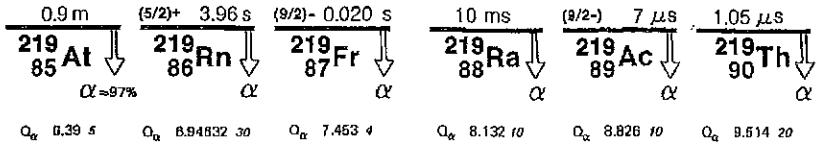
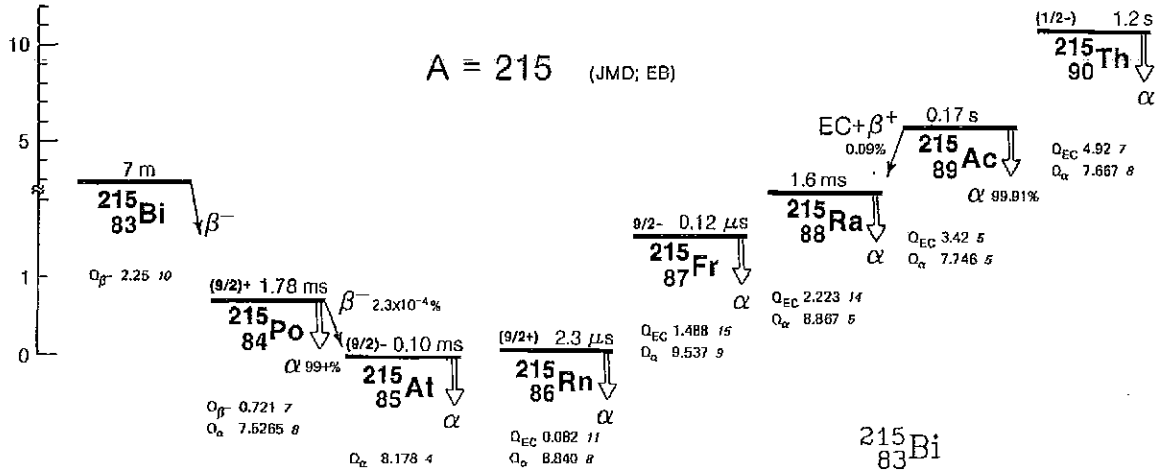




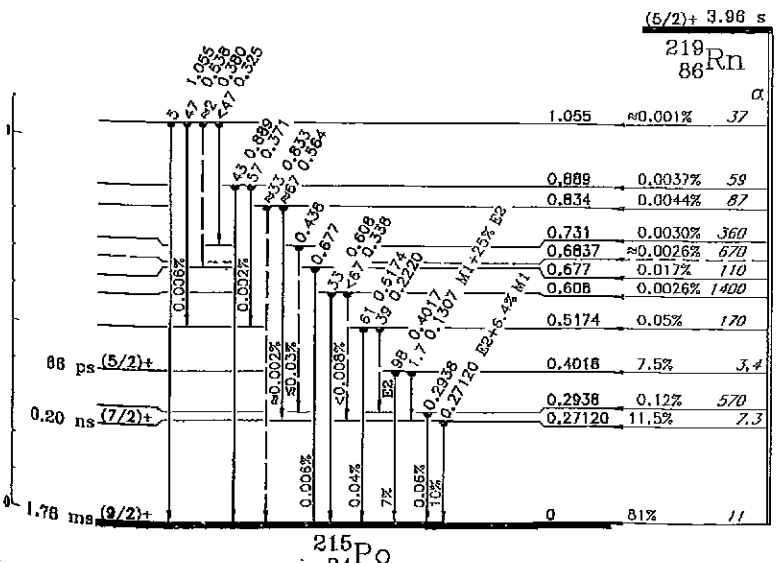
$^{215}_{83}$Bi

A: 1.71 *10* {ANDT 19 175(77)}
☢: β^- {PR 90 267(53)}
$t_{1/2}$: 7.46 m {AFen n167(65)}; 8.2 m {PR 90 267(53)}
Class: A; Ident: chem, genet {PR 90 267(53)}
Prod: descendant ^{227}Ac {PR 90 267(53), Bk64 Hyde2}; natural source {PR 90 267(53), Bk64 Hyde2}

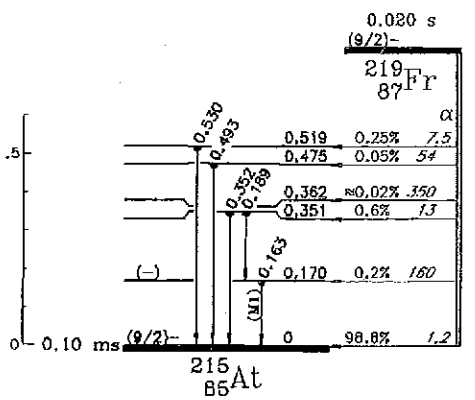
$^{215}_{84}$Po

A: −0.5405 *37* {ANDT 19 175(77)}
☢: α 99+%, β^- 2.3×10^{-4}% {JPPo 11 521(50)}; β^- ≈5×10^{-4}% {Nwis 32 44(44)}
$t_{1/2}$: 1.7785 ms *delay coinc* {IzF 25 1188(61)}; 1.7846 ms *delay coinc* {NIM 92 45(71)}; others: {PRSL 181A 183(42)}
Class: A; Ident: genet {RMP 3 427(31)}
Prod: descendant ^{227}Ac (from natural source or ^{226}Ra(n,γ)^{227}Ra(β^-)) {Bk64 Hyde2}
α: α_0 7.3864 *8 mag* {Metr 7 65(71)}
α_0 7.3864 *10* (99+%), α_{439} 6.9567 (≈0.034%), α_{445} 6.9501 (≈0.022%) *mag* {NP 35 232(62), CR 251 68(60), HPAc 34 240(61)}
others: {NP A149 385(70), UCRL-3877(57), CR 240 2138(55), RMP 26 1(54)}
γ with α: 0.4387 *3* (γ 0.0485%) *Ge(Li)* {CR 266B 1533(68)}
0.4389 (γ 0.064 *2*%) *Ge(Li)* {NP A149 385(70)}
$\gamma_{0.439}$ (γ 0.026 to 0.044%, e_K/γ <0.05) *Ge(Li), scint–semicond γα coinc* {AFen n184(65), CR 265B 822(67)}
$t_{1/2}$(levels): 0.271: 195 *15* ps *delay coinc* {NP A220 367(74)}; 0.402: 665 ps *Doppler* {NP A220 367(74)}; others: {JPPo 30 909(69)}

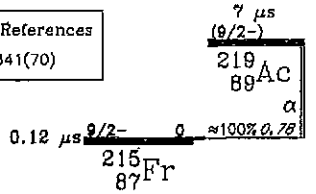
$^{216}_{84}$Po levels – References
Decay: NP A149 385(70), NP A157 456(70), CR 266B 1533(68), CR 265B 822(67), NP 35 232(62), AFen n184(65), ND 22 207(77)



$^{215}_{85}$At levels – References
Decay: JPCo 29 C1-181(68), JINC 28 933(66)



$^{215}_{87}$Fr levels – References
Decay: PR C2 1841(70)



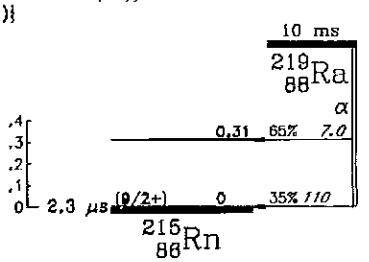
$^{215}_{85}$At

Δ: −1.2627 {ANDT 19 175(77)}
π: α {Nwis 32 44(44), PR 74 695(48)}
$t_{1/2}$: 0.102 ms *delay coinc* {PR 81 782(51)}; others: {PR 74 695(48)}
Class: A; Ident: genet {Nwis 32 44(44), PR 74 695(48)}
Prod: descendant ^{227}Po {Bk64 Hyde2}
α: α_0 8.026 4 *semicond* {LBL−1666 4(73)}
α_0 8.001 (99.95%), α_{405} 7.601 (0.052%) *semicond, semicond–scint ay coinc* {JINC 28 933(66)}
others: {PR 81 782(51), PR 74 695(48), Nwis 32 44(44)}
γ: 0.404 (weak) *scint–semicond γα coinc* {JINC 28 933(66)}

$^{215}_{86}$Rn

Δ: −1.179 10 {ANDT 19 175(77)}
π: α {PR 85 429(52)}
genet: parent ^{211}Po, not parent ^{211m}Po, from level scheme {PR C1 2115(70)}
$t_{1/2}$: 2.30 10 μs *delay coinc* {PR C1 2115(70)}
Class: B; Ident: genet {PR 85 429(52)}; genet, decay charac, excit {PR 182 1329(69)}
Prod: ^{232}Th(α,9n)^{227}U(3α) {PR 85 429(52)}; ^{231}Pa(p,5n)^{227}U(3α) {PR 182 1329(69)}; ^{208}Pb(^{18}O,3n)^{223}Th(2α) {PR C1 2115(70)}
α: α_0 8.674 8 (100%) *semicond* {PR C1 2115(70)}
α_0 8.67 2 *semicond* {PR 182 1329(69)}
others: {PR 85 429(52)}

$^{215}_{88}$Ra levels – References
Decay: PR C1 2115(70)



$^{215}_{87}$Fr

Δ: 0.309 15 {ANDT 19 175(77)}
π: α {UCRL−10023(61)}
$t_{1/2}$: 0.12 2 μs *delay coinc* {PR C9 1168(74)}; others: {PR C2 1841(70), UCRL−10023(61)}
Class: A; Ident: excit {UCRL−10023(61)}; excit, genet, cross bomb, decay charac {PR C2 1841(70)}
Prod: ^{208}Pb(^{11}B,4n) {UCRL−10023(61)}; ^{208}Pb(^{19}F,4n)^{223}Po(2α) {PR C2 1841(70)}; ^{205}Tl(^{22}Ne,4n)^{223}Pa(2α) {PR C2 1841(70)}; ^{209}Bi(^{20}Ne,α2n)^{223}Po(2α) {PR C2 1841(70)}; ^{209}Bi(^{12}C,α2n) {PR C9 1168(74)}
α: α_0 9.364 15 (100%) *semicond* {PR C2 1841(70)}
α_0 9.355 10 *semicond* {PR C9 1168(74)}
others: {UCRL−10023(61)}

$^{215}_{88}$Ra

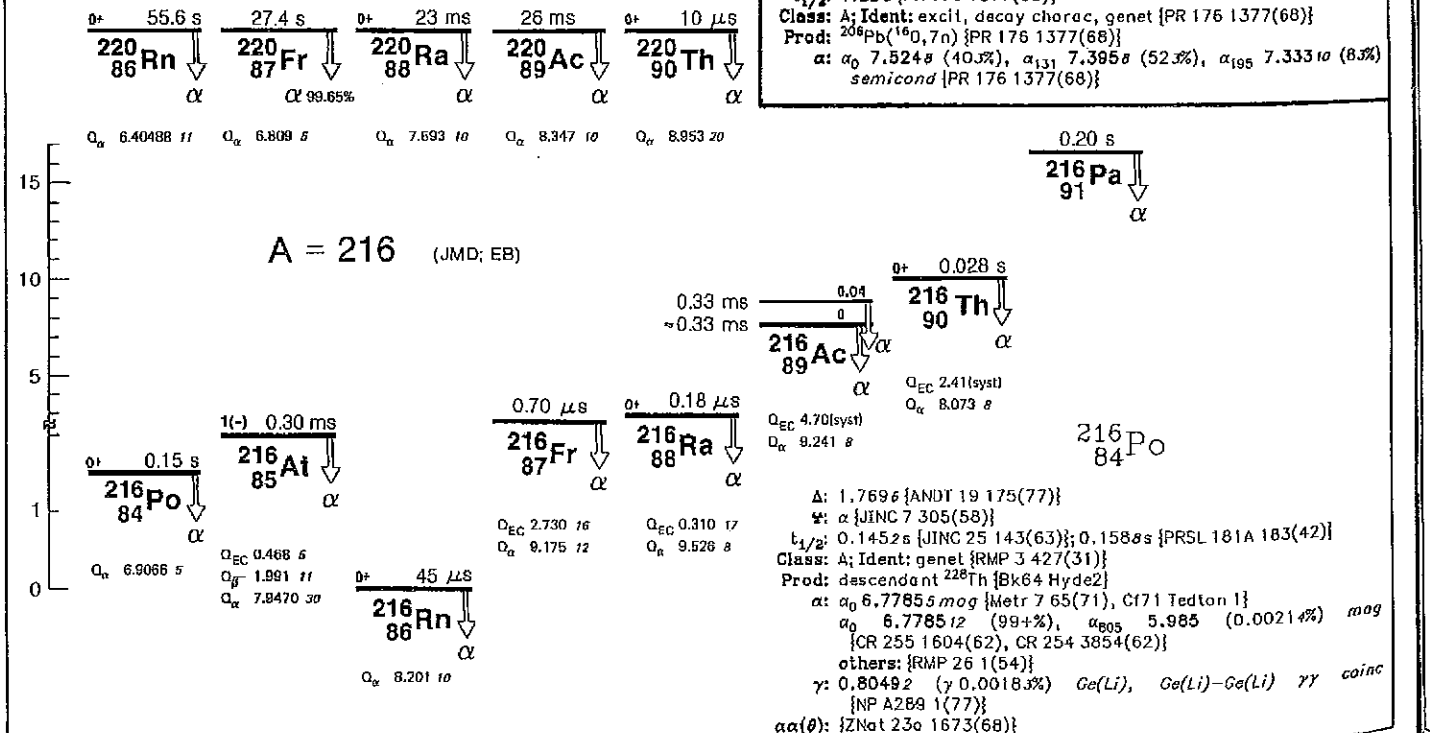
Δ: 2.531 12 {ANDT 19 175(77)}
π: α {UCRL−10023(61), BAPS 7 541(62)}
$t_{1/2}$: 1.56 10 ms {PR C2 2309(70)}; 1.72 ms {PR 176 1377(68)}; 1.6 ms {UCRL−10023(61), BAPS 7 541(62)}
Class: A; Ident: excit {BAPS 7 541(62)}; excit, genet, decay charac {PR 176 1377(68)}; mass spect {Cf69 Kyoto 548}
Prod: ^{209}Bi(^{11}B,5n) {BAPS 7 541(62), PR C2 2309(70)}; ^{206}Pb(^{15}O,3n)^{219}Th(α) {PR 176 1377(68)}
α: α_0 8.697 5 (95.7 10%), α_{548} 8.167 8 (1.35%), α_{832} 7.879 8 (3.05%) *semicond* {PR 176 1377(68), ANDT 12 479(73)}
α_0 8.701 5 (96%), α_{540} 8.175 8 (1.4%), α_{832} 7.885 8 (2.6%) *semicond* {PR C2 2309(70)}
others: {PR 167 1094(68), YadF 4 246(66), BAPS 7 541(62), UCRL−10023(61)}

$^{215}_{89}$Ac

Δ: 5.955 {ANDT 19 175(77)}
π: α 99.91%, EC+β+ 0.092% {PR 167 1094(68)}
$t_{1/2}$: 0.17 1 s {PR 167 1094(68)}
Class: C; Ident: excit, cross bomb, genet {PR 167 1094(68)}
Prod: ^{203}Tl(^{18}O,4n) {PR 167 1094(68)}; ^{205}Tl(^{16}O,6n) {PR 167 1094(68)}; ^{209}Bi(^{12}C,6n) {PR 167 1094(68)}
α: 7.604 5 *semicond* {PR 167 1094(68)}

$^{215}_{90}$Th

Δ: 10.879 {ANDT 19 175(77)}
π: α, no EC (lim 1.5%) {PR 176 1377(68)}
$t_{1/2}$: 1.2 2 s {PR 176 1377(68)}
Class: A; Ident: excit, decay charac, genet {PR 176 1377(68)}
Prod: ^{206}Pb(^{16}O,7n) {PR 176 1377(68)}
α: α_0 7.524 8 (40.3%), α_{131} 7.395 8 (52.3%), α_{195} 7.333 10 (8.3%) *semicond* {PR 176 1377(68)}



$^{216}_{84}$Po

Δ: 1.7696 {ANDT 19 175(77)}
π: α {JINC 7 305(58)}
$t_{1/2}$: 0.1452 s {JINC 25 143(63)}; 0.1588 s {PRSL 181A 183(42)}
Class: A; Ident: genet {RMP 3 427(31)}
Prod: descendant ^{228}Th {Bk64 Hyde2}
α: α_0 6.7785 5 *mag* {Metr 7 65(71), Cf71 Tedton 1}
α_0 6.7785 12 (99+%), α_{605} 5.985 (0.0021+%) *mag* {CR 255 1604(62), CR 254 3854(62)}
others: {RMP 26 1(54)}
γ: 0.8049 2 (γ 0.0018.3%) *Ge(Li), Ge(Li)–Ge(Li) γγ coinc* {NP A289 1(77)}
αα(θ): {ZNat 23a 1673(68)}

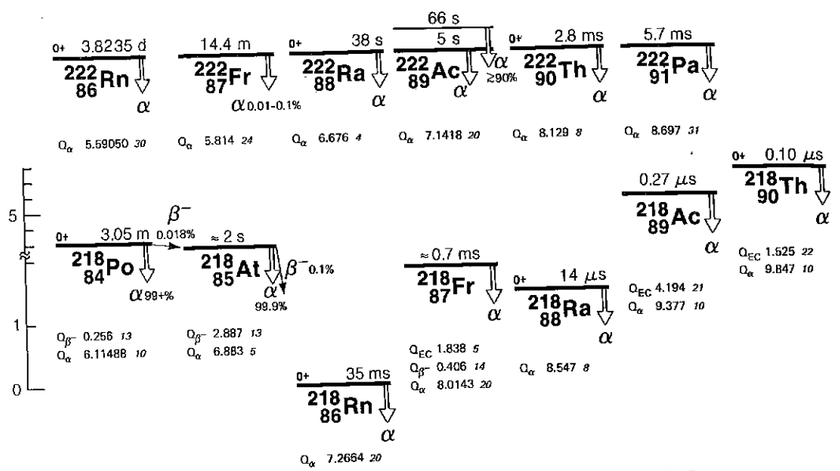
$^{217}_{90}Th$

Δ: 12.141 *36* {ANDT 19 175(77)}
π: α {PR 176 1377(68)}
$t_{1/2}$: 0.252 *7* ms {PRL 31 323(73)}; **others:** {PR 176 1377(68)}
Class: B; **Ident:** excit, decay charac {PR 176 1377(68)}
Prod: $^{206}Pb(^{16}O,5n)$ {PR 176 1377(68)}
α: **9.250** *10 semicond* {PR 176 1377(68)}

$^{217}_{91}Pa$

π: α {PR 176 1377(68)}
$t_{1/2}$: $t_{1/2}$ ≈10 ms (estimated from α-decay theory)
Class: E; **Ident:** decay charac, cross bomb {PR 176 1377(68)}
Prod: $^{203}Tl(^{20}Ne,6n)$ {PR 176 1377(68)}; $^{206}Pb(^{20}Ne,p8n)$ {PR 176 1377(68)}
α: **8.340** *10 semicond* {PR 176 1377(68)}

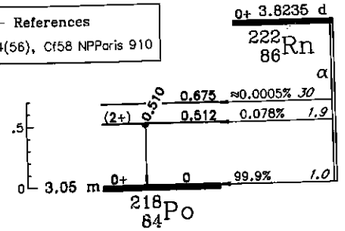
A = 218 (JMD; EB)



$^{218}_{84}Po$

Δ: 8.3546 *33* {ANDT 19 175(77)}
π: α 99+%, β⁻ 0.0185% {Cf58 NPParis 910}; **others:** {OesS 161p2 51(52)}
$t_{1/2}$: 3.05 m {RMP 3 427(31)}
Class: A; **Ident:** chem, genet {RMP 3 427(31)}
Prod: descendant ^{226}Ra, from natural source {Bk64 Hyde2}
α: $α_0$ **6.00255** *10 mag* {Metr 7 65(71), Cf71 Tedton 1}
$α_0$ **6.002** (99+%), $α_{837}$ **5.181** *2* (0.0011%) *mag* {Cf58 NPParis 910}
others: {JPPa 24 854(63), CR 236 1016(53), PR 54 18(38), PRSL 157A 183(36)}
αα(θ): {ZNat 23a 1673(68)}

$^{218}_{84}Po$ levels – References
Decay: PR 102 464(56), Cf58 NPParis 910



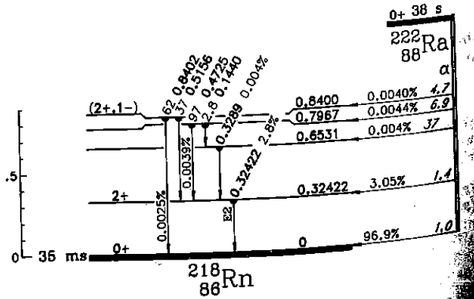
$^{218}_{85}At$

Δ: 8.099 *13* {ANDT 19 175(77)}
π: α 99.9%, β⁻ 0.1% {CR 227 1090(48), JPPa 10 95(49)}
$t_{1/2}$: 1.5 s≤$t_{1/2}$≤2.0 s {CR 227 1090(48), JPPa 10 95(49)}; **others:** {Nwis 31 298(43)}
Class: B; **Ident:** genet {Nwis 31 298(43), Cf58 NPParis 910}
Prod: daughter ^{218}Po {Nwis 31 298(43), CR 227 1090(48), JPPa 10 95(49)}
α: $α_0$ **6.757** *5* (3.6%), $α_{53}$ **6.694** *3* (90%), $α_{96}$ **6.654** *5* (6.4%) *mag* {Cf58 NPParis 910, Bk64 Hyde2, ANDT 12 479(73)}
others: {Nwis 31 298(43)}

$^{218}_{86}Rn$

Δ: 5.212 *5* {ANDT 19 175(77)}
π: α {PR 74 591(48)}
$t_{1/2}$: 35 *1* ms *delay coinc* {JINC 25 143(63)}; 392 ms *delay coinc* {NIM 92 45(71)}; **others:** {UCRL–9511(61), PR 74 591(48)}
Class: A; **Ident:** genet {PR 74 591(48)}
Prod: descendant ^{230}U {Bk64 Hyde2}
α: $α_0$ **7.133** *2 semicond* {LBL–1666 4(73)}
$α_{609}$ **6.542** (0.165%) *semicond–scint αγ coinc, semicond–scint αe coinc* {UCRL–11028(63)}
others: {PR 119 796(60), PR 104 91(56), PR 74 591(48)}
γ: **0.60931** *6* (γ 0.124 *6*%) *Ge(Li), Ge(Li)–Ge(Li) γγ coinc* {NP A270 175(76)}
0.6094 *10* (γ 0.20%, e/γ 0.022 *6*) *Ge(Li), scint–semicond γγ coinc, scint–semicond eα coinc* {UCRL–11028(63), PC64 Lederer}
others: {UCRL–9511(61), PR 104 91(56), PR 96 1568(54)}
$t_{1/2}$(0.324): <80 ps *delay coinc* {KDVM 32n12(60)}

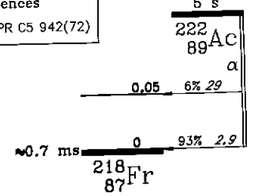
$^{218}_{86}Rn$ levels – References
Decay: PC64 Lederer, UCRL–11028(63), PR 119 796(60), PR 104 91(56), NIM 75 66(69), NP A270 175(76)



$^{218}_{87}Fr$

Δ: 7.050 *6* {ANDT 19 175(77)}
π: α {PR 81 782(51)}
$t_{1/2}$: 0.7 *6* ms {PR C5 942(72)}; ≈5 ms (est) {PR 81 782(51)}
Class: B; **Ident:** genet {PR 75 314(49), PR 81 782(51)}
Prod: descendant ^{226}Pa {PR 75 314(49), PR 81 782(51)}
α: $α_0$ **7.867** *2 semicond* {LBL–1666 4(73)}
$α_0$ **7.851** *10* (93%), $α_{140}$ **7.716** *10* (<0.5%), $α_{300}$ **7.556** *10* (5%), $α_0$ **7.851** *10* (93%), $α_{140}$ **7.526** *15* (1%), $α_{490}$ **7.368** *10* (<0.5%) *semicond, semicond–scint αγ coinc* {SFen 30n4(64)}
others: {PR C5 942(72), PR 81 782(51)}

$^{218}_{87}Fr$ levels – References
Decay: SFen 30n4(64), PR C5 942(72)



$^{218}_{88}Ra$

Δ: 6.644 *14* {ANDT 19 175(77)}
π: α {NP A149 641(70), PR C1 2115(70)}
$t_{1/2}$: 14 *2* μs *delay coinc* {PR C1 2115(70)}
Class: A; **Ident:** excit, decay charac {NP A149 641(70)}; excit, cross bomb, decay charac {PR C1 2115(70)}
Prod: daughter ^{222}Th {NP A149 641(70), PR C1 2115(70)}
α: **8.392** *8 semicond* {NP A149 641(70)}
8.384 *10 semicond* {PR C1 2115(70)}

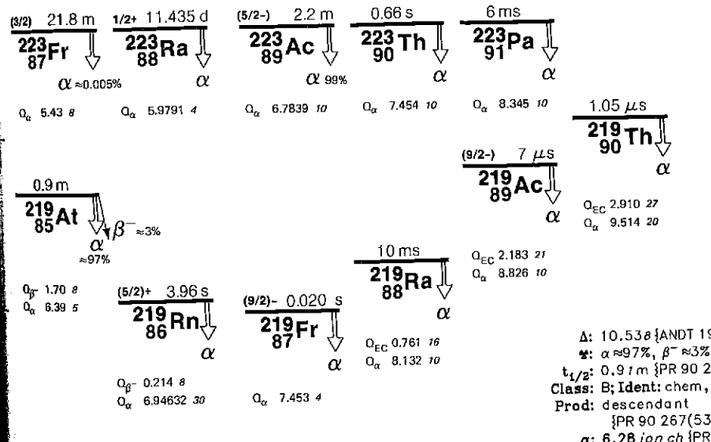
$^{218}_{89}Ac$

Δ: 10.837 *16* {ANDT 19 175(77)}
π: α {PR C2 1841(70)}
genet: parent ^{214}Fr {PR C2 1841(70)}
$t_{1/2}$: 0.27 *4* μs *delay coinc* {PR C2 1841(70)}
Class: A; **Ident:** excit, cross bomb, decay charac, genet {PR C2 1841(70)}
Prod: daughter ^{222}Po {PR C2 1841(70)}
α: $α_0$ **9.204** *15 semicond* {PR C2 1841(70)}

$^{218}_{90}Th$

Δ: 12.362 *16* {ANDT 19 175(77)}
π: α {PL 45B 244(73), PRL 31 323(73)}
$t_{1/2}$: 967 *ns delay coinc* {PL 45B 244(73), NP A217 253(73)}; 122 *8* ns *delay coinc* {PRL 31 323(73)}
Class: A; **Ident:** genet, excit, decay charac {PRL 31 323(73), PL 45B 244(73), NP A217 253(73)}
Prod: $^{206}Pb(^{18}O,4n)$ {PRL 31 323(73)}; $^{209}Bi(^{14}N,5n)$ {PL 45B 244(73), NP A217 253(73)}
α: **9.664** *10* (100%) *semicond* {NP A217 253(73), PL 45B 244(73)}
9.68 *2 semicond* {PRL 31 323(73)}
others: {PR C2 2115(70)}

A = 219 (JMD; EB)



$^{219}_{85}At$

Δ: 10.538 *8* {ANDT 19 175(77)}
π: α ≈97%, β⁻ ≈3% {PR 90 267(53)}
$t_{1/2}$: 0.9 *1* m {PR 90 267(53)}
Class: B; **Ident:** chem, genet {PR 90 267(53)}
Prod: descendant ^{227}Ac {PR 90 267(53)}; natural source {PR 90 267(53)}
α: **6.28** *ion ch* {PR 90 267(53)}

$^{219}_{86}Rn$

Δ: 8.8307 *37* {ANDT 19 175(77)}
π: α {NP 35 232(62)}
$t_{1/2}$: 3.96 *1* s {JINC 28 2771(66)}; 4.005 s {ZNat 16a 577(61)}; 3.92 s {RMP 3 427(31)}
Class: A; **Ident:** chem, genet {RMP 3 427(31)}
Prod: descendant ^{227}Th {Bk64 Hyde2}
α: $α_0$ **6.81929** *27 mag* {Metr 7 65(71), Cf71 Tedton 1}
$α_0$ **6.8189** (81.0 *16*%), $α_{271}$ **6.5527** (11.55%), $α_{294}$ **6.5289** (0.12 *1*%), $α_{402}$ **6.4246** (7.55%), $α_{517}$ **6.3117** (0.054 *6*%), $α_{608}$ **6.2235** (0.0026 *3*%), $α_{677}$ **6.1585** (0.017 *4* 16%), $α_{684}$ **6.1476** (≈0.0026%), $α_{731}$ **6.1019** (0.0030 *3*%), $α_{834}$ **6.0007** (0.0044 *5*%) *mag* {NP 35 232(62)}
no $α_{684}$ (reassigned to ^{211}Bi), $α_{689}$ **5.947** (0.0037%), $α_{1055}$ **5.786** (≈0.001%), other α groups observed *semicond–scint αγ coinc, semicond–semicond αe coinc* {AFen n184(65)}
others: {NuoCs 10v25 1314(62), HPAc 34 240(61), CR 251 68(60), UCRL–3877(57), RMP 26 1(54), CR 202 1274(36)}
γ: (**norm:** $γ_{0.271}$ (γ 10 *1*%), from level scheme) **0.1307** *1* ($t_γ$1.05 *25*, e/γ 4.6, L_1/L_2 2.45, L_1/L_3 2.84), **0.2220** *3* ($t_γ$0.28 *7*), **0.27120** *5* ($t_γ$100, e/γ 0.217, K/L 1.64 *6*, L_1/L_2 0.5164 *7*, L_1/L_3 1.0359 *2*), **0.2940** *3* ($t_γ$0.59 *15*), **0.4018** *2* ($t_γ$65.2 *65*), **0.5165** *5* ($t_γ$0.22 *5*), **0.6770** *10* ($t_γ$0.06 *3*) *Ge(Li), mag conv, Ge(Li)–scint γγ coinc* {NP A149 385(70)}
0.1306 *2* ($t_γ$1.21 *10*, L_2/L_1 0.494 *65*), **0.2714** *1* ($t_γ$100, $e_K/γ$ 0.107 *16*, $e_{L3}/γ$ 0.016 *5*, L_3/L_{1+2} 0.40 *6*), **0.2938** *2* ($t_γ$0.51 *27*), **0.4020** *3* ($t_γ$69.0 *30*, $e_K/γ$ 0.027 *12*) *Ge(Li), mag conv* {NP A157 456(70)}
0.1154 *5*? ($t_γ$0.030 *14*), **0.1305** *3* ($t_γ$1.18 *23*), **0.2710** *2* ($t_γ$100 *14*), **0.2934** *4* ($t_γ$0.70 *14*), **0.3770** *6*? ($t_γ$≈0.06), **0.3880** *6*? ($t_γ$≈0.04), **0.4017** *1* ($t_γ$60.9 *37*), **0.5174** *3* ($t_γ$0.44 *4*), **0.6766** *3*? ($t_γ$≤0.23) *Ge(Li)* {CR 266B 1533(68)}

(Continued on next page)

$^{219}_{86}$Rn (Continued)

(intensities relative to $\dagger_\gamma$100 for $\gamma_{0.271}$) **0.2932***6* ($\dagger_\gamma$0.646), **0.3249***10* ($\dagger_\gamma$<0.06), **0.3377***10* ($\dagger_\gamma$<0.08), **0.3709***15* ($\dagger_\gamma$<0.1), **0.4382***6* ($\dagger_\gamma$≤0.28), **0.5171***8* ($\dagger_\gamma$0.44*10*), **0.5382***15* ($\dagger_\gamma$0.063), **0.5637***15* ($\dagger_\gamma$<0.03), **0.6083***10* ($\dagger_\gamma$0.042), **0.6660***40* ($\dagger_\gamma$<0.08, doublet?), **0.6748***12* ($\dagger_\gamma$0.21 δ), **0.8890***15* ($\dagger_\gamma$0.015 ?), **1.0550***20* ($\dagger_\gamma$0.006 3), other γ rays observed *Ge(Li)* {CR 2658 822(67)}

$\gamma_{0.271}$ (K/L+M+... 1.16*10*), **0.371** (γ ≈0.002%), **0.380** (γ ≈3×10^{-4}%), $\gamma_{0.402}$ (e_K/γ 0.04, K/L+M+... <2), **0.517** (γ ≈0.04%), **0.536** (γ ≈3×10^{-4}%), **0.562** (γ ≈0.002%), **0.606** (γ ≈0.0026%), **0.673** (γ ≈0.01%), **0.833** (γ ≈0.001%), **0.888** (γ ≈0.001%), **1.053** (γ ≈3×10^{-4}%), other γ rays observed *scint–semicond γα coinc, semicond–semicond ea coinc* {AFen n184(65)}

$\gamma_{0.271}$ (K/L_1/L_2/L_3 13/4.5/5.2/2.2), $\gamma_{0.402}$ (K/L_{1+2} 1.8) *mag conv, scint* {UCRL–3877(57)}

others: {JPPa 30 909(69), NP 35 232(62), HPAc 30 272(57), JPPa 1 34(40), AnP s11v8 484(37)}

αγ(θ): {NP A157 456(70), NP A149 385(70), JPPa 30 909(69), NP A96 689(67), JPPa 22 680(61)}

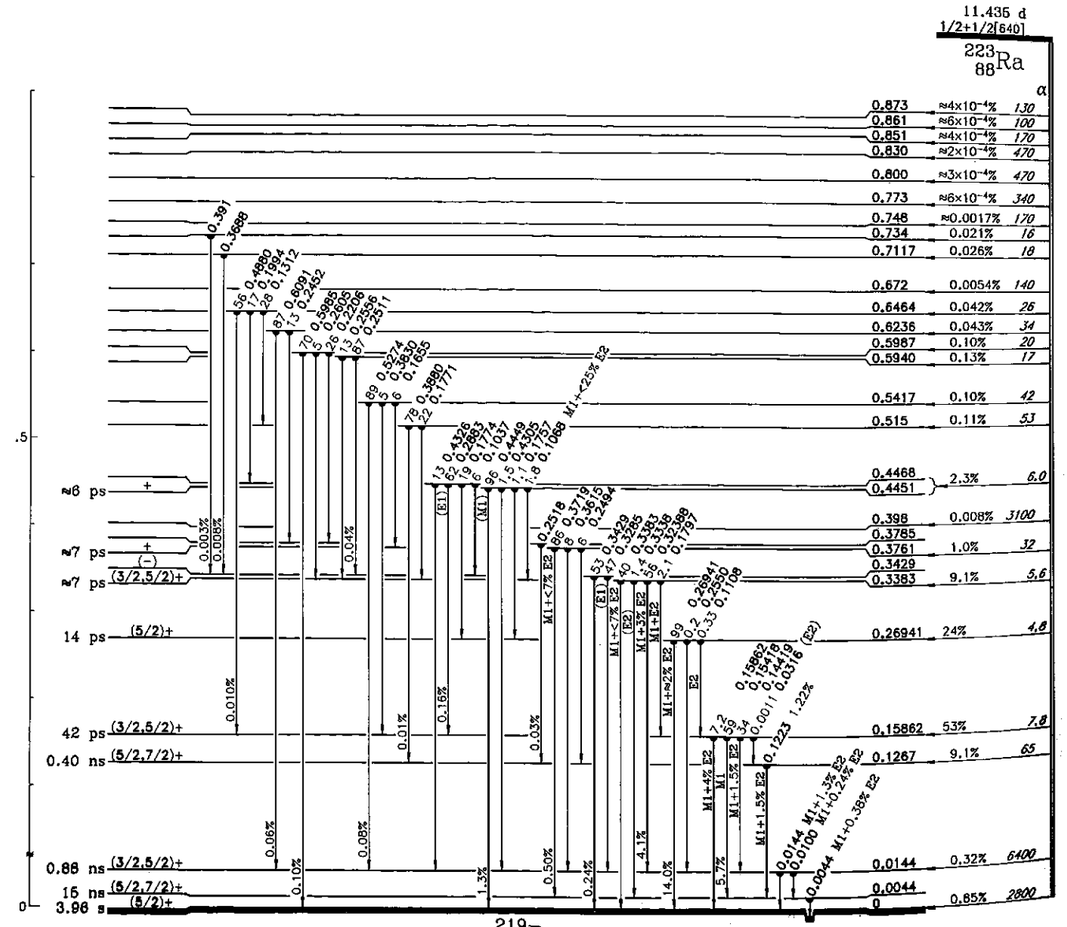
γγ(θ): {NP A157 456(70)}

αγ$_{110\ p}$(θ): {NP A157 456(70)}

$t_{1/2}$(levels): **0.004:** 15.4*13* ns *delay coinc* {NP A223 234(74)}; **0.014:** 0.875*30* ns *delay coinc* {NP A223 234(74)}; **0.127:** 0.402*20* ns *delay coinc* {NP A141 75(70)}; **0.159:** 42.3*50* ps *Doppler* {NIM 134 553(76)}, 40.2*76* ps *Doppler* {PC74 Bowmn, NIM 115 401(74)}, 17.7*26* ps *recoil dist Doppler* {NIM 115 401(74)}; **0.269:** 14.2*23* ps *Doppler* {NIM 134 553(76)}, 4.4*10* ps *recoil dist Doppler* {NIM 115 401(74)}, 27*3* ps *hf deflection* {NIM 97 323(71), IzF 34 2113(70), DokI 191 61(70)}; **0.338:** 6.1*28* ps *Doppler* {NIM 134 553(76)}, 8.1*28* ps *recoil dist Doppler* {NIM 115 401(74)}; **0.376:** 6.9*39* ps *Doppler* {NIM 134 553(76)}; **0.445:** 6.2*31* ps *Doppler* {NIM 134 553(76)}; **others:** {NIM 115 401(74), NP A223 234(74), PC74 Bowmn, NP A141 75(70)}

$^{219}_{86}$Rn levels – References

Decay: NP A141 75(70), NP A149 363(70), NP A223 234(74), Th72 Hessel, NP 35 232(62), CR 266B 1533(68), NIM 134 553(76), ND 22 223(77)



$^{219}_{87}$Fr

Δ: 8.617*9* {ANDT 19 175(77)}

Ψ: α {PR 74 695(48)}

$t_{1/2}$: 0.020*2* s *delay coinc* {PR 81 782(51)}

Class: A; **Ident:** genet {PR 74 695(48)}

Prod: descendant ^{227}Po {Bk64 Hyde2}

α: α_0 7.313*220* (98.8%), α_{170} 7.146*720* (0.2%), α_{351} 6.968*320* (0.6%), α_{362} 6.957*630* (≈0.02%), α_{475} 6.847*225* (0.05%), α_{519} 6.803*920* (0.25%) *mag* {JPCo 29 C1–181(68)}

α_0 7.317*4 semicond* {LBL–1666 4(73)}

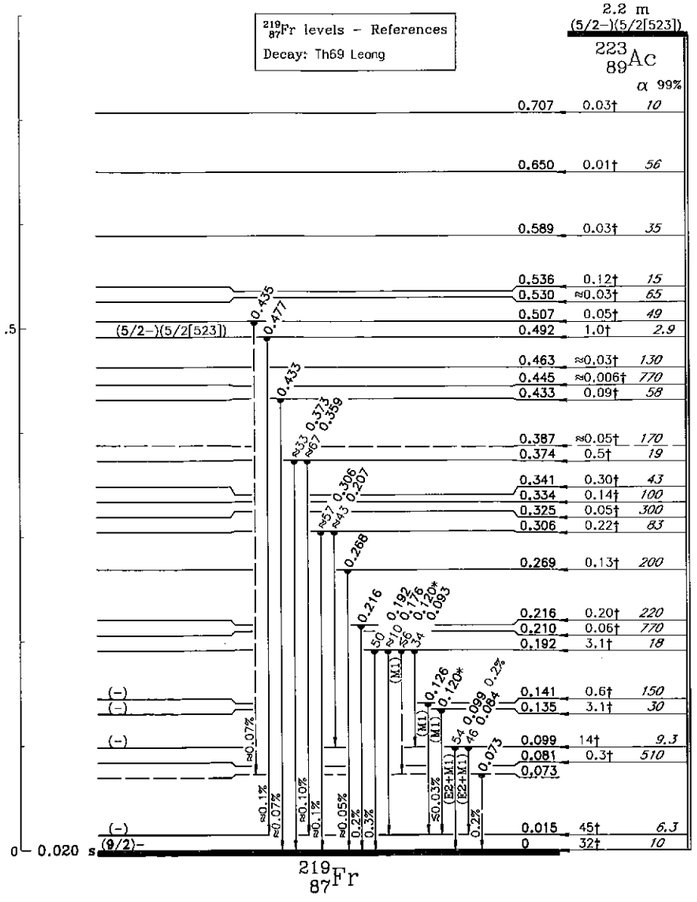
α_0 7.30*1* (98.4%), α_{170} 7.14*1* (0.3*1*%), α_{351} 6.95*1* (0.8*1*%), α_{475} 6.82*1* (0.2*1*%), α_{519} 6.78*1* (0.3*1*%) *semicond, semicond–scint αγ coinc* {JINC 28 933(66)}

others: {PR 81 782(51)}

γ: 0.163 (e_K/γ ≈2), 0.178?, 0.189, 0.352, 0.493, 0.530 *scint–semicond γα coinc* {JINC 28 933(66)}

$^{219}_{87}$Fr levels – References

Decay: Th69 Leong



$^{219}_{88}$Ra

Δ: 9.377*14* {ANDT 19 175(77)}

Ψ: α {PR 85 429(52)}

$t_{1/2}$: 103 ms {PR C1 2115(70)}

Class: B; **Ident:** genet {PR 85 429(52)}; genet, excit {PR 182 1329(69)}; genet, excit, cross bomb {PR C1 2115(70)}

Prod: descendant ^{227}U {Bk64 Hyde2, PR 182 1329(69)}; ^{208}Pb(^{16}O,αn) {PR C1 2115(70)}; ^{208}Pb(^{14}N,p2n) {PR C1 2115(70)}

α: α_0 7.980*10* (35.2%), α_{310} 7.675*10* (65.5%) *semicond* {PR C1 2115(70)}

α_0 7.99*2* (30*10*%), α_{310} 7.70*2* (70*10*%) *semicond* {PR 182 1329(69)}

others: {PR 85 429(52)}

$^{219}_{89}$Ac

Δ: 11.560*16* {ANDT 19 175(77)}

Ψ: α {PR C2 1841(70)}

$t_{1/2}$: 72 μs *delay coinc* {PR C2 1841(70)}

Class: A; **Ident:** genet, excit, cross bomb {PR C2 1841(70)}

Prod: ^{208}Pb(^{19}F,4n)^{223}Po(α) {PR C2 1841(70)}; ^{205}Tl(^{22}Ne,4n)^{223}Po(α) {PR C2 1841(70)}; ^{209}Bi(^{20}Ne,α2n)^{223}Po(α) {PR C2 1841(70)}

α: α_0 8.664*10* (≈100%) *semicond* {PR C2 1841(70)}

$^{219}_{90}$Th

Δ: 14.470*24* {ANDT 19 175(77)}

Ψ: α {PRL 31 323(73)}

$t_{1/2}$: 1.053 μs *delay coinc* {PRL 31 323(73)}

Class: A; **Ident:** genet, excit {PRL 31 323(73)}

Prod: ^{208}Pb(^{16}O,3n) {PRL 31 323(73)}

α: 9.342 *semicond* {PRL 31 323(73)}