 1063.4 *1* | 5.10 *20* | 1190.30 | 4$^+$ | 126.89 | 2$^+$ | | | | (1063γ)(127γ)(θ): $A_2$=+0.07 *16*.<br>$I_\gamma$: 6.0 *2* (1994Ki01), 5.0 *10* (1972Ak03), 5.0 *4* (1972HuZL).<br>$E_\gamma$: 1063.9 *4* (1972Ak03), 1063.4 *4* (1972HuZL). |
| 1071.4 *3* | 0.92 *7* | 1471.73 | (3$^-$) | 400.30 | 4$^+$ | | | | $I_\gamma$: 0.99 *8* (1994Ki01). |
| 1101.2[@] *3* | 0.26[a] *7* | 1895.34 | 5$^-$ | 794.01 | 6$^+$ | | | | |
| 1122.5 *3* | 0.96 *15* | 1522.73 | (2$^+$,3,4$^+$) | 400.30 | 4$^+$ | | | | Eγ=1121.4 *6*, Iγ=1.0 *2* (1972Ak03); Eγ=1121.5 *6*, Iγ=1.05 *15* (1972HuZL). |
| 1134.8[@] *3* | 0.51 *10* | 2025.09 | (1$^+$ to 4$^+$) | 890.62 | 2$^+$ | | | | |
| 1159.9 *2* | 2.95 *14* | 1159.88 | 2$^+$ | 0.0 | 0$^+$ | | | | $I_\gamma$: 0.42 *4* (1994Ki01), 0.7 *3* for 1160.7 *8* γ ray and 2.6 *4* for 1158.0 *8* γ ray (1972Ak03); 3.1 *3* for 1159.2 *5* γ ray (1972HuZL); 3.2 *2* for 1160.0 *5* γ ray (1970FiZZ). |
| 1188.1 *3* | 0.19[a] *7* | 1588.54 | 6$^+$ | 400.30 | 4$^+$ | | | | $I_\gamma$: 0.22 *2* (1994Ki01). |
| 1217.2 *1* | 4.74 *23* | 1617.42 | (3,4)$^+$ | 400.30 | 4$^+$ | | | | α(K)exp=0.008 *2* (2007Ca04)<br>Mult.: M1 or E0+(M1)+E2 (2007Ca04).<br>$q^2$(E0/E2)=1.9 *7*, X(E0/E2)=0.12 *5* (2007Ca04).<br>Eγ=1217.6 *6*, Iγ=3.4 *3* (1972Ak03); Eγ=1217.0 *10*, Iγ=2.0 *3* (1972HuZL). |
| 1227.2 *2* | 1.66 *10* | 1627.39 | (3$^+$,4,5$^+$) | 400.30 | 4$^+$ | | | | $I_\gamma$: 2.09 *9* (1994Ki01), 0.8 *3* (1972Ak03), 1.30 *15* (1972HuZL).<br>$E_\gamma$: 1227.8 *8* (1972Ak03), 1226.6 *10* (1972HuZL). |





$^{182}_{76}Os_{106}$-10

## $^{182}$Ir ε decay (15.0 min) 2007Ca04,1994Ki01,1972Ak03 (continued)

### γ($^{182}$Os) (continued)

| $E_\gamma$ † | $I_\gamma$ ‡ d | $E_i$(level) | $J_i^\pi$ | $E_f$ | $J_f^\pi$ | Mult. b | Comments |
|---|---|---|---|---|---|---|---|
| 1240.6 @ 3 | 0.50 8 | 1640.89 | (2+,3,4+) | 400.30 | 4+ | | |
| 1251.4 1 | 4.95 20 | 1378.25 | 4+ | 126.89 | 2+ | | (1251γ)(127γ)(θ): $A_2$=+0.10 12.<br>$I_\gamma$: 2.96 14 (1994Ki01), 3.2 3 (1972Ak03), 4.4 4 (1972HuZL).<br>$E_\gamma$: 1252.0 8 (1972Ak03), 1251.0 10 (1972HuZL). |
| 1253.6 2 | 1.11 10 | 1654.02 | 5− | 400.30 | 4+ | | $I_\gamma$: 1.76 7 (1994Ki01). |
| 1266.3 1 | 4.29 25 | 1393.20 | (2+) | 126.89 | 2+ | E0+E2(+M1) | α(K)exp=0.014 3 (2007Ca04)<br>$q^2$(E0/E2)=4.4 12, X(E0/E2)=0.31 8 (2007Ca04).<br>Mult.: E0+(M1)+E2 or abnormal M1+E2.<br>Eγ=1265.8 6, Iγ=2.5 3 (1972Ak03); Eγ=1265.8 10, Iγ=3.6 4 (1972HuZL). |
| 1269.2 @ 3 | 0.43 11 | 1669.42 | (4+) | 400.30 | 4+ | | |
| 1334.5 @ 3 | 0.59 20 | 1734.85 | 5− | 400.30 | 4+ | | |
| 1344.9 #e 3 | 0.49 3 | 1471.73 | (3−) | 126.89 | 2+ | | $E_\gamma$: treated as questionable by the evaluators since a γ of 0.49 intensity should have been seen by 2007Ca04. |
| 1353.5 @ 3 | 0.50 13 | 2147.46 | (4+,5,6+) | 794.01 | 6+ | | |
| x1374.8 & 3 | 0.40 8 | | | | | | Additional information 1. |
| 1385.4 @ 3 | 0.63 10 | 1785.44 | (3+,4,5+) | 400.30 | 4+ | | |
| 1393.1 @ 3 | 0.50 13 | 1393.20 | (2+) | 0.0 | 0+ | | |
| 1396.0 @ 2 | 1.30 20 | 1522.73 | (2+,3,4+) | 126.89 | 2+ | | |
| 1444.1 @e 2 | 1.56 15 | 1844.41? | | 400.30 | 4+ | | |
| 1490.2 2 | 1.00 10 | 1617.42 | (3,4)+ | 126.89 | 2+ | | |
| 1495.0 @ 3 | 0.15 7 | 1895.34 | 5− | 400.30 | 4+ | | |
| 1498.9 @ 3 | 0.98 9 | 1899.21 | (2+,3,4+) | 400.30 | 4+ | | |
| 1514.0 @ 2 | 1.13 11 | 1640.89 | (2+,3,4+) | 126.89 | 2+ | | |
| 1549.7 @ 2 | 1.58 16 | 1676.60 | (1,2) | 126.89 | 2+ | | |
| x1575.6 &@ 3 | 0.72 11 | | | | | | |
| 1642.0 @ 2 | 1.68 9 | 1768.90 | (1,2) | 126.89 | 2+ | | |
| x1651.0 & 3 | 0.46 6 | | | | | | Additional information 2. |
| x1662.3 &@ 3 | 0.60 6 | | | | | | |
| 1676.7 @e 3 | 0.39 10 | 1676.60 | (1,2) | 0.0 | 0+ | | |
| x1722.8 &@ 3 | 0.93 14 | | | | | | |
| 1747.1 @ 3 | 0.83 13 | 2147.46 | (4+,5,6+) | 400.30 | 4+ | | |
| 1769.0 @e 3 | 0.80 11 | 1768.90 | (1,2) | 0.0 | 0+ | | |

† From 2007Ca04, unless otherwise stated. Uncertainties assigned by the evaluators as 0.1 keV for Iγ>3, 0.2 keV for Iγ=1-3 and 0.3 keV for Iγ<1, based on a general statement by 2007Ca04 that the uncertainty in Eγ is 0.1-0.3 keV. Energies for a total of 41 γ rays from 1994Ki01 are in good agreement with those from 2007Ca04 but are less complete. Values from 1972Ak03 and 1972HuZL are also in agreement with 2007Ca04 but are less precise and the isotopic

## $^{182}$Ir $\varepsilon$ decay (15.0 min) 2007Ca04,1994Ki01,1972Ak03 (continued)

### $\gamma(^{182}Os)$ (continued)

assignments seem questionable in many cases.

‡ From 2007Ca04, unless otherwise stated. Values from 1994Ki01 are either too high or too low in several cases. Values from 2007Ca04 are adopted here first because these are more complete and obtained from a mass-separated source and secondly because these are in general agreement with those from 1972Ak03, 1972HuZL and 1970FiZZ. Exceptions are noted.

# Weak $\gamma$ reported by 1994Ki01 only, uncertainty of 0.3 keV assigned by the evaluators.

@ $\gamma$ from 2007Ca04 only.

& This $\gamma$ is in coincidence with 127$\gamma$ and 274$\gamma$ (2007Ca04).

*a* From $\gamma\gamma$ coin spectra.

*b* From Ice(K) data of 2007Ca04 and 1972HuZL assuming $\alpha$(K)=0.0749 for for 273, E2 transition, and from $\gamma\gamma(\theta)$ data (1994Ki01).

*c* Calculated values from BrIcc code for stated mult and $\delta$.

*d* For absolute intensity per 100 decays, multiply by 0.40 *4*.

*e* Placement of transition in the level scheme is uncertain.

*x* $\gamma$ ray not placed in level scheme.





$^{182}_{76}Os_{106}$-12

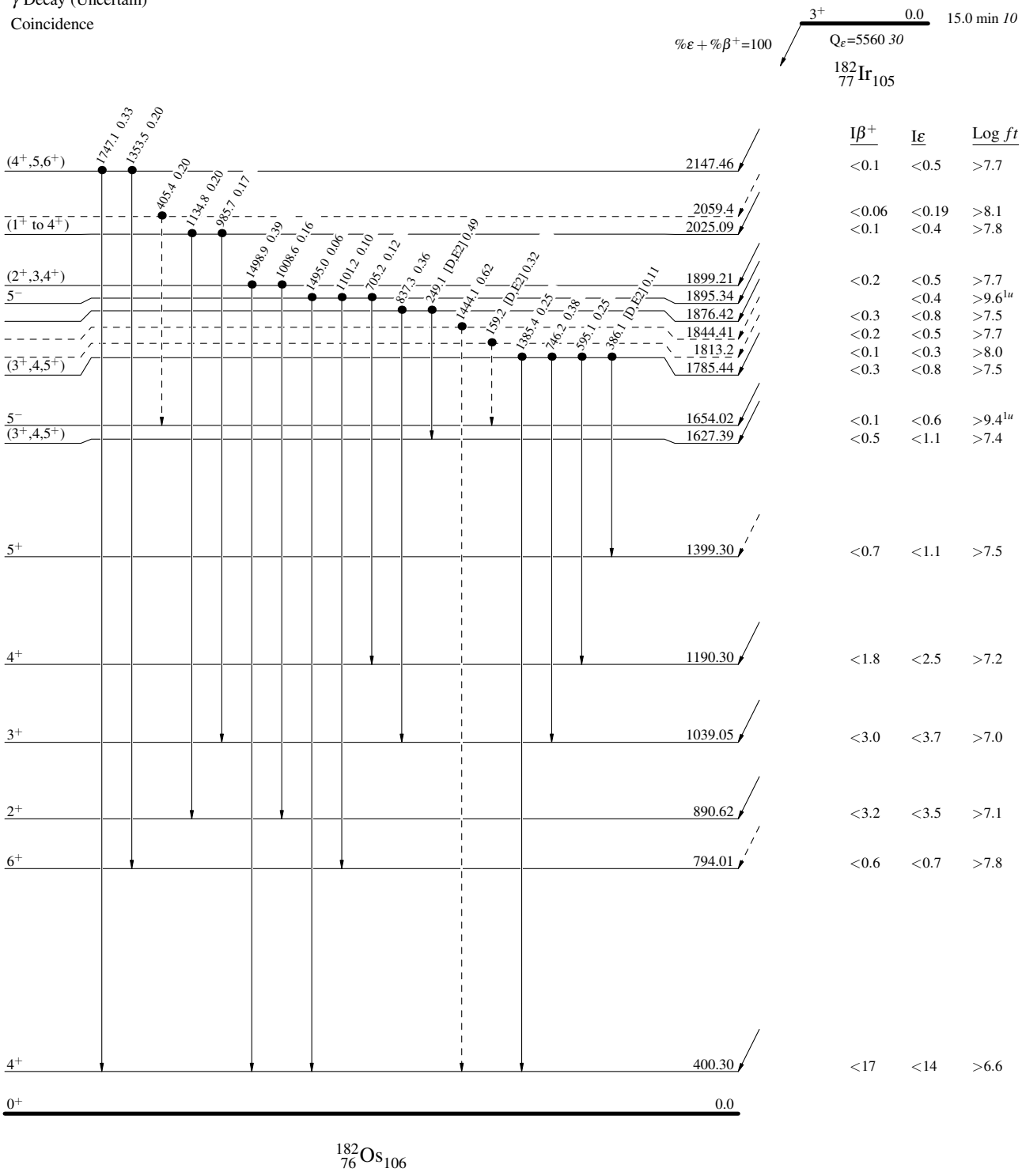
## $^{182}$Ir ε decay (15.0 min) 2007Ca04,1994Ki01,1972Ak03

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)
- Coincidence

Decay Scheme

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays

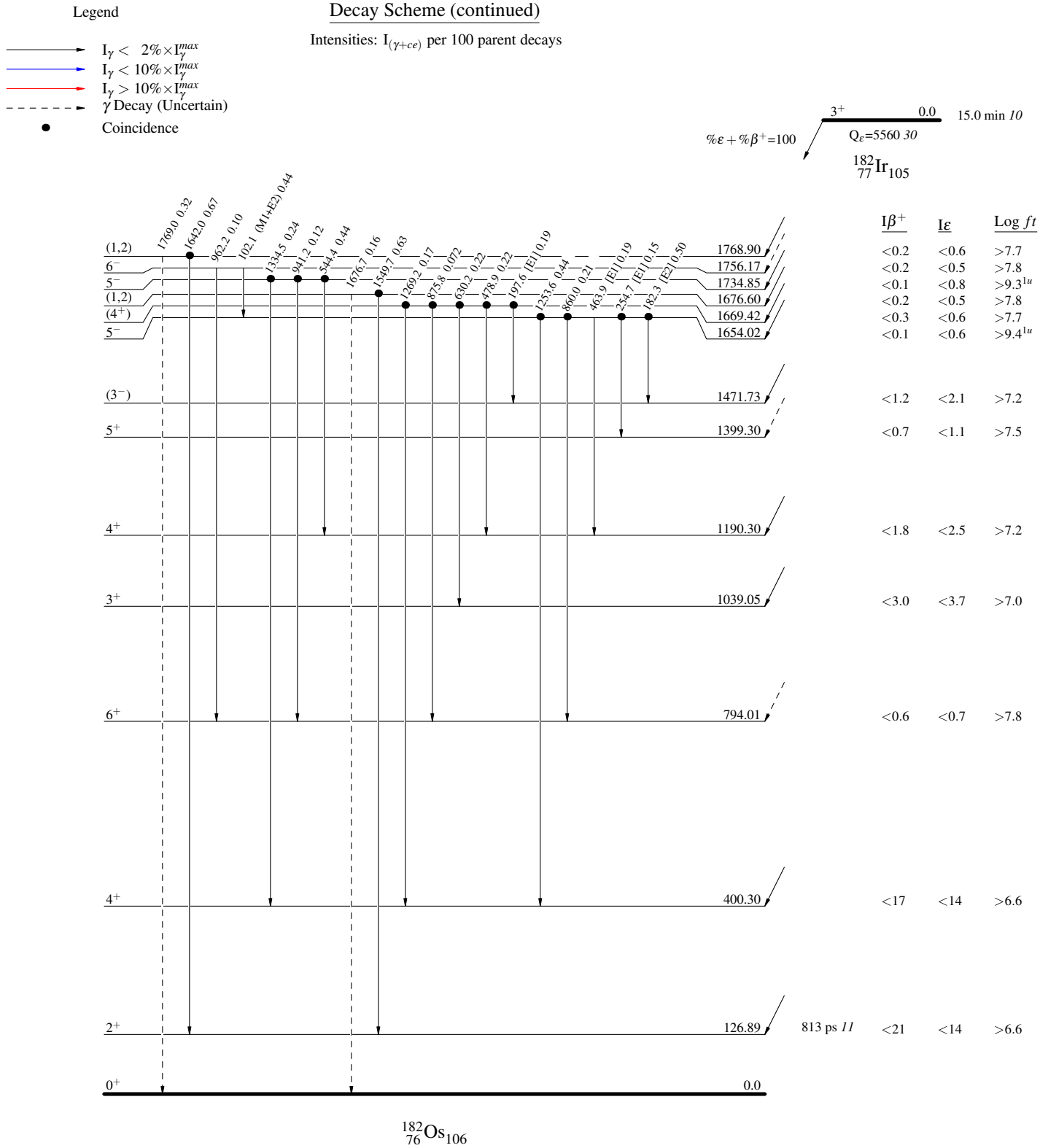



$^{182}_{76}Os_{106}$

## $^{182}$Ir ε decay (15.0 min) 2007Ca04,1994Ki01,1972Ak03

Decay Scheme (continued)

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays

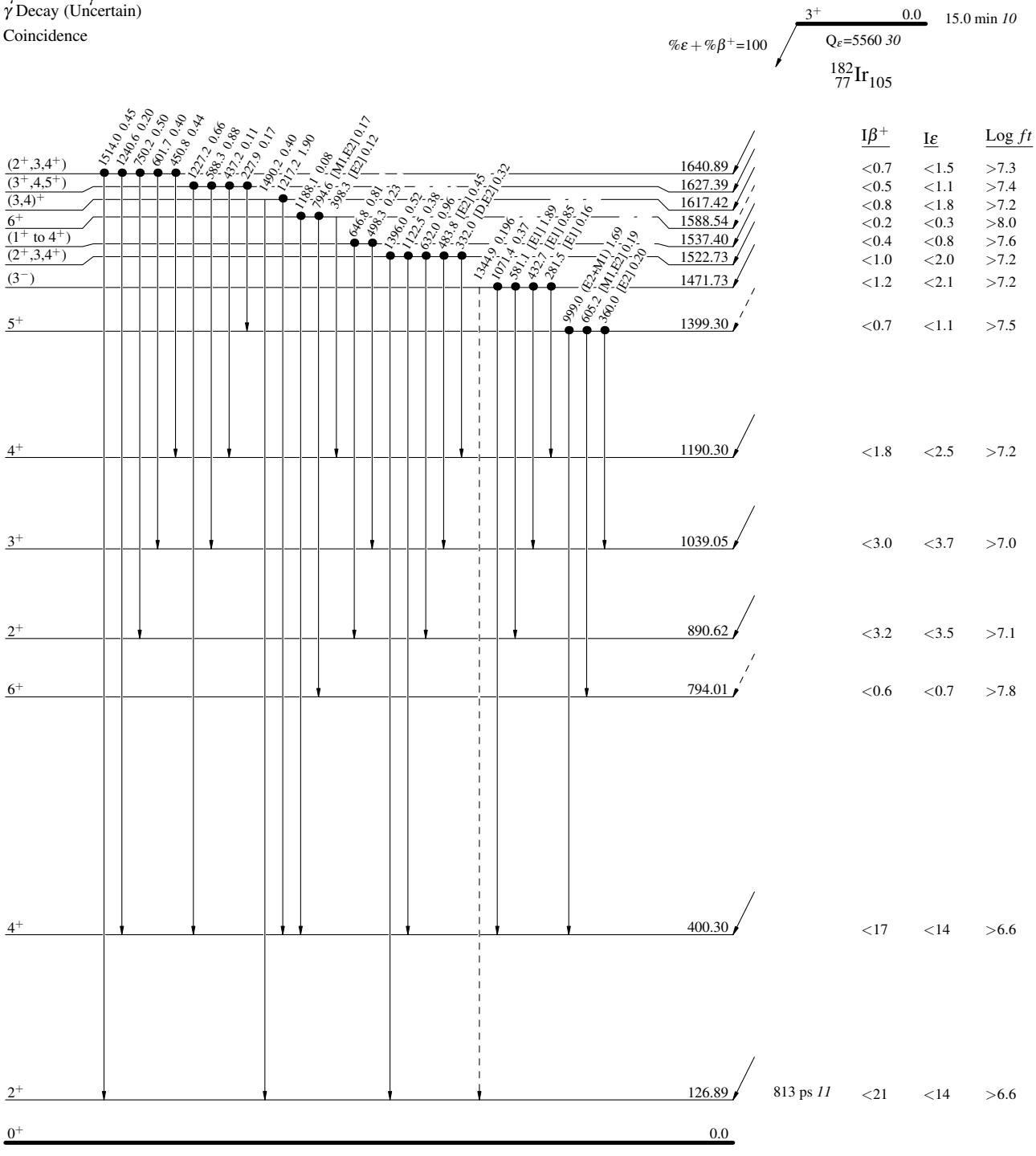


## $^{182}$Ir ε decay (15.0 min) 2007Ca04,1994Ki01,1972Ak03

### Decay Scheme (continued)

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays

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)
- Coincidence

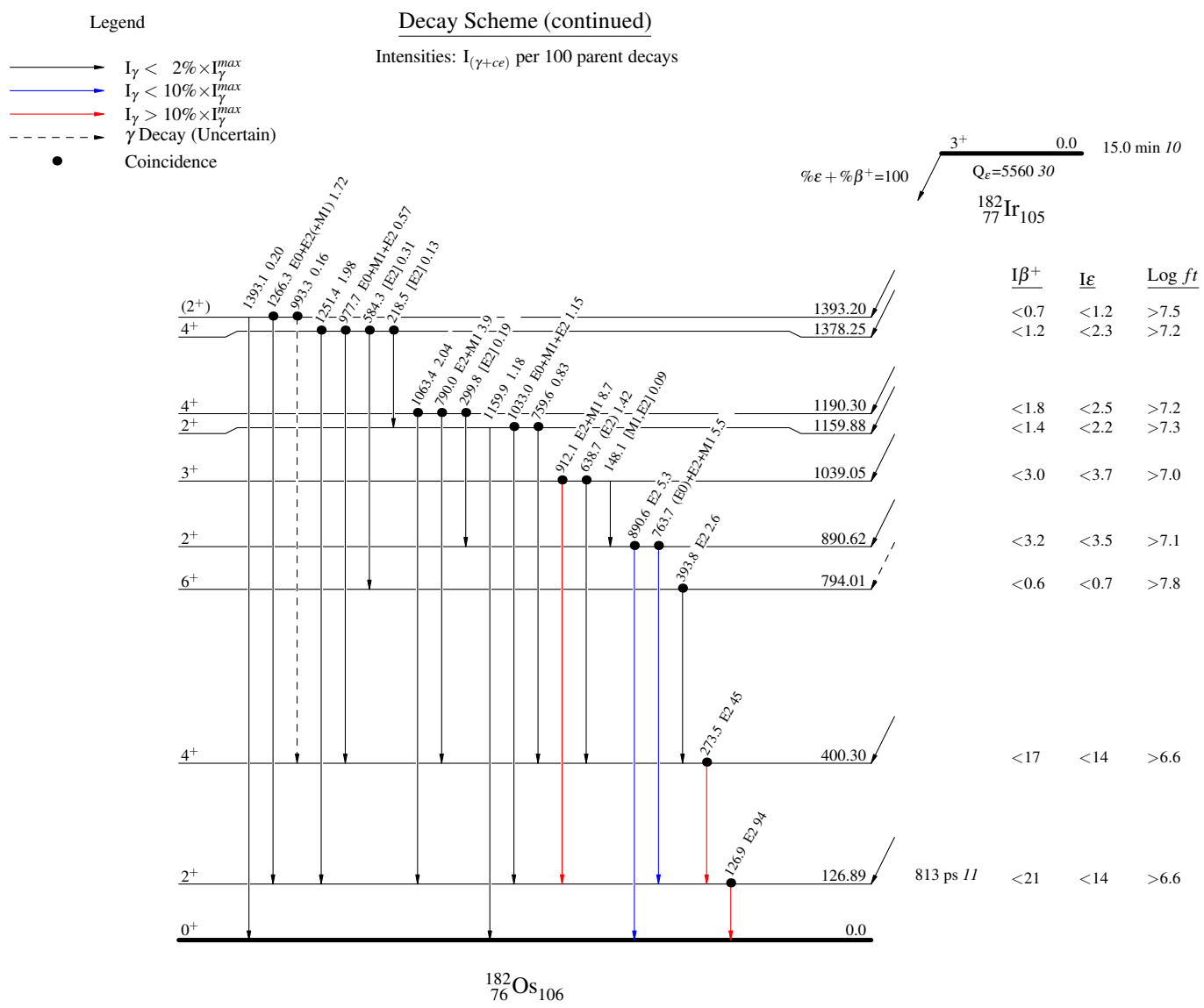



$^{182}_{76}Os_{106}$

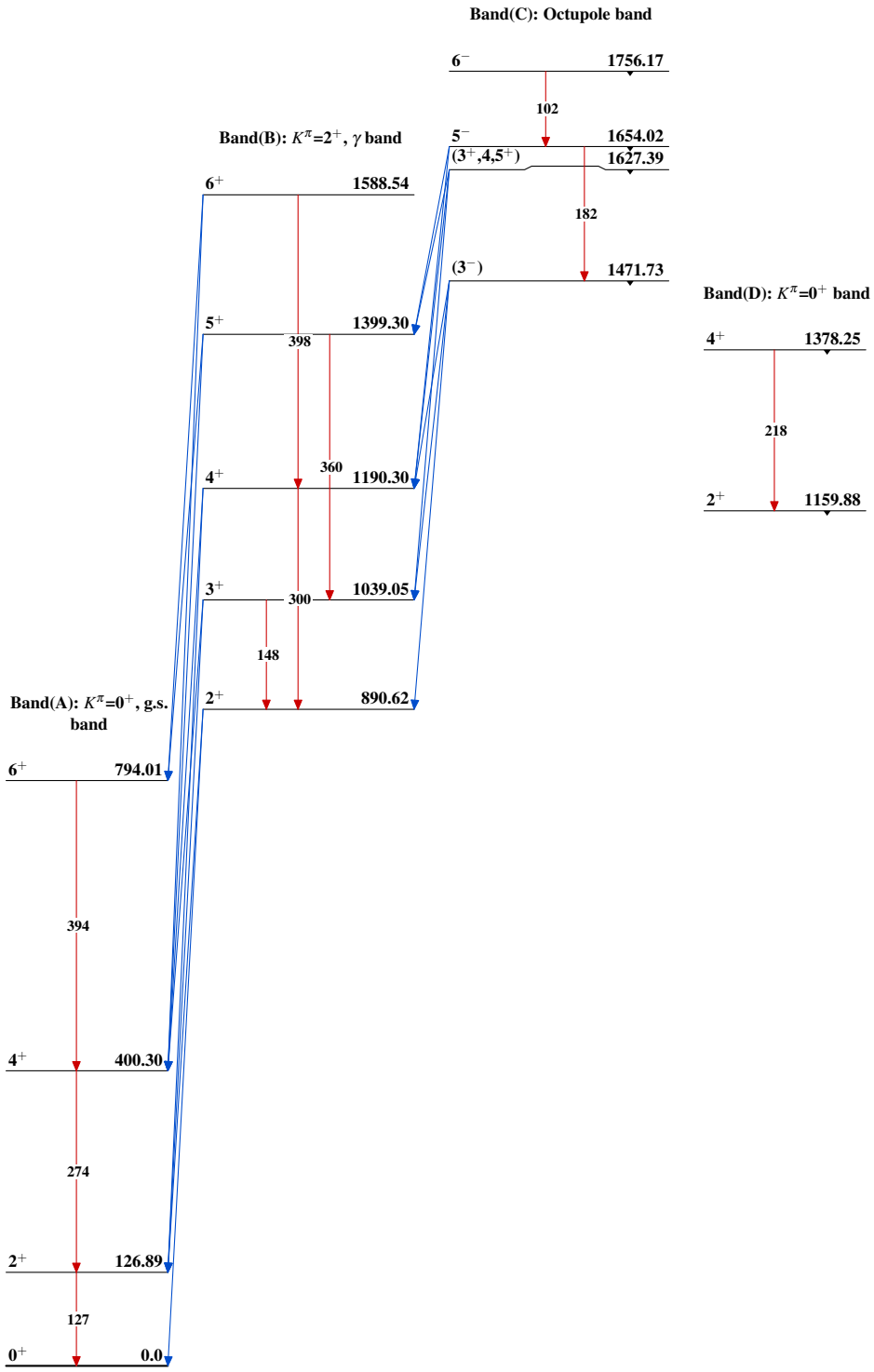
## $^{182}$Ir ε decay (15.0 min) 2007Ca04,1994Ki01,1972Ak03

Decay Scheme (continued)

Intensities: $I_{(\gamma+ce)}$ per 100 parent decays



## $^{182}$Ir ε decay (15.0 min) 2007Ca04,1994Ki01,1972Ak03




$^{182}_{76}Os_{106}$