## Adopted Levels, Gammas

| History | | | |
|---|---|---|---|
| Type | Author | Citation | Literature Cutoff Date |
| Full Evaluation | Yu. Khazov, A. Rodionov and G. Shulyak | NDS 136, 163 (2016) | 14-Jul-2016 |

Q($\beta^-$)=−3879 *6*; S(n)=8416.3 *29*; S(p)=7018 *4*; Q($\alpha$)=2528.8 *28* 2012Wa38

Produced and identified by 1953Du21, irradiation of Nd target by 40 MeV $^4$He.

The $^{146}$Sm scheme is built on the basis of data on $\varepsilon$ decay and in-beam reaction study. It contains more than 210 levels and about 500 $\gamma$ transitions. Six E$\gamma$ energies differ greater than 3$\sigma$ from corresponding level energy differences, they were not taken in to account in a least-square fitting. Band sequences are from 1995Ba57.

### $^{146}$Sm Levels

Cross Reference (XREF) Flags

| | | | |
|---|---|---|---|
| A | $^{146}$Pm $\beta^-$ decay | F | $^{144}$Sm(t,p) |
| B | $^{146}$Eu $\varepsilon$ decay | G | $^{147}$Sm(d,t) |
| C | $^{150}$Gd $\alpha$ decay | H | $^{147}$Sm($^3$He,$\alpha$) |
| D | $^{139}$La($^{11}$B,4n$\gamma$) | I | $^{148}$Sm(p,t) |
| E | Nd($\alpha$,xn$\gamma$) | | |

| E(level)[†‡] | J$^\pi$ | T$_{1/2}$[#] | XREF | Comments |
|---|---|---|---|---|
| 0.0[@] | 0$^+$ | 6.8×10$^7$ y *7* | ABCDEFGHI | %$\alpha$=100<br>T$_{1/2}$: from 2012Ki16. Others: 5×10$^7$ y (1953Du21), 7.4×10$^7$ y *15* (1964Nu02), 10.26×10$^7$ y *48* (1966Fr11), 8.5×10$^7$ y *12* (1963Fr06), 10.31×10$^7$ y *45* (1987Me08).<br>Observed $\alpha$ decay with E$\alpha$=2455 *4* (1987Me08), 2460 *20* (1964Nu02), 2550 *30* (1966Fr11), 2550 *50* (1960Ma39, 1953Du21), retardation factor=0.34 (1993Bu09).<br>Isotope shift, mean square radii differences (2013An02 (compilation nuclear radii of Z=0-96), 1999GaZX, 1990En01, 1986Al33). |
| 747.174[@] *11* | 2$^+$ | ≤7.2 ps | AB DEFGHI | J$^\pi$: 747.2$\gamma$ E2 to 0$^+$; assigned to level sequence built on g.s., 0$^+$. |
| 1380.301[&] *15* | 3$^-$ | | AB DEf h | XREF: f(1387), h(1376).<br>J$^\pi$: 633.1$\gamma$ E1 to 2$^+$; direct population in $^{146}$Eu $\varepsilon$ decay (J$^\pi$=4$^-$); bandhead of one octupole phonon coupled level sequence. |
| 1381.287[@] *14* | 4$^+$ | ≤9 ps | B DEfGhI | XREF: f(1387), h(1376).<br>J$^\pi$: 634.1$\gamma$ E2 to 2$^+$; direct population in $^{146}$Eu $\varepsilon$ decay (J$^\pi$=4$^-$); assigned to level sequence based on g.s. |
| 1647.980 *14* | 2$^+$ | | B EFGHI | J$^\pi$: 1648.0$\gamma$ E2 to 0$^+$, 791.1$\gamma$ from 4$^+$. |
| 1792 *2* | | | G | J$^\pi$: from L(d,t)=3,5. |
| 1811.674[@] *18* | 6$^+$ | 0.09 ns *+10−5* | B DEFGHI | XREF: H(1820).<br>J$^\pi$: 430.4$\gamma$ E2 to 4$^+$, 986.0$\gamma$ E3 from 9$^-$; assigned to the level sequence based on g.s. |
| 1913 *2* | | | G | |
| 2024 *2* | | | G | |
| 2045.715 *16* | 4$^-$ | | B E G | J$^\pi$: 665.4$\gamma$ M1+E2 (ΔJ=1) to 3$^-$; direct population in $^{146}$Eu $\varepsilon$ decay (J$^\pi$=4$^-$). |
| 2083.432[&] *15* | 5$^-$ | | B DEFGHI | J$^\pi$: 271.7$\gamma$ E1 to 6$^+$, 702.1$\gamma$ E1 to 4$^+$. |
| 2155.824 *16* | 2$^+$ | | B EFGHI | J$^\pi$: 2155.8$\gamma$ E2 to 0$^+$, 1470.2$\gamma$ from 4$^+$. L(d,t)=0 is incompatible with the J=2$^+$ assignment. |
| 2211 *1* | 0$^+$ | | I | J$^\pi$: from L(p,t)=0. |
| 2222.438[c] *24* | 6$^+$ | | B DE g I | XREF: g(2224).<br>J$^\pi$: 410.8$\gamma$ M1+E2 (ΔJ=0) to 6$^+$, 820.7$\gamma$ E2 from 8$^+$. Bandhead of level sequence with ΔJ=1. |
| 2225.00 *7* | (2$^+$) | | B Fg | XREF: F(2231). |

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**Adopted Levels, Gammas (continued)**

$^{146}$Sm Levels (continued)

| E(level)[†‡] | Jπ | $T_{1/2}$[#] | XREF | Comments |
|---|---|---|---|---|
| | | | | XREF: g(2224). |
| | | | | Jπ: 2225.0γ to $0^+$, 844.7γ to $3^-$; log *ft*=9.8 in population in $^{146}$Eu ε decay ($J^\pi=4^-$). |
| 2269.885 *16* | $3^+$ | | B E GH | Jπ: 1522.7γ M1+E2 to $2^+$, 888.4γ M1+E2 to $4^+$. |
| 2280.902 *16* | $4^+$ | | B EFG I | Jπ: 1533.7γ E2 to $2^+$; L(p,t)=4, ($J^\pi=4^-$). |
| 2329 *2* | | | G | |
| 2331 *1* | $0^+$ | | G I | Jπ: from L(p,t)=0. |
| 2398.7 *10* | | | E | |
| 2400.92 *3* | $2^+$ | | B E I | Jπ: 2400.9γ E2 to $0^+$, L(p,t)=(2). |
| 2401.6 *3* | $3^-$,$4^-$ | | G | Jπ: from L(d,t)=0. |
| 2439.071 *19* | $4^+$ | | B EFG I | Jπ: 791.1γ E2 to $2^+$; L(p,t)=(4). |
| 2513.448 *19* | $3^-$ | | B E G I | Jπ: 1766.3γ E1 to $2^+$, L(p,t)=(3), L(d,t)=0. |
| 2531.934 *15* | $4^+$ | | B E GHI | Jπ: 1150.6γ M1+E2 to $4^+$, 1784.8γ E2 to $2^+$; direct population in $^{146}$Eu ε decay ($J^\pi=4^-$), L(p,t)=(4). |
| 2544.18 *5* | $2^+$ | | B F I | Jπ: 2544.2γ E2 to $0^+$; L(p,t)=(2). |
| 2551.97 *18* | | | B | |
| 2589.26 *15* | | | E h | XREF: h(2593). |
| 2600 *1* | $0^+$ | | F I | XREF: F(2611). |
| | | | | Jπ: from L(p,t)=0 and L(t,p)=0. |
| 2600.38[&] *3* | $7^-$ | 11 ps *4* | DE Gh | XREF: h(2593). |
| | | | | Jπ: 788.8γ E1 (ΔJ=1, stretched) to $6^+$, 516.9γ E2 to $5^-$. |
| 2605.11 *6* | | | B | |
| 2636.03 *7* | | | B h | |
| 2649.59 *6* | ($2^+$) | | B EfGh | XREF: f(2653), h(2643). |
| | | | | Jπ: 2650.4γ to $0^+$, 210.5γ to $4^+$. |
| 2652 *3* | | | fGh | XREF: f(2653), h(2643). |
| 2667.19 *3* | $4^-$ | | B E | Jπ: 621.4γ E0+M1+E2 to $4^-$, 583.8γ M1 to $5^-$. |
| 2678.287 *16* | $4^+$ | | B Efg | XREF: f(2681), g(2682). |
| | | | | Jπ: 1931.1γ E2 to $2^+$, 1297.0γ E2+M1 to $4^+$. |
| 2684.714 *24* | ($2^+$) | | B Efg | XREF: f(2681), g(2682). |
| | | | | Jπ: 1303.5γ to $4^+$, 1036.7γ to $2^+$; log $f^{1u}t$=10.4 in $^{146}$Eu ε decay population ($J^\pi=4^-$) (1964Ta11). |
| 2737.16[@] *8* | $8^+$ | 11 ps *4* | DEF H | Jπ: 136.9γ E1 to $7^-$, 925.5γ E2 to $6^+$; assigned to level sequence. |
| 2740.7 *5* | | | B | |
| 2744.28 *12* | ($4^+$,5,$6^+$) | | E | Jπ: 463.4γ to $4^+$, 521.9γ to $6^+$. |
| 2782.92 *19* | ($4^+$,$5^-$) | | Ef | XREF: f(2786). |
| | | | | Jπ: 1402.9γ to $3^-$, 971.3γ to $6^+$. |
| 2788.224 *20* | $5^-$ | | B EfGHI | XREF: f(2786). |
| | | | | Jπ: from L(p,t)=5. |
| 2797.67[&] *6* | $9^-$ | 0.83 ns *+20–13* | DE | Jπ: 60.7γ E1 to $8^+$, 197.4γ E2 to $7^-$; assigned to one octupole phonon coupled state sequence. |
| | | | | $T_{1/2}$: Others: from (α,xnγ): 1.0 ns *5* (γγ(t) in (α,2nγ) (1980Ko07)), 1.1 ns *5* (αγ delay coin. in (α,4nγ) (1978Ki11)). |
| 2799.89 *4* | $3^+$ | | B Ef I | XREF: F(2808). |
| | | | | Jπ: 2052.7γ M1+E2 to $2^+$, 715.1γ to $5^-$. |
| 2824 *1* | $2^+$ | | f I | XREF: f(2808). |
| | | | | Jπ: from L(p,t)=2. |
| 2826.3 *7* | $6^-$ | | E | Jπ: 1014.6γ E1 (ΔJ=0) to $6^+$. |
| 2829 *3* | $3^-$,$4^-$ | | G | Jπ: from L(d,t)=0. |
| 2829.24 *16* | ($2^+$) | | B | Jπ: 1448.1γ to $4^+$, 2081.7γ to $2^+$; no population in $^{146}$Eu ε decay ($J^\pi=4^-$). |
| 2850.317 *23* | $4^+$ | | B EFg I | XREF: g(2856). |
| | | | | Jπ: 2103.2γ E2 to $2^+$; L(p,t)=(4). |
| 2859 *1* | $2^+$ | | g I | XREF: g(2856). |
| | | | | Jπ: from L(p,t)=2. |

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**Adopted Levels, Gammas (continued)**

$^{146}$Sm Levels (continued)

| E(level)[†‡] | Jπ | XREF | Comments |
|---|---|---|---|
| 2879.11 *7* | | B | |
| 2898.309 *22* | $5^+$ | B E G | Jπ: 1517.0γ M1+E2 to $4^+$, 1086.6γ M1 to $6^+$. |
| 2905.97 *8* | $(4^+)$ | B G | Jπ: 2158.9γ to $2^+$, 1094.1γ to $6^+$. |
| 2921 *1* | $0^+$ | I | Jπ: from L(p,t)=0. |
| 2932.33 *6* | $(4^+)$ | B EFG I | Jπ: 1552.0γ to $3^-$, 1120.8γ to $6^+$; 848.7γ from $2^+$. |
| 2968.83 *4* | $2^+,3^+$ | B E I | Jπ: 2221.6γ M1 to $2^+$, 1587.5γ to $4^+$; L(p,t)=(4) is incompatible with the ($J^\pi=4^-$) assignment. |
| 2973.34 *3* | $3^+,4^+$ | B Ef i | XREF: f(2979),i(2976).<br>Jπ: 1592.0γ (M1+E2) to $4^+$, 1325.4γ to $2^+$. |
| 2974.39 *15* | $3^-$ | B G i | XREF: i(2976).<br>Jπ: 2227.2γ to $2^+$, 891.3 γ to $5^-$; L(d,t)=0. |
| 2978.0 *10* | | Ef | XREF: f(2979). |
| 2984.5 *3* | | Ef | XREF: f(2979). |
| 2991 *2* | $(4^+)$ | FG I | Jπ: from L(p,t)=(4). |
| 3011.24 *11* | | E | |
| 3014.624 *22* | $3^+$ | B E g | XREF: g(3017).<br>Jπ: 2267.5γ M1 to $2^+$, 1633.3γ M1 to $4^+$. |
| 3019.54 *21* | | E g | XREF: g(3017). |
| 3020.6 *11* | $0^+$ | B F I | Jπ: from L(p,t)=0. |
| 3039.5 *10* | | B | |
| 3043.13[c] *4* | $8^+$ | DE | Jπ: 1231.4γ E2 to $6^+$, 731.6γ from $10^+$, 524.3γ M1 from $9^+$; assigned to the level sequence. |
| 3058.09 *6* | | B F | |
| 3067.703 *20* | $3^+$ | B EFg I | XREF: g(3069).<br>Jπ: 1686.4γ M1+E2 to $4^+$, 2320.5γ M1+E2 to $2^+$; L(d,t)=1. |
| 3072.933 *22* | $5^+$ | B EFg | XREF: g(3069).<br>Jπ: 222.1γ M1 to $4^+$, 850.5 γ M1 to $6^+$; L(d,t)=1. |
| 3092.39 *11* | $(4^+,5,6^+)$ | E I | Jπ: 811.4γ to $4^+$, 1280.8γ to $6^+$. |
| 3093.122 *17* | $3^+$ | B E | Jπ: 2345.9γ M1+E2 to $2^+$, 1711.8γ M1+E2 to $4^+$. |
| 3099.49 *8* | $7^-$ | E | Jπ: 1288.1γ E1+(M2) to $6^+$, 362.3γ to $8^+$. |
| 3105.38 *5* | $(2^+,3,4^+)$ | B G I | Jπ: 2358.2γ to $2^+$, 1724.1γ to $4^+$. |
| 3123.29 *22* | $(2^+,3,4^+)$ | B | Jπ: 1475.3γ to $2^+$, 445.0γ to $4^+$. |
| 3126 *1* | $0^+$ | I | Jπ: from L(p,t)=0. |
| 3129.8 *3* | | B f | XREF: f(3140). |
| 3136.38 *3* | $3^-$ | B EfG I | XREF: f(3140).<br>Jπ: 2389γ E1+M2 to $2^+$, 1090.8γ M1 to $4^-$; L(p,t)=(3). |
| 3151.44 *3* | | B f | XREF: f(3140). |
| 3166.91 *5* | $8^-$ | DE | Jπ: 566.6γ M1 (ΔJ=1, stretched) to $7^-$, 369.6γ to $9^-$. |
| 3176 *1* | $2^+$ | f h | XREF: f(3187), h(3180).<br>Jπ: from L(p,t)=2. |
| 3183.28 *8* | $8^-$ | E | Jπ: 385.6γ M1 $9^-$, 582.9γ D+Q (ΔJ=1) to $7^-$. |
| 3183.928 *19* | $3^+$ | B Efgh | XREF: f(3187), g(3188), h(3180).<br>Jπ: 2436.7γ M1+E2 to $2^+$, 1802.8γ M1+E2 to $4^+$. |
| 3185.67 *9* | | Efg | XREF: g(3188), f(3187). |
| 3198.84 *21* | | Ef | XREF: f(3187). |
| 3200.019 *18* | $4^-$ | B E | Jπ: 1116.6γ M1+E2 to $5^-$, 930.4γ to $3^+$, 686.5γ to $3^-$. |
| 3205 *1* | $2^+$ | I | Jπ: from L(p,t)=2. |
| 3208.31 *4* | $(8^+)$ | E | Jπ: 985.9γ (E2, stretched) to $6^+$. |
| 3220.87 *5* | $(3^-,4,5^-)$ | B E | Jπ: 1840.5γ to $3^-$, 1137.7γ to $5^-$. |
| 3223.9 *15* | $(2^+,3^+,4^+)$ | B G | Jπ: 394.7γ to $(2^+)$; log *ft*=8.98 in $^{146}$Eu ε decay ($J^\pi=4^-$) population. L(d,t)=(5). |
| 3231.63 *6* | $4^+$ | B f i | XREF: f(3240), i(3236).<br>Jπ: 2484.4γ to $2^+$, 1009.3γ to $6^+$; L(p,t)=(4). |
| 3238.646 *22* | $4^+$ | B Ef i | XREF: f(3240), i(3236).<br>Jπ: 2491.5γ E2 to $2^+$, 1427.6γ to $6^+$; L(p,t)=(4). |
| 3244.65 *4* | $(2^+,3,4^+)$ | B fG | XREF: f(3240).<br>Jπ: 2497.5γ to $2^+$, 1863.3γ to $4^+$. |

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**Adopted Levels, Gammas (continued)**

$^{146}$Sm Levels (continued)

| E(level)[†‡] | Jπ | $T_{1/2}$[#] | XREF | Comments |
|---|---|---|---|---|
| 3259.934 *18* | 5⁻ | | B Ef I | XREF: f(3264).<br>Jπ: 1214.2γ M1+E2 to 4⁻, 1448.2γ to 6⁺. |
| 3268 *2* | | | fG I | XREF: f(3264). |
| 3278.14 *21* | | | E | |
| 3278.18 *13* | 2⁺ | | B F I | XREF: F(3264).<br>Jπ: from L(p,t)=2. |
| 3288.60 *17* | (2⁺,3,4⁺) | | B | Jπ: 459.4γ to 2⁺, log *ft*=8.62 in $^{146}$Eu ε decay (Jπ=4⁻) population. |
| 3290.7 *3* | 8⁺ | | E | Jπ: 1479.0γ E2(+M3) to 6⁺, 492.7γ to 9⁻. |
| 3308 *1* | 2⁺ | | I | Jπ: from L(p,t)=2. |
| 3327.0 *4* | | | E | |
| 3329.90 *5* | (2⁺,3,4⁺) | | B | Jπ: 1681.9γ to 2⁺, 1948.7γ to 4⁺. |
| 3338.27 *4* | 3⁺ | | B G | Jπ: 2591.1γ M1+(E2) to 2⁺, 550.4γ to 5⁻. |
| 3340.26 *8* | (5⁻,6⁻) | | E | Jπ: 672.9γ to 4⁻, 739.9γ to 7⁻. |
| 3354.64[b] *6* | 9⁻ | 28 ps +*5*−*4* | DE | Jπ: 754.2γ E2 to 7⁻, 556.9γ M1 (ΔJ=0) to 9⁻; systematics of N=84 isotones (1978Ki11). Bandhead of level sequence with ΔJ=1. |
| 3361.08 *3* | 3⁻,4⁻ | | B E G | XREF: G(3367).<br>Jπ: 1980.8γ M1 to 3⁻, 1277.6γ to 5⁻; L(d,t)=0. |
| 3368.76 *8* | (4⁺) | | B hI | XREF: h(3375).<br>Jπ: 2621.6γ to 2⁺; L(p,t)=(4). |
| 3376.78 *4* | 4⁺ | | B h | XREF: h(3375).<br>Jπ: 2629.5γ E2 to 2⁺, 1995.8 M1+E2 to 4⁺; L(p,t)=(4). |
| 3377.14 *15* | | | E h | XREF: h(3375). |
| 3378.45 *5* | (3⁻,4,5⁻) | | B E h | XREF: h(3375).<br>Jπ: 1332.7γ D+Q to 4⁻, 1998.0γ to 3⁻, 1294.3γ to 5⁻. |
| 3388 *1* | | | I | Jπ: from L(p,t)=(3). |
| 3391.1 *5* | | | E | |
| 3391.678 *22* | 3⁻ | | B G I | Jπ: 2644.4γ E1 to 2⁺; L(p,t)=(3), L(d,t)=0. |
| 3397.62 *9* | (4⁺) | | B | Jπ: 1175.0γ to 6⁺, 2650.4γ to 2⁺. |
| 3412.7 *7* | (4⁺,5,6⁻) | | E | Jπ: 1190.2γ to 6⁺, 1367.1γ to 4⁻. |
| 3418.98 *4* | 3⁺ | | B E h | XREF: h(3425).<br>Jπ: 2671.7γ M1+E2 to 2⁺; log *ft*=8.3 in direct population in $^{146}$Eu ε decay (Jπ=4⁻). |
| 3427.77 *7* | | | B Gh | XREF: G(3425).<br>XREF: h(3425). |
| 3431.28 *4* | 3⁻,4⁻ | | B Gh | XREF: G(3438).<br>XREF: h(3425).<br>Jπ: 2051.0γ to 3⁻, 1347.8γ to 5⁻; L(d,t)=0. |
| 3461.572 *20* | 5⁻ | | B E | Jπ: 1415.9γ M1+E2 to 4⁻, 2081.1γ E2 to 3⁻, 2080.1γ E1 to 4⁺. |
| 3465.84 *4* | | | B | |
| 3471.90 *5* | (2⁺),3⁺ | | B g | XREF: g(3473).<br>Jπ: 2724.7γ M1 to 2⁺, 1191.0γ to 4⁺. |
| 3475.09 *6* | 5⁺,(6⁺) | | B E | Jπ: 1663.4γ M1(+E2) to 6⁺, 624.7γ to 4⁺; log *ft*=8.45 in $^{146}$Eu ε decay (Jπ=4⁻) population. |
| 3476.95 *15* | (2⁺,3,4,5⁻) | | B g | XREF: g(3473).<br>Jπ: 2096.6γ to 3⁻, 2095.6γ to 4⁺; log *ft*=8.95 in $^{146}$Eu ε decay (Jπ=4⁻) population. |
| 3484.3 *3* | (4⁺,5,6⁻) | | E h | XREF: h(3493).<br>Jπ: 818.3γ to 4⁻, 1672.5γ to 6⁺. |
| 3489 *1* | | | hI | XREF: h(3493). |
| 3496 *4* | | | Gh | XREF: h(3493).<br>Jπ: L(d,t)=2. |
| 3509.34 *6* | (3⁺) | | B h | XREF: h(3493).<br>Jπ: 2762.0 (M1+E2) γ to 2⁺, 721.2γ to 5⁻ requires mult=M2 or E3. |
| 3517.37 *3* | 3⁺ | | B E | Jπ: 2770.1γ M1+E2 to 2⁺, 1471.6γ to 4⁻, 1078.3γ to 4⁺. |
| 3526 *4* | 3⁻,4⁻ | | G | Jπ: from L(d,t)=0. |
| 3530.59 *5* | 4⁺ | | B | Jπ: 1484.7γ E1 to 4⁻, 1447.1 γ to 5⁻, 845.8γ to (2⁺). |

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**Adopted Levels, Gammas (continued)**

$^{146}$Sm Levels (continued)

| E(level)[†‡] | Jπ | $T_{1/2}$[#] | XREF | Comments |
|---|---|---|---|---|
| 3546.17 *4* | 2+,3+ | | B G | XREF: G(3551).<br>Jπ: 2799.0γ M1+E2 to 2+, 2164.9γ to 4+; log *ft*=8.4 in $^{146}$Eu ε decay (Jπ=4−) population. |
| 3560.28 *21* | | | E | |
| 3565.4 *4* | | | E | |
| 3567.47[c] *5* | 9+ | | DE | Jπ: 524.3γ M1 (ΔJ=1) to 8+; assigned to the level sequence based on g.s. |
| 3568.4 *10* | | | E | |
| 3580.2 *3* | (4+) | | E hI | XREF: I(3582).<br>XREF: h(3585).<br>Jπ: from L(p,t)=(4). |
| 3583.85 *3* | 4− | | B E GhI | XREF: G(3588).<br>XREF: h(3585).<br>Jπ: 1500.4γ M1+E2 to 5−, 2203.7γ M1+E2 to 3−; L(d,t)=0. |
| 3591.74 *6* | (4+) | | B hI | XREF: h(3585).<br>Jπ: 2845.0γ to 2+, 2210.4 γ to 4+; log *ft*=8.45 in $^{146}$Eu ε decay (Jπ=4−) population; L(p,t)=(4). |
| 3593.2 *10* | | | E h | XREF: h(3585). |
| 3594.89 *20* | | | E h | XREF: h(3585). |
| 3605.83 *7* | 3− | | B G I | XREF: G(3603)I(3608).<br>Jπ: 2858.2γ to 2+; L(d,t)=0, L(p,t)=(2,3). |
| 3618 *3* | 0+ | | G I | XREF: G(3615).<br>Jπ: from L(p,t)=0. |
| 3620.0 *3* | | | E g | XREF: g(3615). |
| 3626.046 *16* | 4+ | | B E | Jπ: 1356.1γ M1+E2 to 3+, 2244.7γ M1+E2 to 4+, 1542.6γ to 5−. |
| 3633.5 *10* | | | E G | XREF: G(3639). |
| 3646.99 *4* | (2+,3,4+) | | B | Jπ: 1491.2γ to 2+; direct population in $^{146}$Eu ε decay (Jπ=4−). |
| 3652.22 *5* | (3−),4+ | | B | Jπ: 2904.9γ E2 to 2+, 1568.9γ to 5−. |
| 3654.19 *7* | (2+,3,4+) | | B | Jπ: 2907.0γ to 2+, 1373.3γ to 4+; direct population in $^{146}$Eu ε decay (Jπ=4−). |
| 3669.78 *21* | | | E | |
| 3677 *4* | | | G | |
| 3685.3 *10* | | | E | |
| 3686 *3* | 0+ | | I | Jπ: from L(p,t)=0. |
| 3693.44 *9* | (2+,3,4+) | | B I | Jπ: 2946.1γ to 2+, 1161.8γ 4+; direct population in $^{146}$Eu ε decay (Jπ=4−). |
| 3701.09 *12* | (7−,8,9) | | E | Jπ: 346.5γ to 9−, 534.0γ to 8−, 657.9γ to 8+. |
| 3715.62 *18* | | | B | |
| 3720.53 *13* | 3− | | B G | Jπ: from L(d,t)=0; 2973.3γ to 2+. |
| 3740.78 *7* | (3,4+) | | B | Jπ: 2993.6γ to 2+, 2360.5γ to 3−; log *ft*=7.7 in $^{146}$Eu ε decay (Jπ=4−) population. |
| 3749.43 *11* | (3−,4+) | | B | Jπ: 3002.2γ to 2+, 1667.0γ to 5−. |
| 3753.57 *7* | 10− | | DE | Jπ: 955.9γ M1 (stretched) to 9−. Jπ=10+ in $^{139}$La($^{11}$B,4nγ). |
| 3766 *4* | 3−,4− | | Gh | XREF: h(3767).<br>Jπ: from L(d,t)=0. |
| 3766.9 *10* | | | E | |
| 3770.32 *11* | 2+ | | B h | XREF: h(3767).<br>Jπ: 749.8 γ to 0+, 2389.0γ to 4+. |
| 3774.66[c] *7* | 10+ | | DE | Jπ: 207.2γ E2+M1 to 9+; assignment to the level sequence based on g.s. |
| 3783.47[&] *9* | 11− | 10 ps *+4−3* | DE | Jπ: 985.9γ E2 (stretched) to 9− and assignment to level sequence. |
| 3786.03 *14* | (2+,3,4+) | | B | Jπ: 3038.5γ to 2+, 2404.7γ to 4+; direct population in $^{146}$Eu ε decay (Jπ=4−). |
| 3790.06 *8* | 3−,4− | | B G | Jπ: from L(d,t)=0. |
| 3800.7 *10* | | | E | |
| 3804.25 *9* | (3−,4,5+) | | B | Jπ: 736.6γ to 3+, 544.3γ to 5−. |
| 3809.6 *10* | | | E | |
| 3810 *15* | | | H | |

Continued on next page (footnotes at end of table)

## Adopted Levels, Gammas (continued)

### $^{146}$Sm Levels (continued)

| E(level)[†‡] | Jπ | $T_{1/2}$[#] | XREF | Comments |
|---|---|---|---|---|
| 3815.2 *10* | | | E | |
| 3825.5 *10* | | | E | |
| 3835 | 3⁻,4⁻ | | G | Jπ: from L(d,t)=0. |
| 3869.7 *10* | | | E G | XREF: G(3873). |
| 3891 *3* | 0⁺ | | I | Jπ: from L(p,t)=0. |
| 3901 *4* | | | G I | XREF: G(3896). |
| 3917 *4* | 3⁻,4⁻ | | G I | XREF: G(3922).<br>Jπ: from L(d,t)=0. |
| 3924.49 *8* | (9⁻) | | DE | Jπ: 569.83γ D (ΔJ=0) to 9⁻, 757.6γ D+Q (ΔJ=1) to 8⁻, 167.0γ from 11⁻. Jπ=10⁻ in $^{139}$La($^{11}$B,4nγ). |
| 3952 *4* | | | G | |
| 3963.4 *10* | | | E | |
| 3970.25 *16* | | | E | |
| 3990.3 *10* | (3⁻),4⁻ | | E G | Jπ: from L(d,t)=0, 650.0γ to (5⁻,6⁻). |
| 4005.7 *7* | | | E | |
| 4014 *3* | (4⁺) | | I | Jπ: from L(p,t)=(4). |
| 4021 *3* | 0⁺ | | I | Jπ: from L(p,t)=0. |
| 4031 *4* | 2⁺ | | G I | Jπ: from L(p,t)=2. |
| 4032.4 *3* | | | E h | XREF: h(4035). |
| 4033.5[c] *3* | (11⁺) | | D | Jπ: 259.0γ to 10⁺, 466.0γ to 9⁺; assigned to level sequence. |
| 4038 *3* | | | hI | XREF: h(4035). |
| 4058 *4* | | | G | |
| 4080.14 *21* | | | E | |
| 4087 *4* | 3⁻,4⁻ | | G | Jπ: L(d,t)=0. |
| 4091.25[b] *7* | 11⁻ | 4.9 ps *+15−13* | DE h | XREF: h(4101).<br>Jπ: 1293.6γ E2 (stretched) to 9⁻; assigned to level sequence. |
| 4116 *4* | | | Gh | XREF: h(4101). |
| 4125.99 *12* | | | E | |
| 4127.8 *10* | | | E | |
| 4135.7 *10* | | | E | |
| 4143.89 *18* | (10⁻,11⁻) | | DE | Jπ: 1346.17γ to 9⁻, 436.0γ from (12⁻). |
| 4145.3[@] *5* | (10⁺) | | DE | Jπ: 1408.1γ to 8⁺; assigned to level sequence with ΔJ=2. |
| 4149 | | | G | |
| 4164.5 *10* | | | E h | XREF: h(4168). |
| 4174 *4* | | | Gh | XREF: h(4168).<br>Jπ: L(d,t)=(5). |
| 4194.90[a] *15* | 12⁺ | 10.4 ps *14* | DE | Jπ: 411.4γ (E1) (stretched) to 11⁻, 1397γ E3 to 9⁻, 1011.4γ E2 from 14⁺. Two octupole phonon coupled state, bandhead of level sequence. |
| 4202.21 *7* | (11⁺) | | E | Jπ: 427.5γ D(M1) (ΔJ=1 stretched) to 10⁺, no γ′s to J<10 and decay pattern. |
| 4239.3 *4* | | | E | |
| 4250 *4* | | | Gh | XREF: h(4267). |
| 4282.32 *17* | | | E h | XREF: h(4267). |
| 4291 *4* | | | G | |
| 4331 *4* | | | G | |
| 4341 *4* | | | G | |
| 4341.15 *11* | (11⁻) | | DE | Jπ: 250.0γ D (ΔJ=0) to 11⁻, 1543.0γ to 9⁻, no γ′s to J<9 and decay pattern. |
| 4360 *4* | | | G | |
| 4374 *4* | | | G | |
| 4407 *4* | | | G | |
| 4415 *4* | | | G | |
| 4443 *4* | | | G | |
| 4461.34 *7* | (12⁻) | ≤5.8 ps | DE | Jπ: 120.4γ (M1+E2) to 11⁻, 259.1γ E1 to (11⁺), no γ′s to J<11; J=12⁺ in ($^{11}$B,4nγ). |

Continued on next page (footnotes at end of table)

## Adopted Levels, Gammas (continued)

### $^{146}$Sm Levels (continued)

| E(level)[†‡] | Jπ | $T_{1/2}$[#] | XREF | Comments |
|---|---|---|---|---|
| 4579.75 *12* | (12⁻) | | DE | Jπ: 238.6γ D (stretched ΔJ=1) to (11⁻), no γ′s to J<11. |
| 4628.77[b] *8* | 13⁻ | 5.3 ps *+23−20* | DE | Jπ: 537.5γ E2 (stretched) to 11⁻, 167.4γ (M1+E2) (ΔJ=1) to 12⁻ 433.0γ (E1) to 12⁺; assigned to the level sequence. |
| 4663 *15* | | | H | |
| 4752.24 *10* | (13⁻) | | DE | Jπ: 172.5γ (M1+E2, ΔJ=1) to (12⁻), 217.3γ D (stretched) from (14⁻). $J^\pi=13^+$ in $^{139}$La($^{11}$B,4nγ). |
| 4969.51 *10* | (14⁻) | | DE | Jπ: 340.7γ D (stretched) to 13⁻, no γ′s to J<13. |
| 5129.47 *14* | 13⁻ | | E | Jπ: 1346.0γ E2 (stretched) to 11⁻, no γ′s to J<11. |
| 5144.2 *5* | | | D | |
| 5206.29[a] *15* | 14⁺ | | DE | Jπ: 1011.4γ E2 (stretched) to 12⁺, no γ′s to J<12; assigned to level sequence. |
| 5218.03[b] *12* | (15⁻) | | DE | Jπ: 248.5γ D(M1) (stretched) to (14⁻), 589.3γ to 13⁻; assigned to level sequence. |
| 5517.42 *14* | (16⁻) | | DE | Jπ: 547.9γ E2 (stretched) to (14⁻), 299.4γ (M1+E2) to (15⁻). |
| 5613.93 *16* | (15⁻) | | DE | Jπ: 644.4γ (M1+E2) to (14⁻), no γ′s to J<14. |
| 5697.18[a] *17* | (16⁺) | | DE | Jπ: 490.1γ E2 (stretched) to 14⁺, no γ′s to J<14; assigned to level sequence. |
| 5800.2 *8* | | | D | |
| 5873.0 *13* | | | DE | |
| 5972.3 *4* | | | E | |
| 6176.9[a] *3* | (18⁺) | | DE | Jπ: assigned by 1995Ba07 to two octupole phonon coupled level sequence. |

[†] From a least-squares fit to Eγ, normalized $\chi^2$=1.3. Eight Eγ′s are ignored when fitting (see comment for corresponding transitions).

[‡] Levels weakly populated in (d,t) and undetermined in other studies are not shown (detail in 1975Oe01).

[#] From recoil distance measurement in $^{139}$La($^{11}$B,4nγ) reaction (1982Ro05), except as noted. The levels populated with significant strength in $^{146}$Nd(α,4nγ) reaction (1978Ki11) have T<0.6 ns.

[@] Band(A): Sequence of levels with ΔJ=2 based on ground state $J^\pi=0^+$.

[&] Band(B): Sequence of levels with ΔJ=2 based on $J^\pi=3^-$ state. One octupole phonon coupled state sequence.

[a] Band(C): Sequence of levels with ΔJ=2 based on $J^\pi=12^+$ state. Two octupole phonon coupled states sequence.

[b] Band(D): Sequence of levels with ΔJ=1 based on $J^\pi=9^-$ state.

[c] Band(E): Sequence of levels with ΔJ=1 based on $J^\pi=6^+$ state.

## Adopted Levels, Gammas (continued)

### γ($^{146}$Sm)

| $E_i$(level) | $J_i^\pi$ | $E_\gamma$[†] | $I_\gamma$[b] | $E_f$ | $J_f^\pi$ | Mult.[c] | δ[d f] | α[e] | Comments |
|---|---|---|---|---|---|---|---|---|---|
| 747.174 | 2+ | 747.168 *13* | 100 | 0.0 | 0+ | E2 | | 0.00473 | B(E2)(W.u.)>7.4 |
| 1380.301 | 3− | 633.077 *22* | 100 | 747.174 | 2+ | E1 | | 0.00257 | |
| 1381.287 | 4+ | 634.134 *20* | 100 | 747.174 | 2+ | E2 | | 0.00699 | B(E2)(W.u.)>13 |
| 1647.980 | 2+ | 267.60 *3* | 3.3 *3* | 1380.301 | 3− | | | | |
| | | 900.797 *18* | 100 *7* | 747.174 | 2+ | E2+M1 | −1.19 *+21−26* | 0.00391 *20* | |
| | | 1648.00# *3* | 19.5 *6* | 0.0 | 0+ | E2 | | $1.05\times10^{-3}$ | |
| 1811.674 | 6+ | 430.385 *17* | 100 *2* | 1381.287 | 4+ | E2 | | 0.0193 | B(E2)(W.u.)>14 |
| 2045.715 | 4− | 664.65# *14* | 6.0 *4* | 1381.287 | 4+ | [E1] | | 0.00232 | |
| | | 665.423 *15* | 100 *14* | 1380.301 | 3− | M1+E2 | −2.7 *5* | 0.00674 *24* | |
| 2083.432 | 5− | 271.688 *28* | 22.8 *5* | 1811.674 | 6+ | E1 | | 0.0189 | |
| | | 702.106 *19* | 100 *3* | 1381.287 | 4+ | E1 | | 0.00207 | |
| | | 703.090 *18* | 98 *3* | 1380.301 | 3− | E2 | | 0.00545 | |
| 2155.824 | 2+ | 775.533# *25* | 7.8 *2* | 1380.301 | 3− | | | | |
| | | 1408.66 *3* | 100 *2* | 747.174 | 2+ | M1+E2 | | 0.0016 *3* | |
| | | 2155.76# *3* | 42.3 *10* | 0.0 | 0+ | E2 | | $9.24\times10^{-4}$ | |
| 2222.438 | 6+ | 410.772 *18* | 100 *2* | 1811.674 | 6+ | M1+E2 | 0.14 *3* | 0.0353 | |
| | | 840.94 *10* | 3.1 *2* | 1381.287 | 4+ | | | | |
| 2225.00 | (2+) | 844.72# *15* | $1.0\times10^{2}$ *4* | 1380.301 | 3− | | | | |
| | | 1477.83# *17* | 55 *19* | 747.174 | 2+ | | | | |
| | | 2224.98# *15* | 95 *6* | 0.0 | 0+ | | | | |
| 2269.885 | 3+ | 224.0@ *10* | @ | 2045.715 | 4− | | | | |
| | | 621.84 *4* | 50.5 *14* | 1647.980 | 2+ | M1+E2 | | 0.010 *3* | |
| | | 888.44# *15* | 100 *23* | 1381.287 | 4+ | M1+E2 | −0.36 *+11−18* | 0.00499 *24* | |
| | | 889.41 *13* | 54 *15* | 1380.301 | 3− | [E1] | | $1.29\times10^{-3}$ | |
| | | 1522.713 *19* | 81.6 *17* | 747.174 | 2+ | M1+E2 | | 0.00136 *21* | |
| 2280.902 | 4+ | 234.9# *2* | 0.36 *2* | 2045.715 | 4− | | | | |
| | | 632.889# *40* | 21.1 *3* | 1647.980 | 2+ | | | | |
| | | 899.487‡[i] *22* | 22.4 *16* | 1381.287 | 4+ | M1+E2 | 0.12 *10* | 0.00504 *10* | $E_\gamma$: poor fit; the level energy difference equals 899.611 *13*. |
| | | 900.6@ *10* | 24@ *7* | 1380.301 | 3− | | | | |
| | | 1533.714 *27* | 100 *2* | 747.174 | 2+ | E2 | | $1.14\times10^{-3}$ | |
| 2398.7 | | 1651.5 *10* | 100 | 747.174 | 2+ | | | | |
| 2400.92 | 2+ | 1653.72# *8* | 23.4 *8* | 747.174 | 2+ | | | | |
| | | 2400.94# *4* | 100 *3* | 0.0 | 0+ | E2 | | $9.42\times10^{-4}$ | |
| 2439.071 | 4+ | 158.5# *8* | 0.45 *25* | 2280.902 | 4+ | E2+M1 | | 0.459 *10* | |
| | | 791.107# *19* | 11.6 *3* | 1647.980 | 2+ | E2 | | 0.00415 | |
| | | 1057.62# *10* | 58 *10* | 1381.287 | 4+ | E2(+M1) | | 0.0028 *7* | |
| | | 1058.68# *9* | 100 *10* | 1380.301 | 3− | [E1] | | $9.28\times10^{-4}$ | |



From ENSDF

$^{146}_{62}Sm_{84}$-8

## Adopted Levels, Gammas (continued)

### γ($^{146}$Sm) (continued)

| $E_i$(level) | $J_i^\pi$ | $E_\gamma$ [†] | $I_\gamma$ [b] | $E_f$ | $J_f^\pi$ | Mult.[c] | δ[d,f] | α[e] | Comments |
|---|---|---|---|---|---|---|---|---|---|
| 2439.071 | 4+ | 1691.6[@] *10* | 13[@] *3* | 747.174 | 2+ | | | | |
| 2513.448 | 3− | 467.762[#] *25* | 9.7 *6* | 2045.715 | 4− | | | | |
| | | 865.343[‡] *44* | 19.9 *4* | 1647.980 | 2+ | E1+(M2) | −0.10 *+20−26* | 0.0015 *14* | |
| | | 1132.06[#] *7* | 17 *4* | 1381.287 | 4+ | [E1] | | $8.26\times10^{-4}$ | |
| | | 1133.12[#] *7* | 100 *4* | 1380.301 | 3− | M1+E2 | +0.07 *+9−7* | 0.00293 *5* | δ: from 1992Ad04; the 2nd value +1.14 *18*. |
| | | 1766.278 *21* | 97 *2* | 747.174 | 2+ | E1 | | $7.89\times10^{-4}$ | |
| 2531.934 | 4+ | 251.2[#] *4* | | 2280.902 | 4+ | | | | |
| | | 376.11[#] *4* | 2.6 *4* | 2155.824 | 2+ | | | | |
| | | 1150.626[#] *15* | 100 *2* | 1381.287 | 4+ | M1+E2 | −0.42 *5* | 0.00268 *5* | |
| | | 1784.762[#] *13* | 33.6 *7* | 747.174 | 2+ | E2 | | $9.83\times10^{-4}$ | |
| 2544.18 | 2+ | 1796.89[#] *8* | 71 *4* | 747.174 | 2+ | | | | |
| | | 2544.21[#] *6* | 100 *3* | 0.0 | 0+ | E2 | | $9.64\times10^{-4}$ | |
| 2551.97 | | 903.98[#] *25* | 100 *25* | 1647.980 | 2+ | | | | |
| | | 1804.79[#] *24* | 73 *22* | 747.174 | 2+ | | | | |
| 2589.26 | | 1208.95[@] *15* | 100[@] | 1380.301 | 3− | | | | |
| 2600.38 | 7− | 516.88[@] *3* | 9.9[@] *11* | 2083.432 | 5− | E2 | | 0.01175 | B(E2)(W.u.)=2.7 *11* |
| | | 788.76 *3* | 100[@] *13* | 1811.674 | 6+ | E1 | | $1.63\times10^{-3}$ | B(E1)(W.u.)=$4.1\times10^{-5}$ *17* |
| 2605.11 | | 1857.92[#] *5* | 100 | 747.174 | 2+ | | | | |
| 2636.03 | | 1255.72[#] *6* | 100 | 1380.301 | 3− | | | | $E_\gamma$: doublet line is assumed by 1995Va40, ΔEγ in coincidence measurement can not identify what level of 1380-1381 doublet is populated. |
| 2649.59 | (2+) | 210.5[#] *5* | 15 *5* | 2439.071 | 4+ | | | | |
| | | 1902.45[#] *6* | 100 *4* | 747.174 | 2+ | | | | |
| | | 2650.35[g‡#i] *17* | 19.9[g] *15* | 0.0 | 0+ | | | | $E_\gamma$: poor fit; the level energy difference equals 2649.57 *6*. |
| 2667.19 | 4− | 397.31[#] *6* | ≈100 | 2269.885 | 3+ | | | | |
| | | 583.76 *3* | 100[@] *6* | 2083.432 | 5− | M1 | | 0.01459 | |
| | | 621.4[@] *1* | 26[@] *4* | 2045.715 | 4− | E0+M1+E2 | | 0.010 *3* | α: for M1+E2. |
| | | 855.45[@] *10* | 18[@] *2* | 1811.674 | 6+ | (M2+E3) | 0.05 *+20−29* | 0.0149 *5* | |
| | | 1287.6[@] *6* | 20[@] | 1380.301 | 3− | | | | |
| 2678.287 | 4+ | 397.327[#] *26* | 12.3 *13* | 2280.902 | 4+ | E2+M1 | | 0.031 *8* | |
| | | 522.2[#] *2* | 2.54 *7* | 2155.824 | 2+ | | | | |
| | | 1030.274[#] *37* | 0.24 *4* | 1647.980 | 2+ | | | | |
| | | 1297.029[#] *16* | 100 *2* | 1381.287 | 4+ | E2+(M1) | −1.25 *25* | 0.00175 *8* | |
| | | 1931.087[#] *20* | 22.1 *6* | 747.174 | 2+ | E2 | | $9.42\times10^{-4}$ | |



From ENSDF

$^{146}_{62}Sm_{84}$-9

## Adopted Levels, Gammas (continued)

### γ($^{146}$Sm) (continued)

| $E_i$(level) | $J_i^\pi$ | $E_\gamma$[†] | $I_\gamma$[b] | $E_f$ | $J_f^\pi$ | Mult.[c] | δ[df] | α[e] | Comments |
|---|---|---|---|---|---|---|---|---|---|
| 2684.714 | (2$^+$) | 403.73 *4* | 94 *10* | 2280.902 | 4$^+$ | | | | |
| | | 1036.66 *8* | 66 *4* | 1647.980 | 2$^+$ | | | | |
| | | 1303.47 *5* | 100 *5* | 1381.287 | 4$^+$ | | | | |
| | | 1937.57 *11* | 96 *6* | 747.174 | 2$^+$ | | | | |
| 2737.16 | 8$^+$ | 136.86 *22* | 2.6[@] *3* | 2600.38 | 7$^-$ | E1 | | 0.1175 | B(E1)(W.u.)=0.00021 *9* |
| | | 515.3[@] *8* | 1.6[@] *16* | 2222.438 | 6$^+$ | [E2] | | 0.01184 | B(E2)(W.u.)=0.5 *5* |
| | | 925.52[@] *19* | 100[@] *10* | 1811.674 | 6$^+$ | E2 | | 0.00293 | B(E2)(W.u.)=1.6 *7* |
| 2740.7 | | 1994.0[#] *10* | 100 | 747.174 | 2$^+$ | | | | |
| 2744.28 | (4$^+$,5,6$^+$) | 463.35[@] *15* | 28[@] *5* | 2280.902 | 4$^+$ | | | | |
| | | 521.9[@] *2* | 100[@] *20* | 2222.438 | 6$^+$ | | | | |
| 2782.92 | (4$^+$,5$^-$) | 699.6[@] *10* | [@] | 2083.432 | 5$^-$ | | | | |
| | | 971.3[@] *2* | 100[@] *28* | 1811.674 | 6$^+$ | | | | |
| | | 1400.8[@] *7* | 18[@] *8* | 1381.287 | 4$^+$ | | | | |
| | | 1402.9[@] *10* | 26[@] *13* | 1380.301 | 3$^-$ | | | | |
| 2788.224 | 5$^-$ | 704.772[#] *19* | 100.0 *21* | 2083.432 | 5$^-$ | M1 | | 0.00915 | |
| | | 742.55 *11* | 38 *5* | 2045.715 | 4$^-$ | E2+M1 | −1.2 *+6−11* | 0.0061 *11* | |
| | | 976.51 *5* | 10 *4* | 1811.674 | 6$^+$ | | | | |
| | | 1406.98 *3* | 91.6 *21* | 1381.287 | 4$^+$ | (E1) | | 7.01×10$^{-4}$ | |
| | | 1407.2[@] *2* | 42 *10* | | | | | | |
| 2797.67 | 9$^-$ | 60.68 *16* | 100[@] *10* | 2737.16 | 8$^+$ | E1 | | 1.051 *17* | B(E1)(W.u.)=0.00044 *+9−12* |
| | | 197.36 *13* | 69[@] *11* | 2600.38 | 7$^-$ | E2 | | 0.218 | B(E2)(W.u.)=12 *+3−4* |
| | | 986.0[&] *5* | 7.4[@] *8* | 1811.674 | 6$^+$ | E3 | | 0.00550 | B(E3)(W.u.)=32 *+7−9* |
| 2799.89 | 3$^+$ | 715.1[#] *11* | | 2083.432 | 5$^-$ | | | | |
| | | 753.80[‡#i] *8* | 4.0 *5* | 2045.715 | 4$^-$ | | | 0.00107 *2* | $E_\gamma$: poor fit; the level energy difference equals 754.17 *4*. |
| | | 2052.71[#] *5* | 100 *3* | 747.174 | 2$^+$ | M1+E2 | +0.501 *+25−23* | 1.07×10$^{-3}$ *2* | δ: from 1992Ad04; the 2$^{nd}$ value +4.4 *+5−3*. |
| 2826.3 | 6$^-$ | 1014.6[@] *7* | 100[@] | 1811.674 | 6$^+$ | E1 | | 1.00×10$^{-3}$ | |
| 2829.24 | (2$^+$) | 549.1[#] *10* | 78 *17* | 2280.902 | 4$^+$ | | | | |
| | | 1448.1[#] *2* | 1.0×10$^2$ *4* | 1381.287 | 4$^+$ | | | | |
| | | 2081.7[#] *3* | ≈56 | 747.174 | 2$^+$ | | | | |
| 2850.317 | 4$^+$ | 172.1[#] *3* | | 2678.287 | 4$^+$ | | | | |
| | | 411.1[@] *10* | [@] | 2439.071 | 4$^+$ | | | | |
| | | 569.54 *5* | 100 *6* | 2280.902 | 4$^+$ | M1 | | 0.01551 | |
| | | 766.838[#] *23* | 78 *2* | 2083.432 | 5$^-$ | | | | |
| | | 804.61 *10* | 80.5 *25* | 2045.715 | 4$^-$ | (E1+M2) | 0.79 *+29−24* | 0.0078 *25* | |
| | | 1038.35[#] *20* | 20.3 *25* | 1811.674 | 6$^+$ | | | | |



From ENSDF

## Adopted Levels, Gammas (continued)

### γ($^{146}$Sm) (continued)

| $E_i$(level) | $J_i^\pi$ | $E_\gamma$[†] | $I_\gamma$[b] | $E_f$ | $J_f^\pi$ | Mult.[c] | α[e] | Comments |
|---|---|---|---|---|---|---|---|---|
| 2850.317 | 4+ | 1469.93 *15* | 83.1 *34* | 1380.301 | 3− | | | |
| | | 2103.16[#] *5* | 63.6 *25* | 747.174 | 2+ | E2 | $9.25\times10^{-4}$ | |
| 2879.11 | | 833.1[#] *2* | 50 *4* | 2045.715 | 4− | | | |
| | | 1231.03[#] *10* | 70 *7* | 1647.980 | 2+ | | | |
| | | 2132.09[#] *10* | 100 *5* | 747.174 | 2+ | | | |
| 2898.309 | 5+ | 459.6[@] *10* | [@] | 2439.071 | 4+ | | | |
| | | 814.70[#] *25* | 1.29 *24* | 2083.432 | 5− | | | |
| | | 852.2[@] *10* | [@] | 2045.715 | 4− | | | |
| | | 1086.636 *17* | 84 *2* | 1811.674 | 6+ | M1 | 0.00323 | |
| | | 1517.00 *3* | 100 *2* | 1381.287 | 4+ | M1+E2 | 0.00137 *22* | |
| 2905.97 | (4+) | 636.22[#] *13* | $1.0\times10^{2}$ *4* | 2269.885 | 3+ | | | |
| | | 1094.10[#] *11* | 14.5 *13* | 1811.674 | 6+ | | | |
| | | 2158.92[#] *13* | 2.7 *12* | 747.174 | 2+ | | | |
| 2932.33 | (4+) | 848.70[ha] *15* | 100[h] *21* | 2083.432 | 5− | | | |
| | | 1120.77[#] *9* | 19 *1* | 1811.674 | 6+ | | | |
| | | 1551.01 *14* | 93 *15* | 1381.287 | 4+ | | | |
| | | 1552.00 *11* | 61 *15* | 1380.301 | 3− | | | |
| 2968.83 | 2+,3+ | 1587.53[#] *8* | 12 *8* | 1381.287 | 4+ | | | |
| | | 1588.53[#] *8* | 15 *8* | 1380.301 | 3− | | | |
| | | 2221.64 *5* | 100 *4* | 747.174 | 2+ | M1 | $1.08\times10^{-3}$ | |
| 2973.34 | 3+,4+ | 534.26[#] *9* | 76 *24* | 2439.071 | 4+ | | | |
| | | 703.46 *6* | 64 *12* | 2269.885 | 3+ | | | |
| | | 1325.35[#] *4* | 52.9 *18* | 1647.980 | 2+ | | | |
| | | 1592.04[#] *6* | 100 *18* | 1381.287 | 4+ | (M1+E2) | 0.00127 *19* | |
| | | 1593.05[#] *6* | 100 *18* | 1380.301 | 3− | [E1] | $7.31\times10^{-4}$ | |
| 2974.39 | 3− | 295.59[#] *25* | 18 *4* | 2678.287 | 4+ | | | |
| | | 891.29[#] *20* | 100 *25* | 2083.432 | 5− | | | |
| | | 2227.2[#] *4* | ≈8.3 | 747.174 | 2+ | | | |
| 2978.0 | | 1596.7[@] *10* | 100[@] | 1381.287 | 4+ | | | |
| 2984.5 | | 1172.8[@] *3* | 100[@] | 1811.674 | 6+ | | | |
| 3011.24 | | 788.8[h@] *1* | 100[h@] | 2222.438 | 6+ | | | |
| 3014.624 | 3+ | 575.64[#] *16* | 4.7 *14* | 2439.071 | 4+ | | | |
| | | 733.97[#] *13* | 10.8 *14* | 2280.902 | 4+ | | | |
| | | 968.83 *9* | 10.6 *7* | 2045.715 | 4− | | | |
| | | 1202.75 *21* | 1.6 *5* | 1811.674 | 6+ | | | Mult.: would be M3/E4. |
| | | 1366.69[#] *8* | 7.9 *23* | 1647.980 | 2+ | | | |



From ENSDF

$^{146}_{62}Sm_{84}$-11

## Adopted Levels, Gammas (continued)

### γ($^{146}$Sm) (continued)

| $E_i$(level) | $J_i^\pi$ | $E_\gamma$ † | $I_\gamma$ [b] | $E_f$ | $J_f^\pi$ | Mult. [c] | δ [d f] | α [e] |
|---|---|---|---|---|---|---|---|---|
| 3014.624 | 3+ | 1633.30# *3* | 94 *2* | 1381.287 | 4+ | M1 | | $1.40\times10^{-3}$ |
| | | 2267.49# *4* | 100 *3* | 747.174 | 2+ | M1 | | $1.08\times10^{-3}$ |
| 3019.54 | | 797.1@ *2* | @ | 2222.438 | 6+ | | | |
| 3020.6 | 0+ | 2273.4# *15* | 100 | 747.174 | 2+ | | | |
| 3039.5 | | 600.4# *10* | 100 | 2439.071 | 4+ | | | |
| 3043.13 | 8+ | 305.5@ *5* | 3@ *3* | 2737.16 | 8+ | | | |
| | | 442.4@ *3* | 7@ *4* | 2600.38 | 7− | | | |
| | | 820.68 *3* | 100@ *10* | 2222.438 | 6+ | E2 | | 0.00382 |
| | | 1231.42 *18* | 10.0@ *11* | 1811.674 | 6+ | E2 | | $1.63\times10^{-3}$ |
| 3058.09 | | 833.11# *9* | 12.2 *13* | 2225.00 | (2+) | | | |
| | | 974.9# *1* | 100 *5* | 2083.432 | 5− | | | |
| | | 2310.81# *8* | 20.8 *10* | 747.174 | 2+ | | | |
| 3067.703 | 3+ | 1022.05# *9* | 3.6 *11* | 2045.715 | 4− | | | |
| | | 1419.70# *3* | 20.6 *8* | 1647.980 | 2+ | | | |
| | | 1686.397# *21* | 100.0 *21* | 1381.287 | 4+ | M1+E2 | −0.52 *+7−10* | 0.00127 *3* |
| | | 2320.54# *4* | 15.2 *4* | 747.174 | 2+ | M1+E2 | | 0.00100 *8* |
| 3072.933 | 5+ | 222.33# *10* | 3.5 *2* | 2850.317 | 4+ | M1 | | 0.181 |
| | | 850.49 *10* | 56 *3* | 2222.438 | 6+ | M1 | | 0.00580 |
| | | 989.49# *4* | 15.8 *5* | 2083.432 | 5− | | | |
| | | 1027.26# *5* | 17.4 *7* | 2045.715 | 4− | | | |
| | | 1691.643# *22* | 100 *2* | 1381.287 | 4+ | E2+M1 | −0.17 *5* | $1.32\times10^{-3}$ *2* |
| 3092.39 | (4+,5,6+) | 811.35@ *15* | 34@ *6* | 2280.902 | 4+ | | | |
| | | 1009.1@ *2* | 100@ *7* | 2083.432 | 5− | | | |
| | | 1280.8@ *2* | 13.5@ *18* | 1811.674 | 6+ | | | |
| 3093.122 | 3+ | 812.21# *3* | 20.1 *6* | 2280.902 | 4+ | M1 | | 0.00648 |
| | | 823.21# *3* | 14.1 *5* | 2269.885 | 3+ | E2 | | 0.00379 |
| | | 937.29# *4* | 8.5 *10* | 2155.824 | 2+ | | | |
| | | 1047.36# *5* | 12.4 *4* | 2045.715 | 4− | | | |
| | | 1445.136# *23* | 93.0 *25* | 1647.980 | 2+ | M1+(E2) | | 0.00149 *25* |
| | | 1711.844# *22* | 53 *1* | 1381.287 | 4+ | M1+E2 | | 0.00116 *15* |
| | | 2345.91# *30* | 100 *2* | 747.174 | 2+ | M1+E2 | | 0.00100 *7* |
| 3099.49 | 7− | 362.25@ *15* | 6@ *4* | 2737.16 | 8+ | | | |
| | | 499.1@ *1* | 50@ *7* | 2600.38 | 7− | | | |
| | | 877.1@ *2* | 68@ *8* | 2222.438 | 6+ | | | |



From ENSDF

$^{146}_{62}Sm_{84}$-12

## Adopted Levels, Gammas (continued)

### γ($^{146}$Sm) (continued)

| $E_i$(level) | $J_i^\pi$ | $E_\gamma$[†] | $I_\gamma$[b] | $E_f$ | $J_f^\pi$ | Mult.[c] | δ[df] | α[e] | Comments |
|---|---|---|---|---|---|---|---|---|---|
| 3099.49 | 7⁻ | 1014.65[@i] *45* | 7[@] *5* | 2083.432 | 5⁻ | | | | $E_\gamma$: poor fit; the level energy difference equals 1016.09 *8*. |
| | | 1288.05[@] *15* | 100[@] *10* | 1811.674 | 6⁺ | E1(+M2) | +0.016 *64* | 0.00072 *3* | |
| 3105.38 | (2⁺,3,4⁺) | 1724.07[#] *6* | 100 *14* | 1381.287 | 4⁺ | | | | |
| | | 1725.08[#] *6* | 86 *14* | 1380.301 | 3⁻ | | | | |
| | | 2358.17[#] *13* | 44 *3* | 747.174 | 2⁺ | | | | |
| 3123.29 | (2⁺,3,4⁺) | 445.0[#] *3* | 100 *20* | 2678.287 | 4⁺ | | | | |
| | | 1475.3[#] *3* | 5.5 *15* | 1647.980 | 2⁺ | | | | |
| 3129.8 | | 848.85[h#] *30* | 100[h] | 2280.902 | 4⁺ | | | | |
| 3136.38 | 3⁻ | 1090.844[‡#i] *21* | 23.4 *5* | 2045.715 | 4⁻ | M1 | | 0.00321 | $E_\gamma$: poor fit; the level energy difference equals 1090.660 *25*. |
| | | 1488.48[#] *13* | 3.8 *4* | 1647.980 | 2⁺ | | | | |
| | | 1756.08[#] *3* | 100 *3* | 1380.301 | 3⁻ | M1+E2 | −0.10 *4* | $1.27\times10^{-3}$ | |
| | | 2389.13[#] *4* | 16.8 *7* | 747.174 | 2⁺ | E1+M2 | −0.05 *+4−5* | $1.08\times10^{-3}$ *2* | |
| 3151.44 | | 870.55[#] *6* | 31 *11* | 2280.902 | 4⁺ | | | | |
| | | 881.55[#] *3* | 100 *5* | 2269.885 | 3⁺ | | | | |
| 3166.91 | 8⁻ | 369.58 *15* | 16[@] *4* | 2797.67 | 9⁻ | | | | |
| | | 566.54 *4* | 100[@] *6* | 2600.38 | 7⁻ | M1 | | 0.01572 | |
| 3183.28 | 8⁻ | 385.60[@] *6* | 25[@] *6* | 2797.67 | 9⁻ | M1 | | 0.0419 | |
| | | 445.9[@] *10* | [@] | 2737.16 | 8⁺ | | | | |
| | | 582.95[@] *19* | 100[@] *6* | 2600.38 | 7⁻ | D+Q | | | |
| 3183.928 | 3⁺ | 914.031[#] *16* | 66.6 *15* | 2269.885 | 3⁺ | M1 | | 0.00488 | |
| | | 1028.10[#] *5* | 2.2 *3* | 2155.824 | 2⁺ | | | | |
| | | 1535.93[#] *5* | 18.6 *16* | 1647.980 | 2⁺ | | | | |
| | | 1802.76[#] *7* | 16.5 *9* | 1381.287 | 4⁺ | M1+E2 | | 0.00110 *13* | |
| | | 2436.74[#] *4* | 100.0 *21* | 747.174 | 2⁺ | M1+E2 | 0.35 *10* | $1.06\times10^{-3}$ *2* | |
| 3185.67 | | 1102.15[@] *10* | 100[@] *10* | 2083.432 | 5⁻ | | | | |
| | | 1374.3[@] *2* | 71[@] *11* | 1811.674 | 6⁺ | | | | |
| 3198.84 | | 976.4[@] *2* | 100[@] | 2222.438 | 6⁺ | | | | |
| 3200.019 | 4⁻ | 686.54[#] *10* | 7.5 *6* | 2513.448 | 3⁻ | | | | |
| | | 760.963[#] *23* | 21.9 *7* | 2439.071 | 4⁺ | | | | |
| | | 918.94[#] *6* | 16.6 *7* | 2280.902 | 4⁺ | | | | |
| | | 930.39[#] *11* | 4.7 *12* | 2269.885 | 3⁺ | | | | |
| | | 1116.566[#] *15* | 100 *2* | 2083.432 | 5⁻ | M1+E2 | −0.30 *+9−12* | 0.00295 *9* | |
| | | 1818.78[#] *3* | 29.1 *7* | 1381.287 | 4⁺ | | | | |



From ENSDF

$^{146}_{62}Sm_{84}$-13

## Adopted Levels, Gammas (continued)

### γ($^{146}$Sm) (continued)

| $E_i$(level) | $J_i^\pi$ | $E_\gamma$[†] | $I_\gamma$[b] | $E_f$ | $J_f^\pi$ | Mult.[c] | $\delta$[df] | $\alpha$[e] |
|---|---|---|---|---|---|---|---|---|
| 3208.31 | (8$^+$) | 985.87[@] *3* | 100[@] | 2222.438 | 6$^+$ | (E2) | | 0.00256 |
| 3220.87 | (3$^-$,4,5$^-$) | 1137.66[#] *13* | 30.7 *21* | 2083.432 | 5$^-$ | | | |
| | | 1175.09[#] *11* | 100 *21* | 2045.715 | 4$^-$ | | | |
| | | 1840.52[#] *6* | 14 *6* | 1380.301 | 3$^-$ | | | |
| 3223.9 | (2$^+$,3$^+$,4$^+$) | 394.7[#] *15* | 100 | 2829.24 | (2$^+$) | | | |
| 3231.63 | 4$^+$ | 553.35[#] *11* | 100 *18* | 2678.287 | 4$^+$ | | | |
| | | 1009.27[#] *11* | 3.1 *3* | 2222.438 | 6$^+$ | | | |
| | | 2484.39[#] *8* | 5.32 *21* | 747.174 | 2$^+$ | | | |
| 3238.646 | 4$^+$ | 224.05[#] *3* | 22.4 *16* | 3014.624 | 3$^+$ | | | |
| | | 837.72[#] *8* | 3.2 *4* | 2400.92 | 2$^+$ | | | |
| | | 1155.09 *4* | 100 *3* | 2083.432 | 5$^-$ | | | |
| | | 1427.55[@] *25* | ≈100[@] | 1811.674 | 6$^+$ | | | |
| | | 1857.33[#] *5* | 27 *5* | 1381.287 | 4$^+$ | | | |
| | | 1858.34[#] *5* | 31 *5* | 1380.301 | 3$^-$ | | | |
| | | 2491.51[#] *4* | 94.8 *26* | 747.174 | 2$^+$ | E2 | | 9.55×10$^{-4}$ |
| 3244.65 | (2$^+$,3,4$^+$) | 843.72[#] *9* | 2.2 *5* | 2400.92 | 2$^+$ | | | |
| | | 974.77[#] *8* | 100 *15* | 2269.885 | 3$^+$ | | | |
| | | 1088.83[#] *8* | 21.2 *20* | 2155.824 | 2$^+$ | | | |
| | | 1596.66[#] *7* | 66 *3* | 1647.980 | 2$^+$ | | | |
| | | 1863.29[#] *17* | 9.7 *9* | 1381.287 | 4$^+$ | | | |
| | | 2497.46[#] *5* | 42.4 *11* | 747.174 | 2$^+$ | | | |
| 3259.934 | 5$^-$ | 202.2[#] *4* | 0.61 *12* | 3058.09 | | | | |
| | | 471.67[#] *4* | 2.23 *11* | 2788.224 | 5$^-$ | | | |
| | | 658.3[@] *10* | | 2600.38 | 7$^-$ | | | |
| | | 820.0[@] *10* | | 2439.071 | 4$^+$ | | | |
| | | 979.09[#] *10* | 2.74 *18* | 2280.902 | 4$^+$ | | | |
| | | 1176.522[#] *24* | 100.0 *24* | 2083.432 | 5$^-$ | M1+E2 | 0.77 *10* | 0.00235 *7* |
| | | 1214.209[#] *21* | 19.5 *4* | 2045.715 | 4$^-$ | M1+E2 | 0.75 *+26−13* | 0.00220 *13* |
| | | 1448.21[#] *6* | 5.7 *2* | 1811.674 | 6$^+$ | | | |
| | | 1878.62[#] *3* | 9.2 *6* | 1381.287 | 4$^+$ | E1 | | 8.36×10$^{-4}$ |
| | | 1879.63[#] *3* | 4.9 *6* | 1380.301 | 3$^-$ | [E2] | | 9.53×10$^{-4}$ |
| 3278.14 | | 1055.7[@] *2* | 100[@] | 2222.438 | 6$^+$ | | | |
| 3278.18 | 2$^+$ | 449.2[#] *5* | 1.0×10$^2$ *4* | 2829.24 | (2$^+$) | | | |
| | | 1896.85[#] *19* | 6 *3* | 1381.287 | 4$^+$ | | | |
| | | 1897.85[#] *19* | 6 *3* | 1380.301 | 3$^-$ | | | |



From ENSDF

$^{146}_{62}Sm_{84}$-14

## Adopted Levels, Gammas (continued)

### γ($^{146}$Sm) (continued)

| $E_i$(level) | $J_i^\pi$ | $E_\gamma$[†] | $I_\gamma$[b] | $E_f$ | $J_f^\pi$ | Mult.[c] | δ[df] | α[e] | Comments |
|---|---|---|---|---|---|---|---|---|---|
| 3288.60 | (2$^+$,3,4$^+$) | 459.35[#] *6* | 1.0×10$^2$ *3* | 2829.24 | (2$^+$) | | | | |
| | | 548.4[#] *10* | 6.7 *19* | 2740.7 | | | | | |
| 3290.7 | 8$^+$ | 492.7[@] *10* | 29[@] *11* | 2797.67 | 9$^-$ | | | | |
| | | 690.2[@] *10* | 20[@] *10* | 2600.38 | 7$^-$ | | | | |
| | | 1479.0[@] *3* | 100[@] *26* | 1811.674 | 6$^+$ | E2(+M3) | −0.11 *+12−13* | 0.00126 *23* | |
| 3327.0 | | 1243.6[@] *4* | 100[@] | 2083.432 | 5$^-$ | | | | |
| 3329.90 | (2$^+$,3,4$^+$) | 1681.94[#] *13* | 29 *2* | 1647.980 | 2$^+$ | | | | |
| | | 1948.65[#] *6* | 100 *4* | 1381.287 | 4$^+$ | | | | |
| | | 2582.51[#] *11* | 13.2 *9* | 747.174 | 2$^+$ | | | | |
| 3338.27 | 3$^+$ | 550.4[#] *3* | 28 *5* | 2788.224 | 5$^-$ | | | | |
| | | 937.33[#] *8* | 1.8 *3* | 2400.92 | 2$^+$ | | | | |
| | | 1068.32[#] *7* | 27.5 *14* | 2269.885 | 3$^+$ | | | | |
| | | 1956.97[#] *4* | 100 *24* | 1381.287 | 4$^+$ | | | | |
| | | 2591.11[#] *8* | 15.4 *5* | 747.174 | 2$^+$ | M1+(E2) | | 0.00103 *7* | |
| 3340.26 | (5$^-$,6$^-$) | 552.0[@] *10* | [@] | 2788.224 | 5$^-$ | | | | |
| | | 672.9[@] *10* | [@] | 2667.19 | 4$^-$ | | | | |
| | | 739.85[@] *10* | 86[@] *14* | 2600.38 | 7$^-$ | | | | |
| | | 1117.95[@] *15* | 100[@] *18* | 2222.438 | 6$^+$ | | | | |
| | | 1256.7[@] *2* | 29[@] *4* | 2083.432 | 5$^-$ | | | | |
| | | 1528.3[@] *10* | [@] | 1811.674 | 6$^+$ | | | | |
| 3354.64 | 9$^-$ | 187.75 *5* | 5.6 *3* | 3166.91 | 8$^-$ | [M1] | | 0.287 | B(M1)(W.u.)=0.0053 *+9−11* |
| | | 556.9 *1* | 100[@] *6* | 2797.67 | 9$^-$ | M1+E2 | −0.35 *+19−17* | 0.0157 *8* | B(M1)(W.u.)=0.0032 *+7−8*; B(E2)(W.u.)<1.4 |
| | | 617.46 *13* | 10[@] *3* | 2737.16 | 8$^+$ | [E1] | | 0.00271 | B(E1)(W.u.)=2.9×10$^{-6}$ *+10−11* |
| | | 754.17 *18* | 6.7[@] *6* | 2600.38 | 7$^-$ | E2 | | 0.00463 | B(E2)(W.u.)=0.097 *+18−20* |
| 3361.08 | 3$^-$,4$^-$ | 847.5[@] *10* | | 2513.448 | 3$^-$ | | | | |
| | | 1277.55[#] *6* | 29.3 *13* | 2083.432 | 5$^-$ | | | | |
| | | 1980.79[#] *3* | 100 *4* | 1380.301 | 3$^-$ | M1 | | 1.13×10$^{-3}$ | |
| 3368.76 | (4$^+$) | 1987.44[#] *15* | 70 *40* | 1381.287 | 4$^+$ | | | | |
| | | 1988.45[#] *15* | 100 *40* | 1380.301 | 3$^-$ | | | | |
| | | 2621.56[#] *11* | 57 *4* | 747.174 | 2$^+$ | | | | |
| 3376.78 | 4$^+$ | 937.68[#] *8* | 15 *6* | 2439.071 | 4$^+$ | | | | |
| | | 1293.48[#] *13* | 40 *4* | 2083.432 | 5$^-$ | | | | |
| | | 1330.33[‡#i] *20* | 10.3 *14* | 2045.715 | 4$^-$ | | | | $E_\gamma$: poor fit; the level energy difference equals 1331.02 *4*. |



From ENSDF

$^{146}_{62}Sm_{84}$-15

## Adopted Levels, Gammas (continued)

### γ($^{146}$Sm) (continued)

| $E_i$(level) | $J_i^\pi$ | $E_\gamma$ † | $I_\gamma$ [b] | $E_f$ | $J_f^\pi$ | Mult. [c] | δ [d f] | α [e] | Comments |
|---|---|---|---|---|---|---|---|---|---|
| 3376.78 | 4+ | 1728.76# 7 | 4.1 11 | 1647.980 | 2+ | | | | |
| | | 1995.75#i 9 | 100 4 | 1381.287 | 4+ | M1+E2 | | 0.00103 10 | $E_\gamma$: poor fit; the level energy difference equals 1995.44 4. |
| | | 2629.50# 5 | 22.9 6 | 747.174 | 2+ | E2 | | $9.80\times10^{-4}$ | |
| 3377.14 | | 210.6@ 10 | 100@ 23 | 3166.91 | 8− | | | | |
| | | 776.75@ 15 | 91@ 17 | 2600.38 | 7− | | | | |
| 3378.45 | (3−,4,5−) | 1294.3@ 10 | @ | 2083.432 | 5− | | | | |
| | | 1332.74# 4 | 100 4 | 2045.715 | 4− | D+Q | | | |
| | | 1998.00# 15 | 46 6 | 1380.301 | 3− | | | | |
| 3391.1 | | 1579.45@ 45 | 100@ | 1811.674 | 6+ | | | | |
| 3391.678 | 3− | 459.4# 2 | 38 3 | 2932.33 | (4+) | | | | |
| | | 1110.79# 5 | 9.3 21 | 2280.902 | 4+ | | | | |
| | | 1743.69# 3 | 27.0 13 | 1647.980 | 2+ | | | | |
| | | 2010.37# 4 | 43 7 | 1381.287 | 4+ | | | | |
| | | 2011.38# 4 | 100 7 | 1380.301 | 3− | M1+E2 | | 0.00103 10 | |
| | | 2644.43# 5 | 77.1 21 | 747.174 | 2+ | E1 | | $1.20\times10^{-3}$ | |
| 3397.62 | (4+) | 1175.0# 2 | 100 18 | 2222.438 | 6+ | | | | |
| | | 2017.40# 13 | 21.2 16 | 1380.301 | 3− | | | | |
| | | 2650.35g# 17 | 7.1g 6 | 747.174 | 2+ | | | | |
| 3412.7 | (4+,5,6−) | 1190.2@ 10 | @ | 2222.438 | 6+ | | | | |
| | | 1367.1@ 10 | @ | 2045.715 | 4− | | | | |
| 3418.98 | 3+ | 1137.8# 3 | 32 2 | 2280.902 | 4+ | | | | |
| | | 1335.52# 9 | 100 5 | 2083.432 | 5− | | | | |
| | | 1373.5a 1 | | 2045.715 | 4− | | | | |
| | | 2037.86# 7 | 54.3 18 | 1381.287 | 4+ | | | | |
| | | 2671.65# 5 | 29.6 8 | 747.174 | 2+ | M1+E2 | | 0.00105 7 | δ: from 1992Ad04; −0.21 +8−9 or −2.1 +4−5. |
| 3427.77 | | 2680.57# 7 | 100 | 747.174 | 2+ | | | | |
| 3431.28 | 3−,4− | 1347.79# 6 | 36.1 17 | 2083.432 | 5− | | | | |
| | | 1385.60# 6 | $1.0\times10^2$ 6 | 2045.715 | 4− | | | | |
| | | 2049.96# 8 | 23 3 | 1381.287 | 4+ | | | | |
| | | 2050.97# 8 | 97 13 | 1380.301 | 3− | | | | |
| 3461.572 | 5− | 948.14# 15 | 0.54 9 | 2513.448 | 3− | | | | |
| | | 1378.135# 19 | 35.9 8 | 2083.432 | 5− | M1+E2 | | 0.00189 | δ: from 1992Ad04; −0.12 8 or +0.97 15. |
| | | 1415.859# 21 | 14.5 3 | 2045.715 | 4− | M1+E2 | +0.45 +7−5 | 0.00171 4 | |
| | | 1649.76# 10 | 8.9 11 | 1811.674 | 6+ | | | | |



From ENSDF

$^{146}_{62}Sm_{84}$-16

## Adopted Levels, Gammas (continued)

### γ($^{146}$Sm) (continued)

| $E_i$(level) | $J_i^\pi$ | $E_\gamma$[†] | $I_\gamma$[b] | $E_f$ | $J_f^\pi$ | Mult.[c] | α[e] | Comments |
|---|---|---|---|---|---|---|---|---|
| 3461.572 | 5⁻ | 2080.05[#] *15* | 44 *17* | 1381.287 | 4⁺ | E1 | 9.29×10⁻⁴ | |
| | | 2081.11[#] *15* | 100 *17* | 1380.301 | 3⁻ | E2 | 9.25×10⁻⁴ | |
| 3465.84 | | 1184.93[#] *3* | 100 | 2280.902 | 4⁺ | | | |
| 3471.90 | (2⁺),3⁺ | 1191.01[#] *10* | 42 *13* | 2280.902 | 4⁺ | | | |
| | | 1823.90[#] *10* | 28 *6* | 1647.980 | 2⁺ | | | |
| | | 2724.70[#] *6* | 100 *3* | 747.174 | 2⁺ | M1 | 1.12×10⁻³ | |
| 3475.09 | 5⁺,(6⁺) | 624.75[#] *14* | 100 *12* | 2850.317 | 4⁺ | | | |
| | | 1663.42[#] *6* | 80 *2* | 1811.674 | 6⁺ | M1(+E2) | 0.00120 *16* | |
| | | 2092.7[@] *7* | | 1381.287 | 4⁺ | | | |
| 3476.95 | (2⁺,3,4,5⁻) | 2095.64[#] *20* | 100 *13* | 1381.287 | 4⁺ | | | |
| | | 2096.64[#] *20* | 100 *13* | 1380.301 | 3⁻ | | | |
| 3484.3 | (4⁺,5,6⁻) | 818.3[@] *10* | | 2667.19 | 4⁻ | | | |
| | | 1672.5[@] *3* | | 1811.674 | 6⁺ | | | |
| 3509.34 | (3⁺) | 441.43[#] *12* | 50 *6* | 3067.703 | 3⁺ | | | |
| | | 721.24[#] *8* | 100 *7* | 2788.224 | 5⁻ | | | |
| | | 1239.86[#] *20* | 15 *4* | 2269.885 | 3⁺ | | | |
| | | 2762.04[#] *8* | 27.0 *11* | 747.174 | 2⁺ | (M1+E2) | 0.00107 *7* | |
| 3517.37 | 3⁺ | 380.91[#] *7* | 83 *3* | 3136.38 | 3⁻ | | | |
| | | 1004.3[#] *4* | 8.3 *25* | 2513.448 | 3⁻ | | | |
| | | 1078.29[#] *7* | 31.7 *11* | 2439.071 | 4⁺ | | | |
| | | 1471.63[#] *14* | 58.0 *25* | 2045.715 | 4⁻ | | | |
| | | 1869.86[#] *25* | 6.1 *13* | 1647.980 | 2⁺ | | | |
| | | 2137.08[#] *4* | 100.0 *25* | 1380.301 | 3⁻ | E1(+M2) | 9.64×10⁻⁴ *16* | δ: from 1992Ad04; −0.18≤δ≤+2.0. |
| | | 2770.12[#] *8* | 16.0 *6* | 747.174 | 2⁺ | M1+E2 | 0.00107 *7* | |
| 3530.59 | 4⁺ | 845.81[#] *10* | 40 *9* | 2684.714 | (2⁺) | | | |
| | | 852.28[#] *12* | 42 *10* | 2678.287 | 4⁺ | | | |
| | | 881.5[#] *2* | 38.7 *22* | 2649.59 | (2⁺) | | | |
| | | 998.7[#] *3* | 4.9 *14* | 2531.934 | 4⁺ | | | |
| | | 1017.08[#] *16* | 18.8 *23* | 2513.448 | 3⁻ | | | |
| | | 1260.89[#] *9* | 25.7 *19* | 2269.885 | 3⁺ | | | |
| | | 1447.12[#] *9* | 100 *19* | 2083.432 | 5⁻ | | | |
| | | 1484.72[#] *8* | 88 *4* | 2045.715 | 4⁻ | E1 | 7.07×10⁻⁴ | |
| | | 2149.2[#] *3* | 32 *11* | 1381.287 | 4⁺ | | | |
| 3546.17 | 2⁺,3⁺ | 1898.17[#] *8* | 27 *7* | 1647.980 | 2⁺ | | | |
| | | 2164.86[#] *5* | 100 *3* | 1381.287 | 4⁺ | | | |



From ENSDF

$^{146}_{62}Sm_{84}$-17

## Adopted Levels, Gammas (continued)

### γ($^{146}$Sm) (continued)

| $E_i$(level) | $J_i^\pi$ | $E_\gamma$[†] | $I_\gamma$[b] | $E_f$ | $J_f^\pi$ | Mult.[c] | α[e] | Comments |
|---|---|---|---|---|---|---|---|---|
| 3546.17 | 2⁺,3⁺ | 2798.97[#] *6* | 64.7 *20* | 747.174 | 2⁺ | M1+E2 | 0.00107 *7* | |
| 3560.28 | | 393.2[@] *10* | 100[@] *22* | 3166.91 | 8⁻ | | | |
| | | 460.8[@] *2* | 98[@] *28* | 3099.49 | 7⁻ | | | |
| 3565.4 | | 1753.75[@] *35* | 100[@] | 1811.674 | 6⁺ | | | |
| 3567.47 | 9⁺ | 401.0 *5* | 2.4[@] *6* | 3166.91 | 8⁻ | | | |
| | | 524.33[@] *3* | 100[@] *7* | 3043.13 | 8⁺ | M1 | 0.0191 | |
| | | 830.6[@] *3* | ≤22[@] | 2737.16 | 8⁺ | | | |
| 3568.4 | | 2187.1[@] *10* | 100[@] | 1381.287 | 4⁺ | | | |
| 3580.2 | (4⁺) | 1496.8[@] *3* | 100[@] | 2083.432 | 5⁻ | | | |
| 3583.85 | 4⁻ | 399.81[#] *10* | 8.1 *23* | 3183.928 | 3⁺ | | | |
| | | 569.11[#] *10* | 11 *3* | 3014.624 | 3⁺ | | | |
| | | 783.96[#] *3* | 27.6 *12* | 2799.89 | 3⁺ | | | |
| | | 1500.44[#] *3* | 73.6 *23* | 2083.432 | 5⁻ | M1+E2 | 0.00139 *22* | |
| | | 2203.73[‡#i] *3* | 100.0 *23* | 1380.301 | 3⁻ | M1+E2 | 0.00100 *8* | $E_\gamma$: poor fit; the level energy difference equals 2203.55 *3*. δ: from 1992Ad04; +4.6 *+19−12* or +0.43 *+8−9*. |
| 3591.74 | (4⁺) | 534.1[#] *2* | 100 *6* | 3058.09 | | | | |
| | | 1190.1[#] *3* | 76.3 *24* | 2400.92 | 2⁺ | | | |
| | | 1944.3[#] *3* | 9.6 *23* | 1647.980 | 2⁺ | | | |
| | | 2210.35[#] *6* | 71.3 *26* | 1381.287 | 4⁺ | | | |
| | | 2845.0[#] *3* | 1.2 *4* | 747.174 | 2⁺ | | | |
| 3593.2 | | 2212.9[@] *10* | 100[@] | 1380.301 | 3⁻ | | | |
| 3594.89 | | 1783.2[@] *2* | 100[@] | 1811.674 | 6⁺ | | | |
| 3605.83 | 3⁻ | 422.3[#] *3* | 30 *9* | 3183.928 | 3⁺ | | | |
| | | 1166.67[#] *10* | 39 *7* | 2439.071 | 4⁺ | | | |
| | | 1336.01[#] *9* | 100 *7* | 2269.885 | 3⁺ | | | |
| | | 2858.2[#] *3* | 4.6 *11* | 747.174 | 2⁺ | | | |
| 3620.0 | | 1808.35[@] *25* | 100[@] | 1811.674 | 6⁺ | | | |
| 3626.046 | 4⁺ | 532.87[#] *7* | 41.4 *25* | 3093.122 | 3⁺ | E2 | 0.01085 | |
| | | 611.46[#] *25* | 4.7 *13* | 3014.624 | 3⁺ | | | |
| | | 826.32[#] *12* | 4.3 *6* | 2799.89 | 3⁺ | E2,M1 | 0.0050 *13* | |
| | | 941.30[#] *3* | 50.2 *16* | 2684.714 | (2⁺) | | | |
| | | 1094.11[#] *6* | 18 *7* | 2531.934 | 4⁺ | | | |
| | | 1186.98[#] *10* | 9.8 *6* | 2439.071 | 4⁺ | | | |
| | | 1225.39[#] *11* | 4.2 *4* | 2400.92 | 2⁺ | | | |
| | | 1345.176[#] *22* | 48.9 *13* | 2280.902 | 4⁺ | M1+E2 | 0.0017 *3* | δ: from 1992Ad04; −0.16≤δ≤1.3. |



From ENSDF

$^{146}_{62}Sm_{84}$-18

## Adopted Levels, Gammas (continued)

### γ($^{146}$Sm) (continued)

| $E_i$(level) | $J_i^\pi$ | $E_\gamma$ † | $I_\gamma$ [b] | $E_f$ | $J_f^\pi$ | Mult.[c] | δ[d f] | α[e] | Comments |
|---|---|---|---|---|---|---|---|---|---|
| 3626.046 | 4+ | 1356.145# *17* | 100 *2* | 2269.885 | 3+ | M1+E2 | +0.05 *+7−8* | 0.00196 | δ: from 1992Ad04; the 2nd value −6.9 *+24−79*. |
| | | 1470.21# *4* | 6.2 *19* | 2155.824 | 2+ | | | | |
| | | 1542.56# *3* | 33.0 *9* | 2083.432 | 5− | | | | |
| | | 1580.16# *18* | 4.0 *5* | 2045.715 | 4− | | | | |
| | | 1978.20# *6* | 16.0 *6* | 1647.980 | 2+ | | | | |
| | | 2244.71# *4* | 50.2 *13* | 1381.287 | 4+ | M1+E2 | | 0.00100 *8* | δ: from 1992Ad04; −1.1≤δ≤28. |
| | | 2878.76# *10* | 2.02 *16* | 747.174 | 2+ | | | | |
| 3633.5 | | 1033.1@ *10* | 100@ | 2600.38 | 7− | | | | |
| 3646.99 | (2+,3,4+) | 553.8# *10* | 1.0×10$^2$ *3* | 3093.122 | 3+ | | | | |
| | | 1491.16# *3* | 100 *12* | 2155.824 | 2+ | | | | |
| 3652.22 | (3−),4+ | 1371.33# *10* | 20 *8* | 2280.902 | 4+ | | | | |
| | | 1496.39# *10* | 25 *8* | 2155.824 | 2+ | | | | |
| | | 1568.93# *10* | 97 *13* | 2083.432 | 5− | | | | |
| | | 2004.25# *11* | 76 *6* | 1647.980 | 2+ | | | | |
| | | 2904.87# *9* | 100 *6* | 747.174 | 2+ | E2 | | 1.04×10$^{-3}$ | |
| 3654.19 | (2+,3,4+) | 415.52# *16* | 27 *9* | 3238.646 | 4+ | | | | |
| | | 1110.03# *16* | 100 *14* | 2544.18 | 2+ | | | | |
| | | 1373.29# *15* | 64 *23* | 2280.902 | 4+ | | | | |
| | | 1498.35# *14* | 36 *10* | 2155.824 | 2+ | | | | |
| | | 2906.99# *13* | 70 *10* | 747.174 | 2+ | | | | |
| 3669.78 | | 1069.4@ *2* | 100@ | 2600.38 | 7− | | | | |
| 3685.3 | | 1084.9@ *10* | 100@ | 2600.38 | 7− | | | | |
| 3693.44 | (2+,3,4+) | 1161.75# *14* | 100 *12* | 2531.934 | 4+ | | | | |
| | | 2946.10# *10* | 65 *7* | 747.174 | 2+ | | | | |
| 3701.09 | (7−,8,9) | 346.5@ *10* | 100@ *25* | 3354.64 | 9− | | | | |
| | | 534.20@ *12* | 34@ *8* | 3166.91 | 8− | | | | |
| | | 657.85@ *25* | 58@ *11* | 3043.13 | 8+ | | | | |
| 3715.62 | | 2968.41# *18* | 100@ | 747.174 | 2+ | | | | |
| 3720.53 | 3− | 653.0# *3* | 100 *30* | 3067.703 | 3+ | | | | |
| | | 2072.50# *15* | 32 *4* | 1647.980 | 2+ | | | | |
| | | 2973.3g# *4* | 3.3g *8* | 747.174 | 2+ | | | | |
| 3740.78 | (3,4+) | 1208.82# *8* | 99 *6* | 2531.934 | 4+ | | | | |
| | | 2360.49# *14* | 100 *6* | 1380.301 | 3− | | | | |
| | | 2993.61# *24* | 6.7 *7* | 747.174 | 2+ | | | | |
| 3749.43 | (3−,4+) | 1667.0# *7* | 100 *43* | 2083.432 | 5− | | | | |



From ENSDF

$^{146}_{62}Sm_{84}$-19

## Adopted Levels, Gammas (continued)

### γ($^{146}$Sm) (continued)

| $E_i$(level) | $J_i^\pi$ | $E_\gamma$[†] | $I_\gamma$[b] | $E_f$ | $J_f^\pi$ | Mult.[c] | α[e] | Comments |
|---|---|---|---|---|---|---|---|---|
| 3749.43 | (3⁻,4⁺) | 2368.93[#] *22* | 56 *6* | 1380.301 | 3⁻ | | | |
| | | 3002.24[#] *12* | 44.3 *21* | 747.174 | 2⁺ | | | |
| 3753.57 | 10⁻ | 955.90 *3* | 100[@] | 2797.67 | 9⁻ | M1 | 0.00438 | |
| 3766.9 | | 1166.5[@] *10* | 100[@] | 2600.38 | 7⁻ | | | |
| 3770.32 | 2⁺ | 372.67[#] *23* | 1.0×10² *3* | 3397.62 | (4⁺) | | | |
| | | 749.8[#] *15* | 70 *7* | 3020.6 | 0⁺ | | | |
| | | 838.02[#] *15* | 6.9 *14* | 2932.33 | (4⁺) | | | |
| | | 2389.00[#] *17* | 80.3 *14* | 1381.287 | 4⁺ | | | |
| 3774.66 | 10⁺ | 207.16 *7* | 100[@] *4* | 3567.47 | 9⁺ | E2+M1 | 0.202 *17* | |
| | | 731.56 *15* | 36[@] *3* | 3043.13 | 8⁺ | | | |
| 3783.47 | 11⁻ | 985.85[@] *7* | 100[@] | 2797.67 | 9⁻ | E2 | 0.00256 | B(E2)(W.u.)=1.3 *+4−6* |
| 3786.03 | (2⁺,3,4⁺) | 1385.6[#] *3* | 100 *3* | 2400.92 | 2⁺ | | | |
| | | 2404.74[#] *22* | 21.4 *19* | 1381.287 | 4⁺ | | | |
| | | 3038.50[#] *23* | 1.53 *17* | 747.174 | 2⁺ | | | |
| 3790.06 | 3⁻,4⁻ | 606.22[#] *22* | 100 *24* | 3183.928 | 3⁺ | | | |
| | | 1565.02[#] *20* | ≤71 | 2225.00 | (2⁺) | | | |
| | | 3042.85[#] *8* | 15 *3* | 747.174 | 2⁺ | | | |
| 3800.7 | | 1989.0[@] *10* | 100[@] | 1811.674 | 6⁺ | | | |
| 3804.25 | (3⁻,4,5⁺) | 544.32[#] *13* | 1.0×10² *4* | 3259.934 | 5⁻ | | | |
| | | 736.55[#] *11* | 57 *6* | 3067.703 | 3⁺ | | | |
| | | 1063.6[#] *7* | 6.4 *21* | 2740.7 | | | | |
| | | 1198.3[#] *10* | 6 *5* | 2605.11 | | | | |
| 3809.6 | | 766.5[@] *10* | 100 | 3043.13 | 8⁺ | | | |
| 3815.2 | | 1078.0[@] *10* | 100 | 2737.16 | 8⁺ | | | |
| 3825.5 | | 1027.8[@] *10* | 100 | 2797.67 | 9⁻ | | | |
| 3869.7 | | 2058.0[@] *10* | 100 | 1811.674 | 6⁺ | | | |
| 3924.49 | (9⁻) | 171.10 *45* | 22 *5* | 3753.57 | 10⁻ | | | |
| | | 569.83 *7* | 98 *15* | 3354.64 | 9⁻ | D | | |
| | | 757.62 *10* | 100 *11* | 3166.91 | 8⁻ | D+Q | | |
| 3963.4 | | 2151.7[@] *10* | 100 | 1811.674 | 6⁺ | | | |
| 3970.25 | | 1172.57[@] *14* | 100 | 2797.67 | 9⁻ | | | |
| 3990.3 | (3⁻),4⁻ | 650.0[@] *10* | 100 | 3340.26 | (5⁻,6⁻) | | | |
| 4005.7 | | 1208.0[@] *10* | | 2797.67 | 9⁻ | | | |
| | | 1268.5[@] *10* | | 2737.16 | 8⁺ | | | |
| 4032.4 | | 833.55[@] *15* | 100 | 3198.84 | | | | |



From ENSDF

## Adopted Levels, Gammas (continued)

### γ($^{146}$Sm) (continued)

| $E_i$(level) | $J_i^\pi$ | $E_\gamma$ † | $I_\gamma$ b | $E_f$ | $J_f^\pi$ | Mult. c | α e | Comments |
|---|---|---|---|---|---|---|---|---|
| 4033.5 | (11$^+$) | 259.0& *5* | | 3774.66 | 10$^+$ | | | |
| | | 466.0& *5* | | 3567.47 | 9$^+$ | | | |
| 4080.14 | | 725.5@ *2* | 100 | 3354.64 | 9$^-$ | | | |
| 4091.25 | 11$^-$ | 167.0& *5* | | 3924.49 | (9$^-$) | | | |
| | | 308.0 *5* | | 3783.47 | 11$^-$ | | | |
| | | 736.8 *3* | 100 *10* | 3354.64 | 9$^-$ | E2 | 0.00489 | B(E2)(W.u.)=6.8 *+20–23* |
| | | 1293.57@ *3* | 71 *7* | 2797.67 | 9$^-$ | E2 | 1.49×10$^{-3}$ | B(E2)(W.u.)=0.29 *+9–10* |
| 4125.99 | | 771.35@ *10* | 100 | 3354.64 | 9$^-$ | | | |
| 4127.8 | | 1390.6@ *10* | 100 | 2737.16 | 8$^+$ | | | |
| 4135.7 | | 1398.5@ *10* | 100 | 2737.16 | 8$^+$ | | | |
| 4143.89 | (10$^-$,11$^-$) | 1346.17 *19* | 100 | 2797.67 | 9$^-$ | | | |
| 4145.3 | (10$^+$) | 1408.1 *5* | 100 | 2737.16 | 8$^+$ | | | |
| 4164.5 | | 1121.4@ *10* | 100 | 3043.13 | 8$^+$ | | | |
| 4194.90 | 12$^+$ | 411.40 *15* | 100& *17* | 3783.47 | 11$^-$ | (E1) | 0.00678 | B(E1)(W.u.)=0.00033 *10* |
| | | 1397.0& *5* | 0.68& *12* | 2797.67 | 9$^-$ | E3 | 0.00247 | B(E3)(W.u.)=60 *17* |
| 4202.21 | (11$^+$) | 427.53@ *5* | 100 | 3774.66 | 10$^+$ | (M1+E2) | 0.026 *7* | |
| 4239.3 | | 948.6@ *2* | 100 | 3290.7 | 8$^+$ | | | |
| 4282.32 | | 1545.15@ *15* | 100 | 2737.16 | 8$^+$ | | | |
| 4341.15 | (11$^-$) | 250.00 *18* | 80 *8* | 4091.25 | 11$^-$ | D | | |
| | | 558.1@ *2* | 100 *70* | 3783.47 | 11$^-$ | | | |
| | | 566.0& *5* | | 3774.66 | 10$^+$ | | | |
| | | 1543.0& *5* | | 2797.67 | 9$^-$ | | | |
| 4461.34 | (12$^-$) | 120.43 *18* | 18 *2* | 4341.15 | (11$^-$) | (M1+E2) | 1.10 *11* | |
| | | 259.13@ *3* | 9 *5* | 4202.21 | (11$^+$) | E1 | 0.0214 | B(E1)(W.u.)>0.00013 |
| | | 317.0& *5* | | 4143.89 | (10$^-$,11$^-$) | | | |
| | | 370.08 *7* | 100 *8* | 4091.25 | 11$^-$ | M1 | 0.0466 | B(M1)(W.u.)>0.045 |
| | | 428.0& *5* | | 4033.5 | (11$^+$) | | | |
| | | 678.0@ *3* | 15 *5* | 3783.47 | 11$^-$ | | | |
| 4579.75 | (12$^-$) | 238.62 *10* | 100 | 4341.15 | (11$^-$) | D | | |
| | | 436.0& *5* | | 4143.89 | (10$^-$,11$^-$) | | | |
| 4628.77 | 13$^-$ | 167.43 *3* | 100 *17* | 4461.34 | (12$^-$) | (M1+E2) | 0.388 *9* | |
| | | 433.0& *5* | | 4194.90 | 12$^+$ | (E1) | 0.00601 | |
| | | 537.5 *1* | 58 *6* | 4091.25 | 11$^-$ | E2 | 0.01060 | B(E2)(W.u.)=15 *7* |
| 4752.24 | (13$^-$) | 172.52 *10* | 36 *5* | 4579.75 | (12$^-$) | (M1+E2) | 0.353 *11* | |
| | | 290.89 *10* | 100 *10* | 4461.34 | (12$^-$) | D | | |
| | | 969.0& *5* | | 3783.47 | 11$^-$ | | | |
| 4969.51 | (14$^-$) | 217.29 *10* | 17 *2* | 4752.24 | (13$^-$) | D | | |



From ENSDF

$^{146}_{62}Sm_{84}$-21

## Adopted Levels, Gammas (continued)

### γ($^{146}$Sm) (continued)

| $E_i$(level) | $J_i^\pi$ | $E_\gamma$ † | $I_\gamma$ [b] | $E_f$ | $J_f^\pi$ | Mult. [c] | α [e] |
|---|---|---|---|---|---|---|---|
| 4969.51 | (14⁻) | 340.7 *1* | 100 *10* | 4628.77 | 13⁻ | D | |
| 5129.47 | 13⁻ | 1346.0@ *1* | 100 | 3783.47 | 11⁻ | E2 | $1.39\times10^{-3}$ |
| 5144.2 | | 392.0& *5* | 100 | 4752.24 | (13⁻) | | |
| 5206.29 | 14⁺ | 1011.39 *1* | 100 | 4194.90 | 12⁺ | E2 | 0.00243 |
| 5218.03 | (15⁻) | 248.5 *1* | 100 *10* | 4969.51 | (14⁻) | M1 | 0.1338 |
| | | 589.26 *18* | 44 *8* | 4628.77 | 13⁻ | | |
| 5517.42 | (16⁻) | 299.39 *10* | 100 *10* | 5218.03 | (15⁻) | (M1+E2) | 0.069 *13* |
| | | 547.91 *18* | 35 *5* | 4969.51 | (14⁻) | E2 | 0.01009 |
| 5613.93 | (15⁻) | 644.42 *12* | 100 | 4969.51 | (14⁻) | (M1+E2) | 0.0091 *24* |
| 5697.18 | (16⁺) | 479.07 *26* | 100 *30* | 5218.03 | (15⁻) | | |
| | | 490.9 *1* | 76 *8* | 5206.29 | 14⁺ | E2 | 0.01347 |
| 5800.2 | | 656.0& *5* | 100& | 5144.2 | | | |
| 5873.0 | | 259.1 *12* | 100 | 5613.93 | (15⁻) | | |
| 5972.3 | | 454.9@ *3* | 100 | 5517.42 | (16⁻) | | |
| 6176.9 | (18⁺) | 479.71 *26* | 100 | 5697.18 | (16⁺) | | |

† Weighted average, except as noted.
‡ Not taken in to account in a least-squares fitting.
# From $^{146}$Eu ε+β⁺ decay.
@ From $^{144}$Nd(α,xnγ).
& From $^{139}$La($^{11}$B,4nγ).
[a] Unweighted average.
[b] From $^{146}$Eu ε+β⁺ decay to the energy levels <3809 keV and from (α,xn) reaction above this energy, unless otherwise stated.
[c] From α(exp), γ(θ) at oriented nuclei, γγ(θ) and RUL.
[d] From γ(θ) in $^{146}$Eu ε+β⁺ decay and γ(θ) in Nd(α,xnγ).
[e] Additional information 1.
[f] If No value given it was assumed δ=1.00 for E2/M1 and δ=0.10 for the other multipolarities.
[g] Multiply placed with undivided intensity.
[h] Multiply placed with intensity suitably divided.
[i] Placement of transition in the level scheme is uncertain.



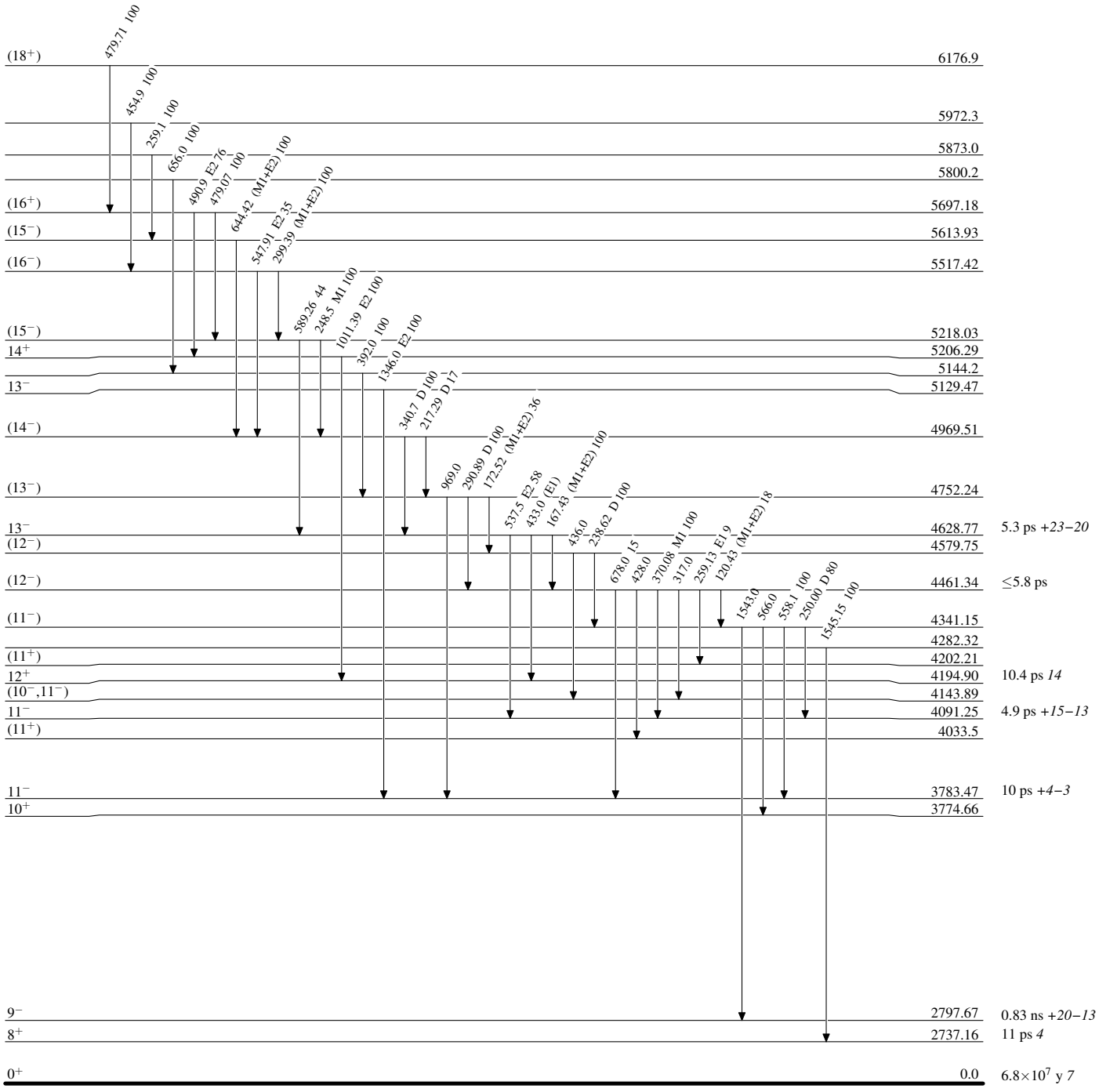
From ENSDF

$^{146}_{62}Sm_{84}$-22

## Adopted Levels, Gammas

### Level Scheme

Intensities: Relative photon branching from each level

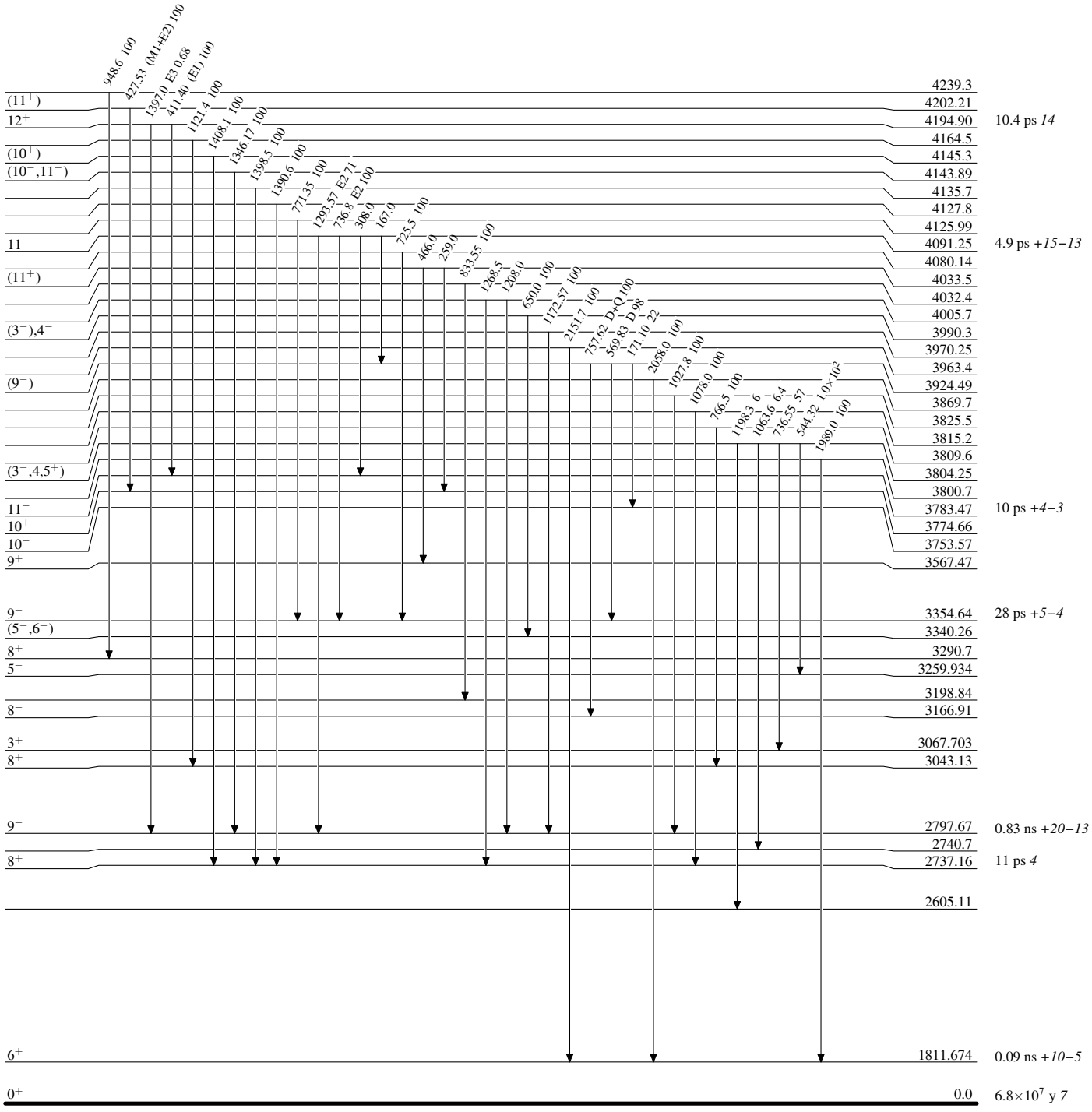



$^{146}_{62}Sm_{84}$

**Adopted Levels, Gammas**

Level Scheme (continued)

Intensities: Relative photon branching from each level

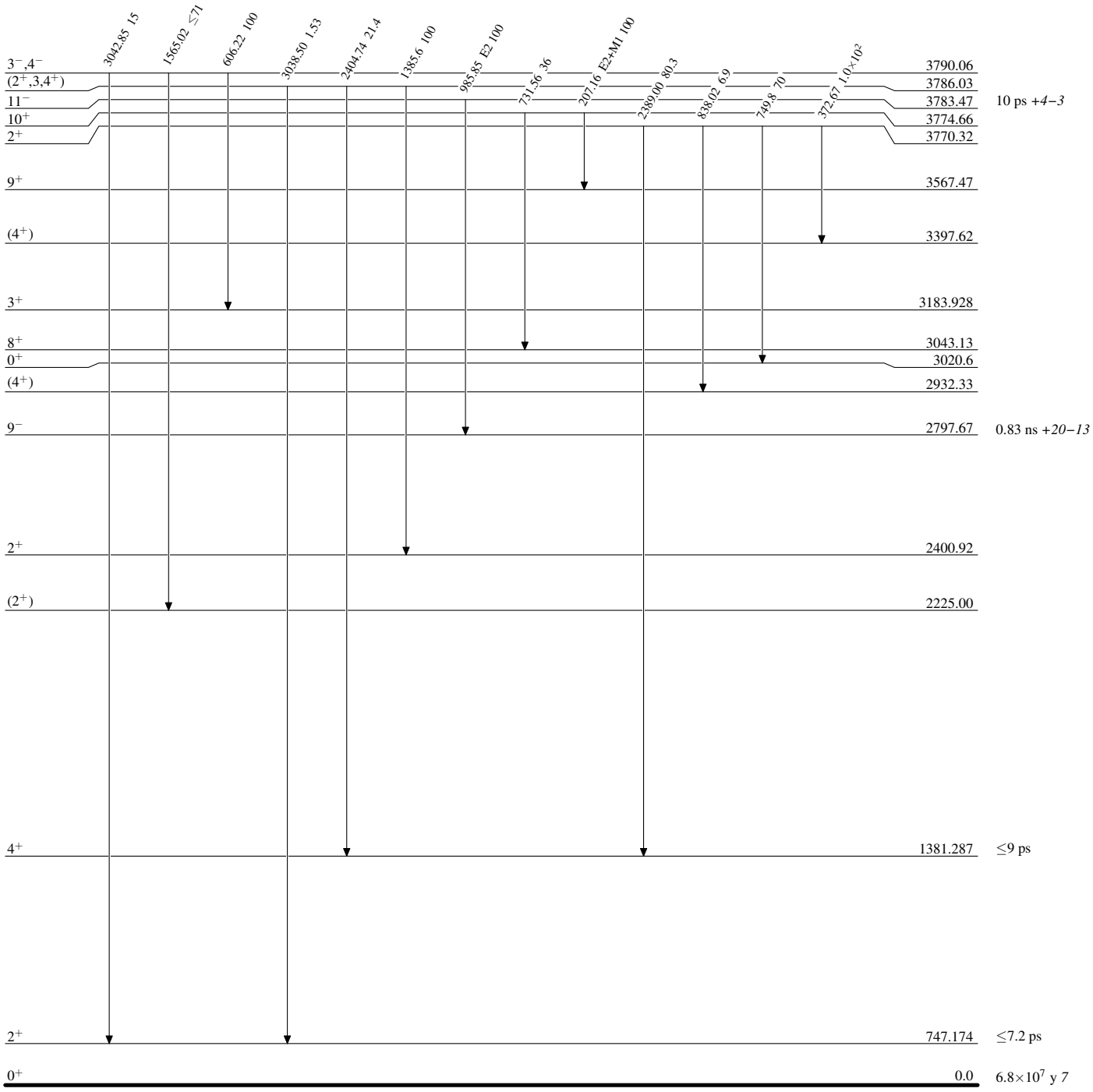



$^{146}_{62}Sm_{84}$

**Adopted Levels, Gammas**

Level Scheme (continued)

Intensities: Relative photon branching from each level

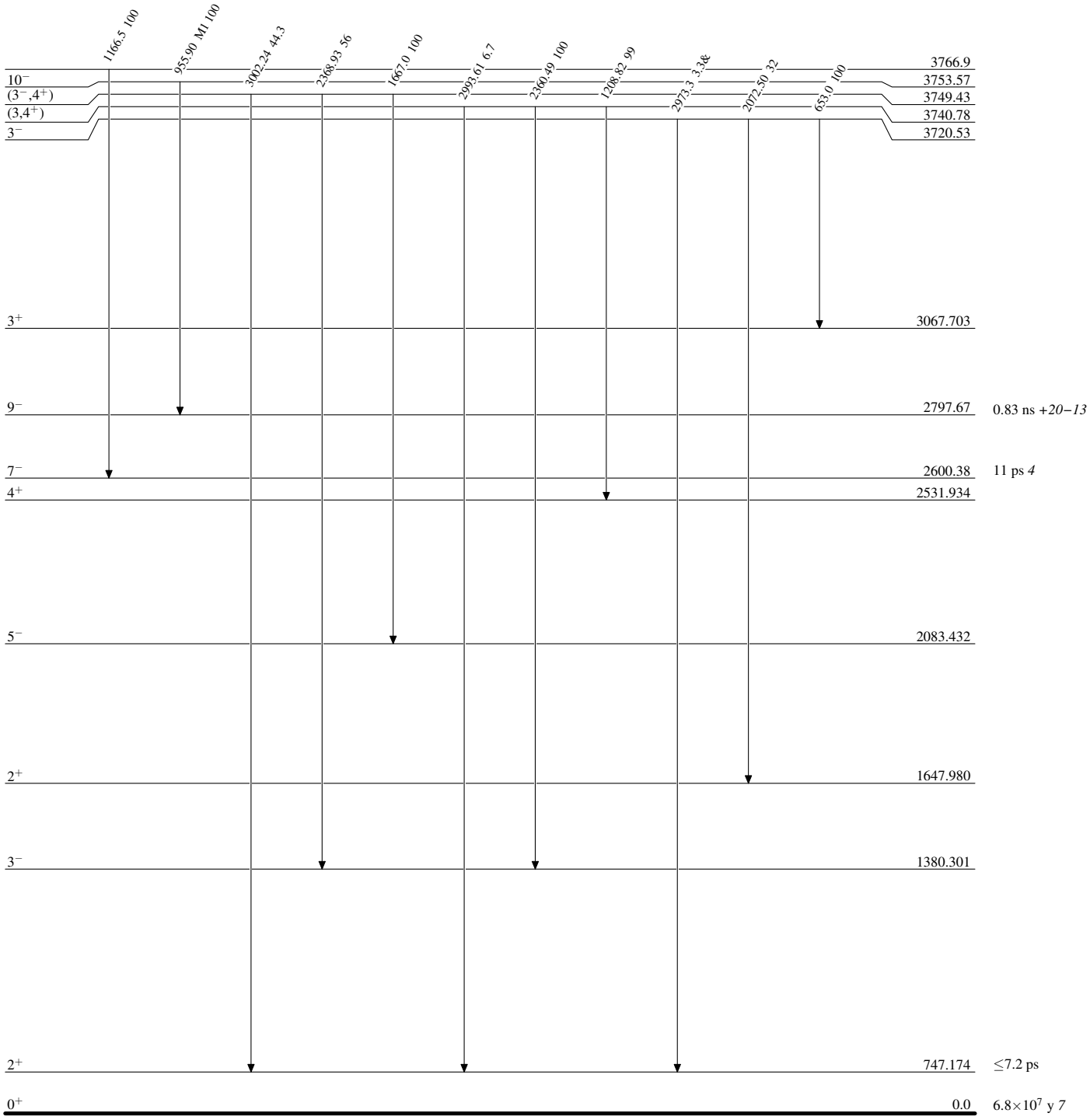



$^{146}_{62}Sm_{84}$

## Adopted Levels, Gammas

### Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given

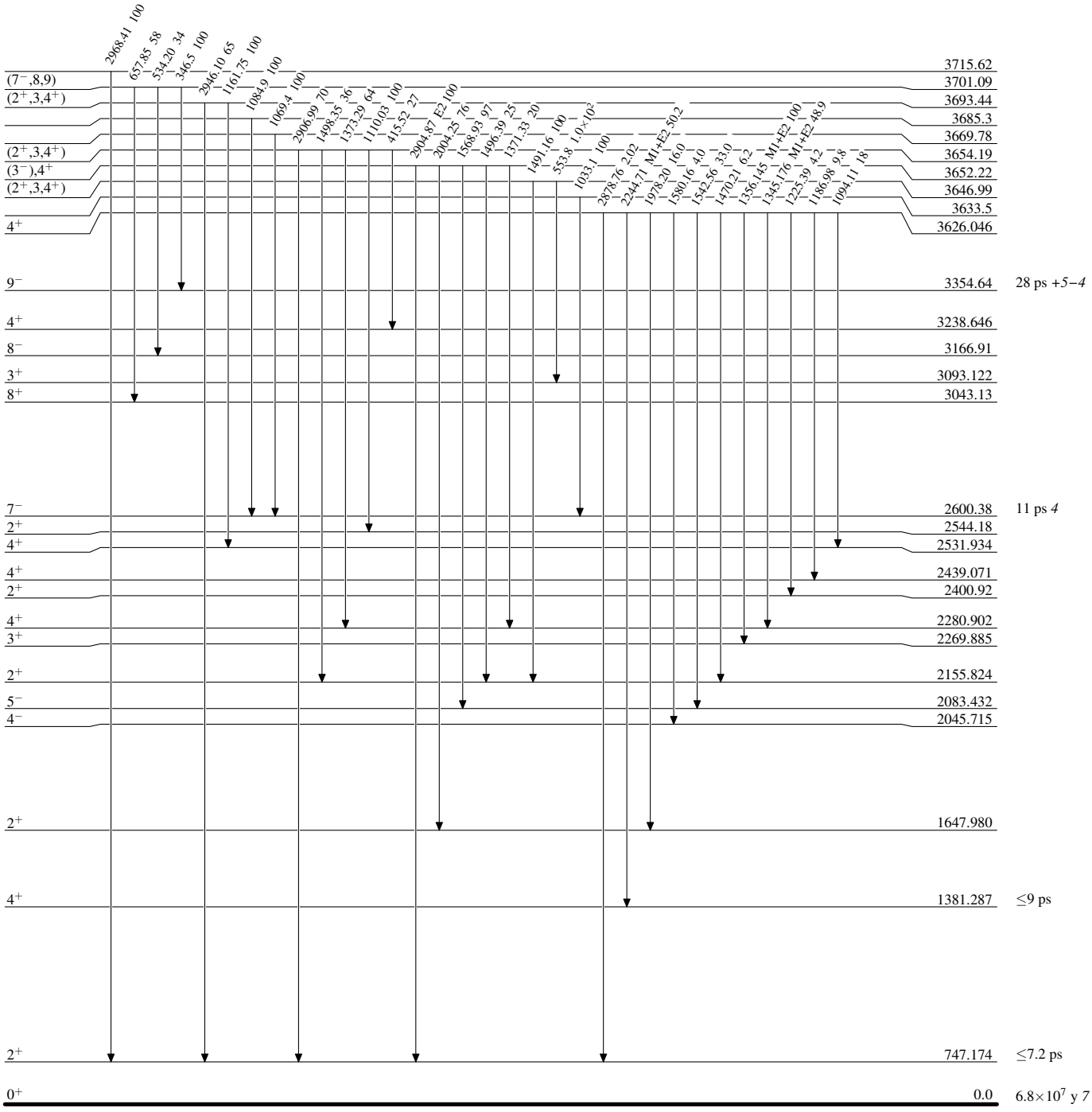



$^{146}_{62}Sm_{84}$

## Adopted Levels, Gammas

### Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given

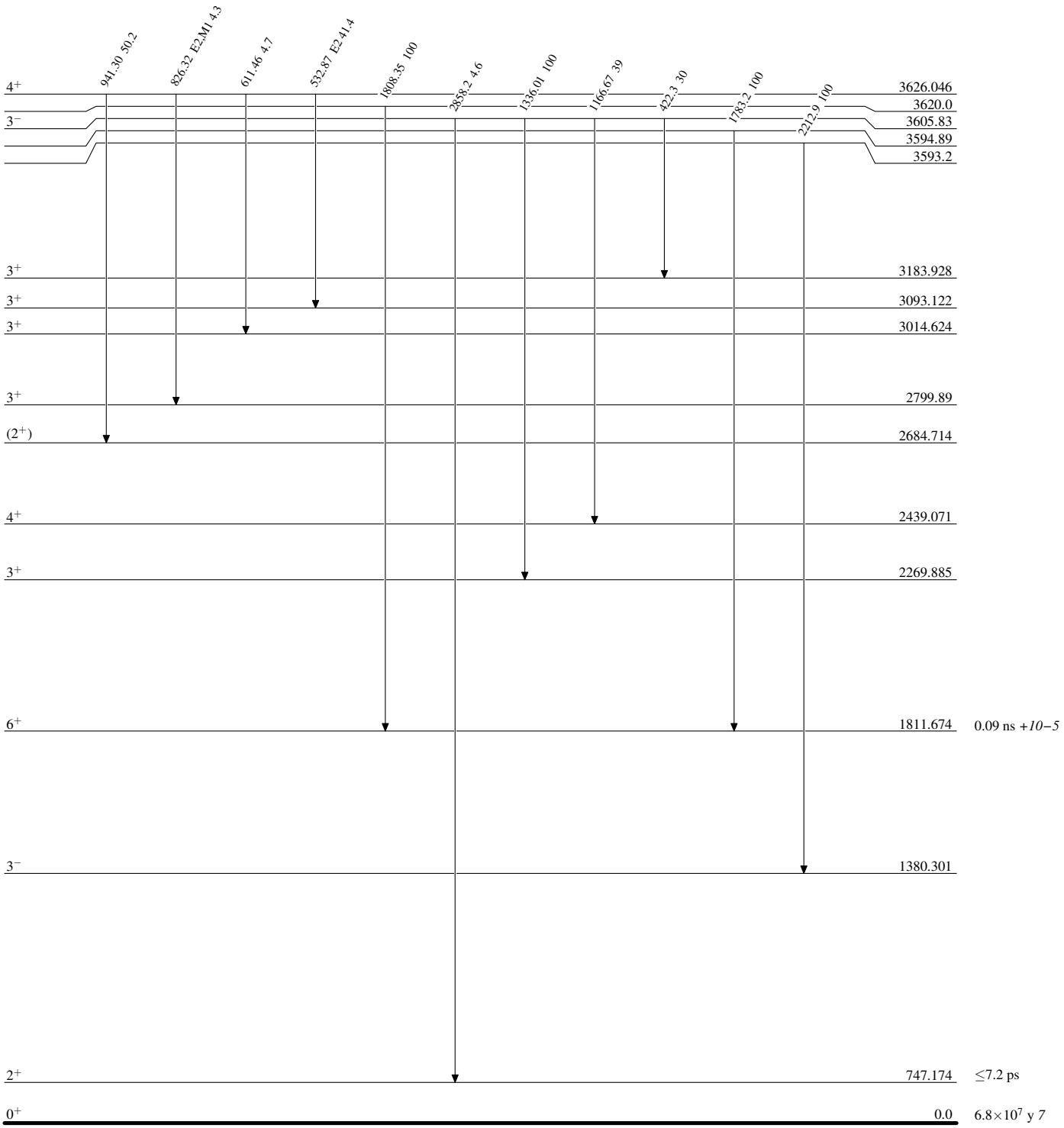



$^{146}_{62}Sm_{84}$

## Adopted Levels, Gammas

### Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given



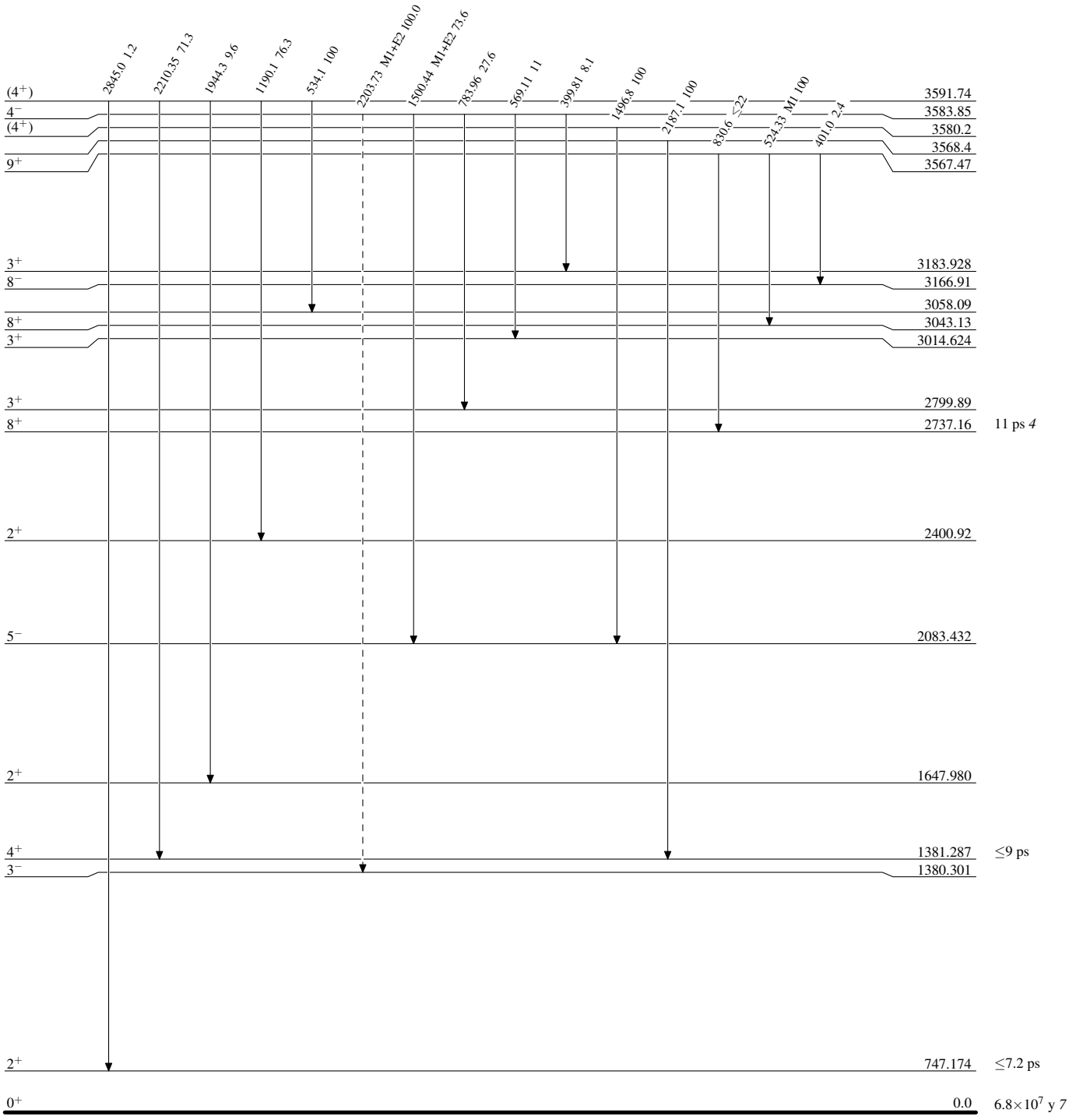
## Adopted Levels, Gammas

Legend

### Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given

- - - - - - ► $\gamma$ Decay (Uncertain)

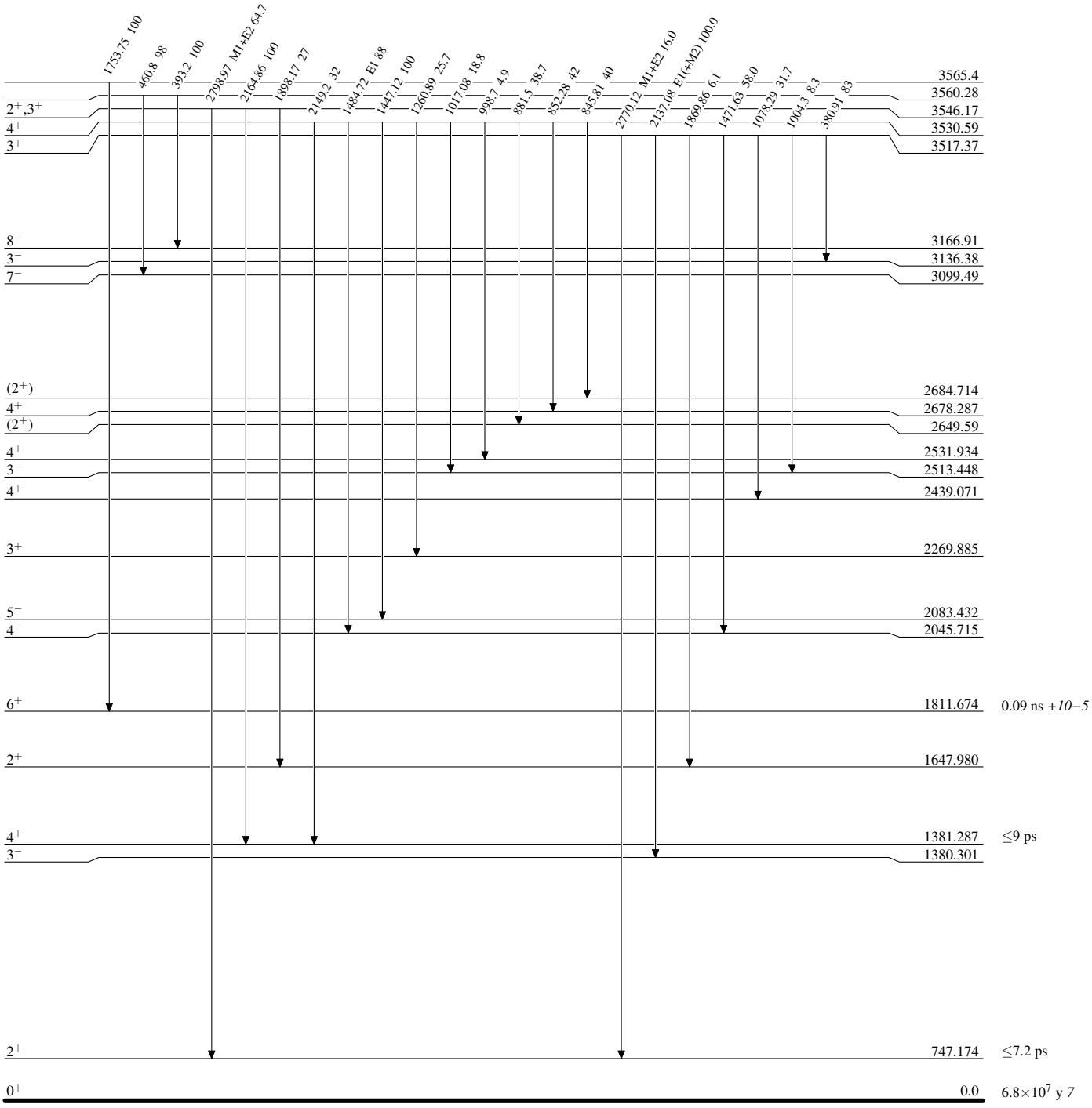



$^{146}_{62}Sm_{84}$

## Adopted Levels, Gammas

### Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given

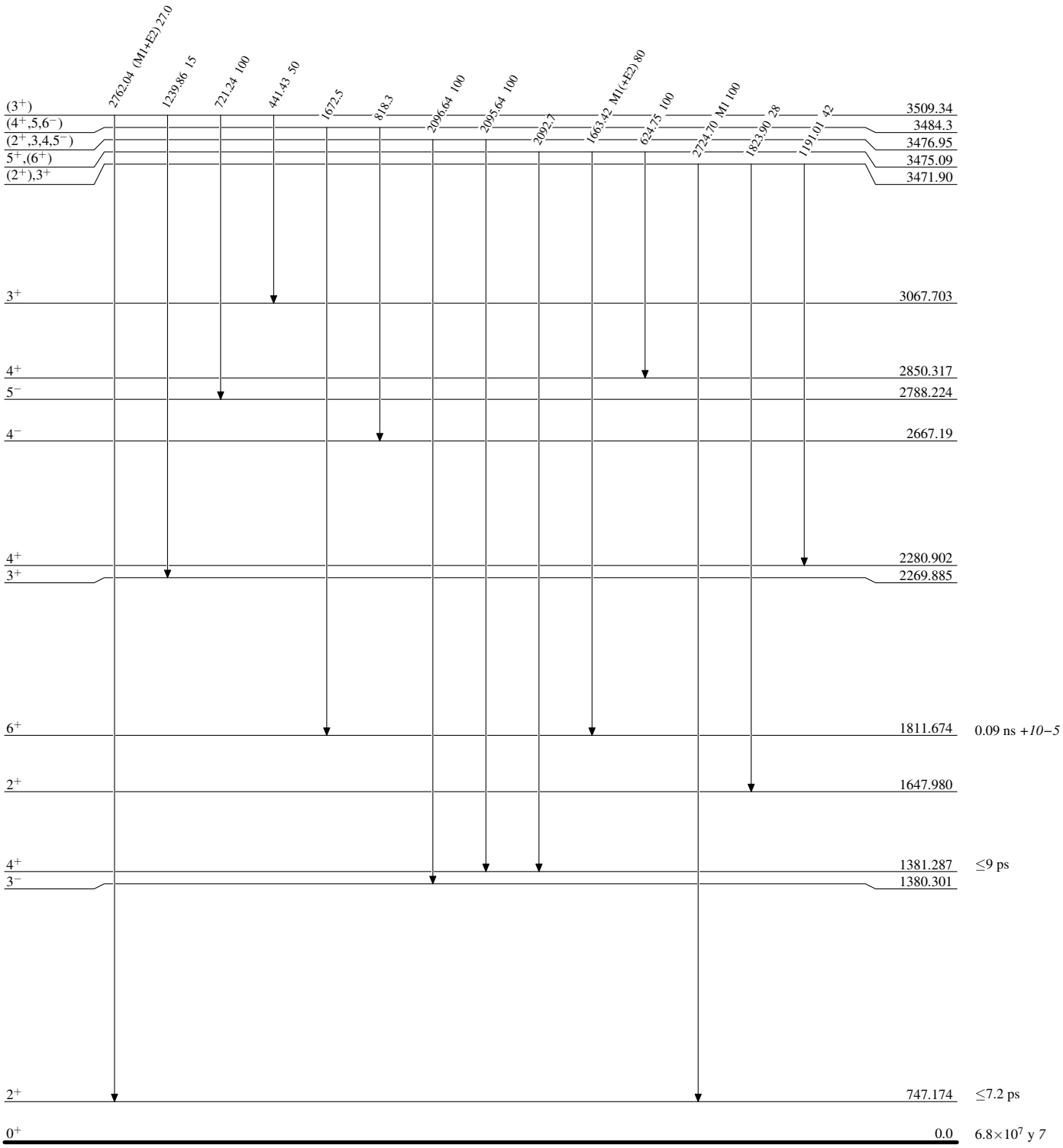



$^{146}_{62}Sm_{84}$

## Adopted Levels, Gammas

### Level Scheme (continued)

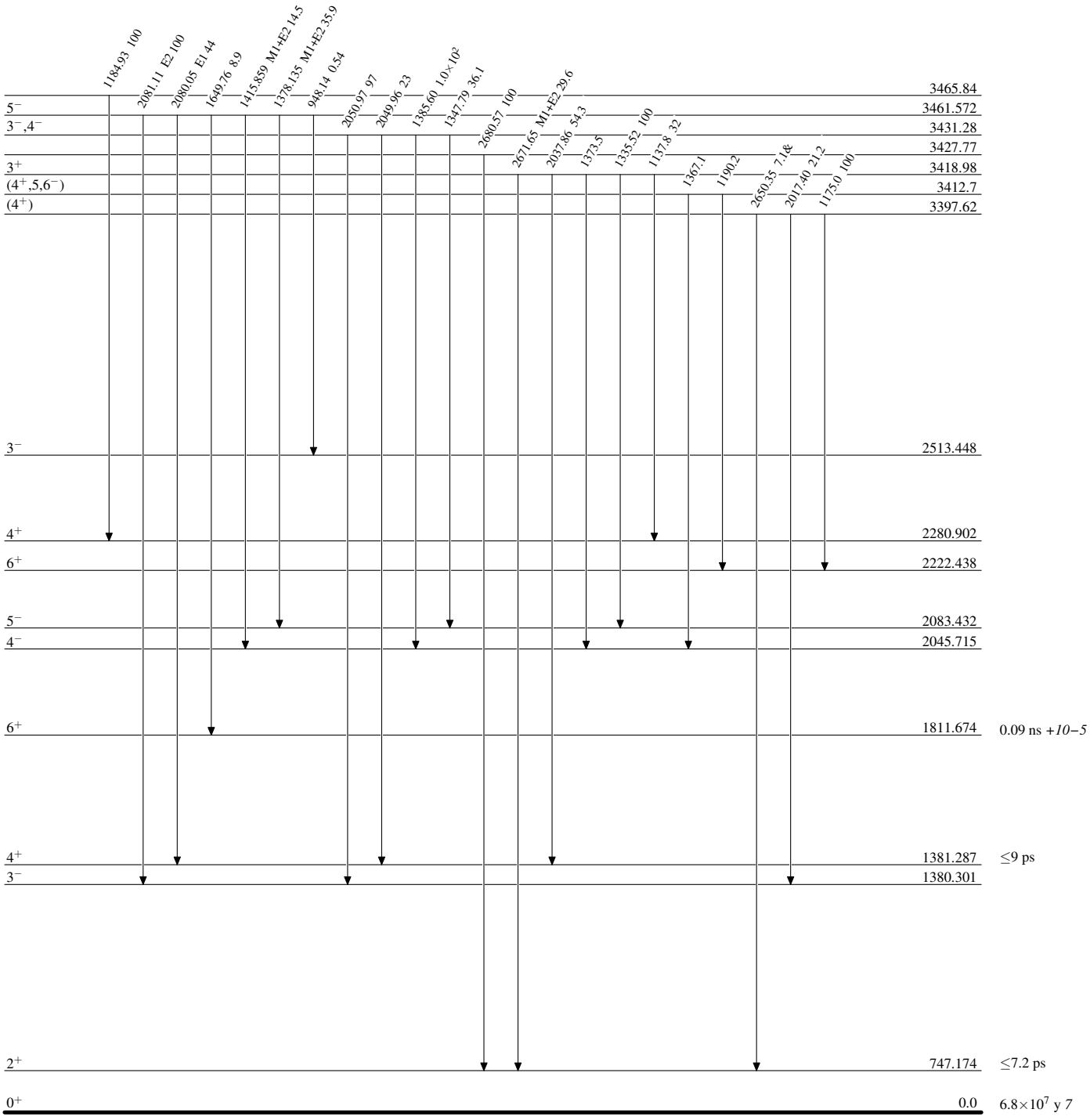
Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given



## Adopted Levels, Gammas

### Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given



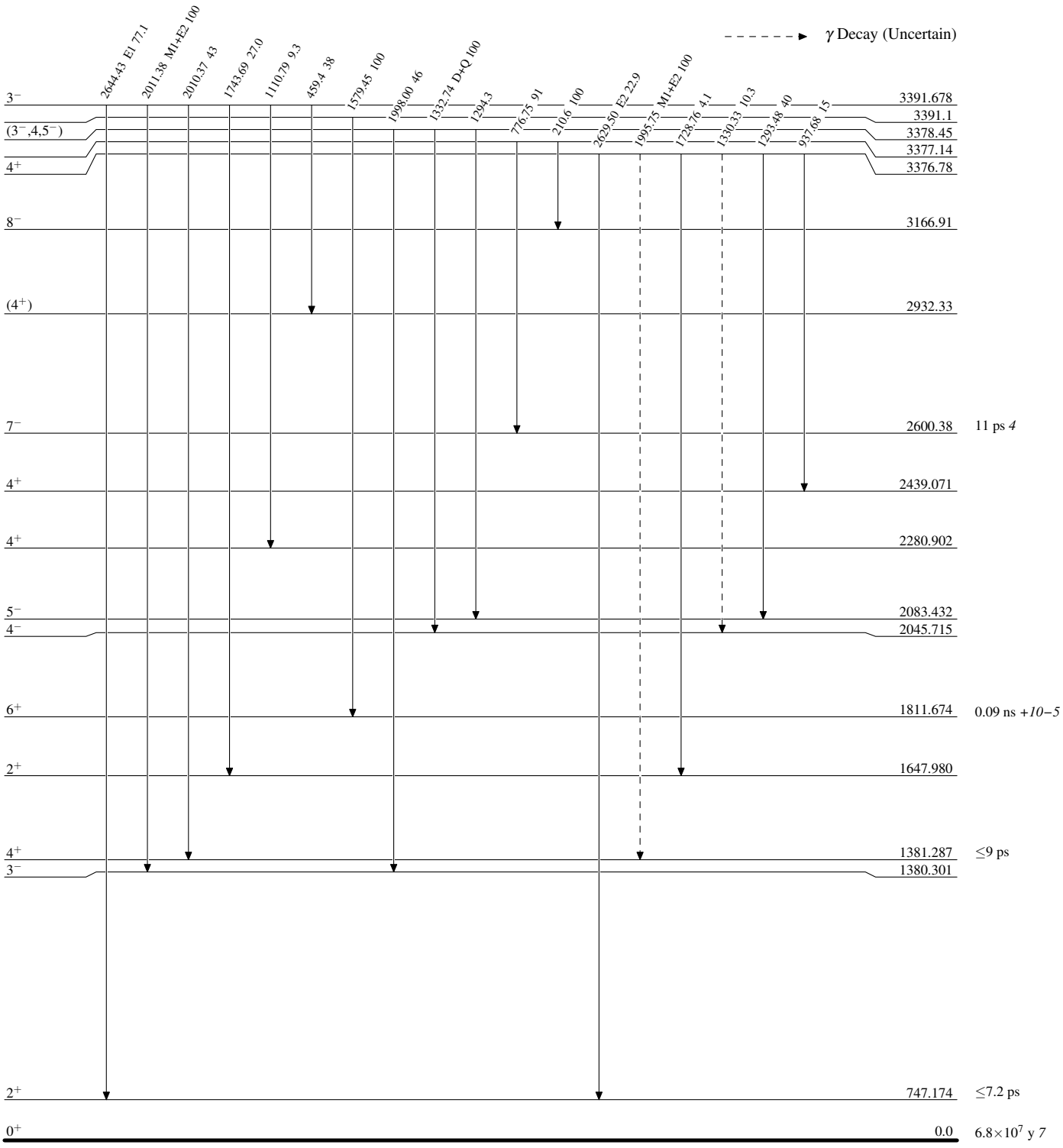

$^{146}_{62}Sm_{84}$

## Adopted Levels, Gammas

### Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given

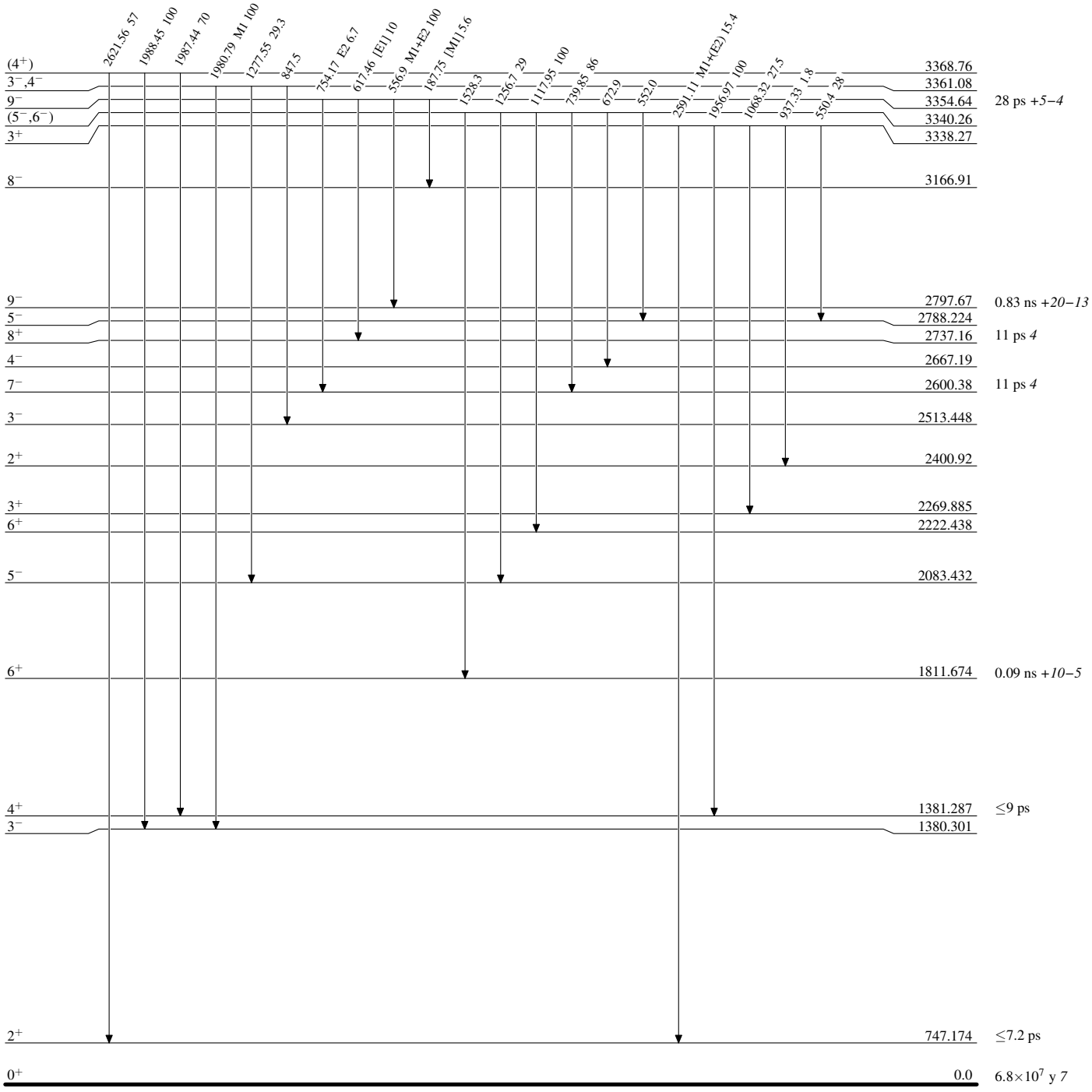
Legend



**Adopted Levels, Gammas**

Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given

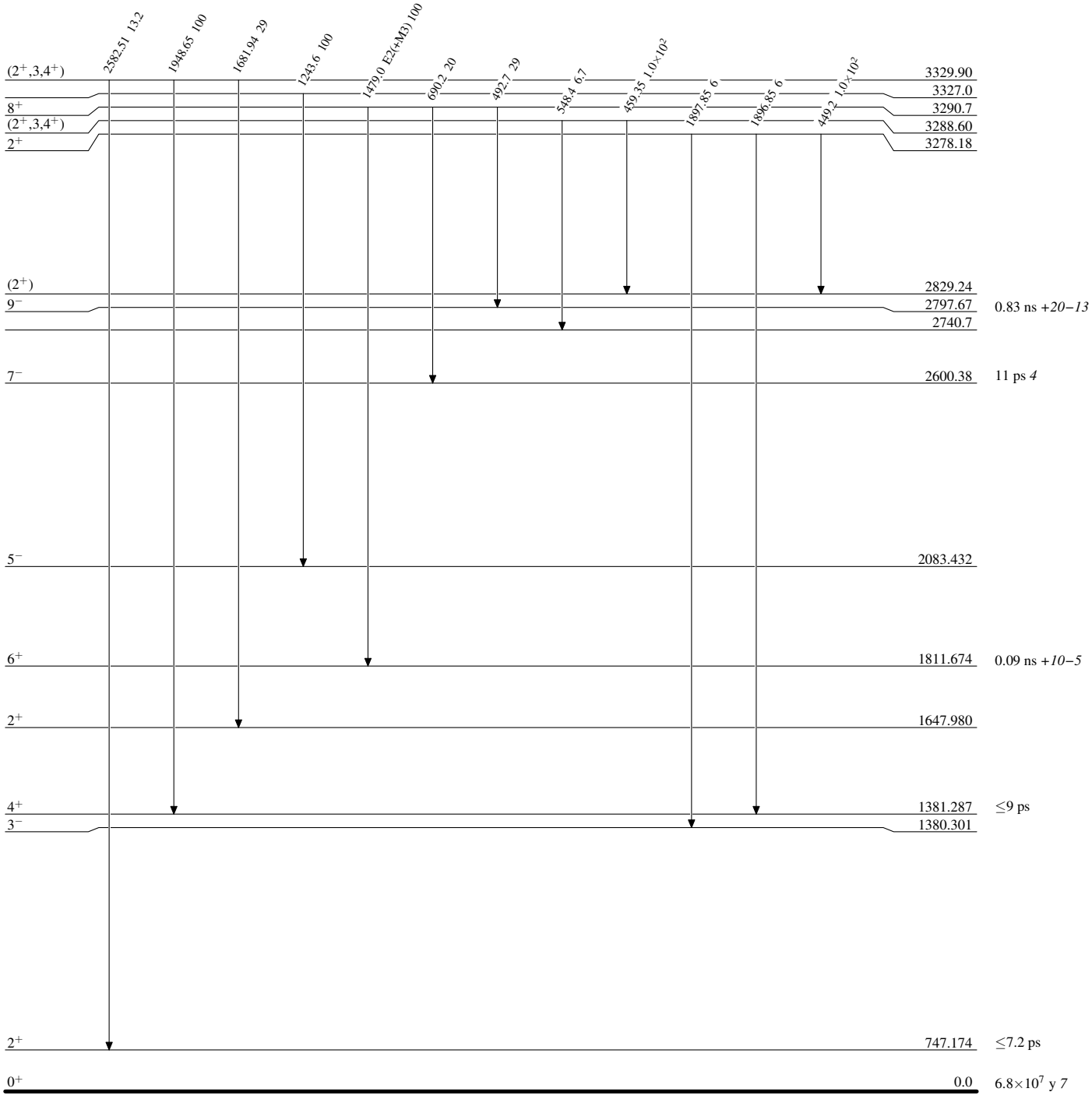



$^{146}_{62}Sm_{84}$

## Adopted Levels, Gammas

### Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given

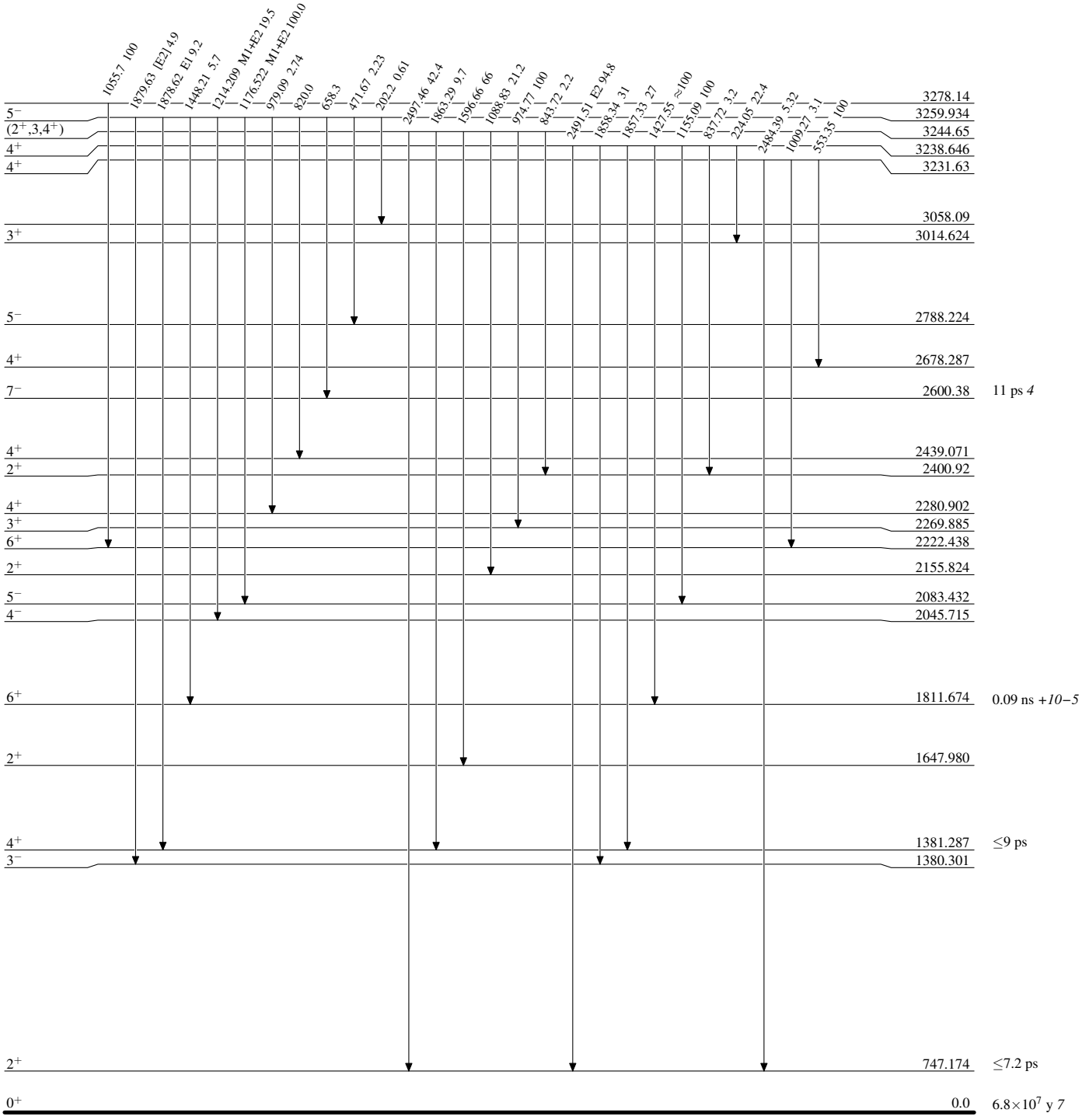



$^{146}_{62}Sm_{84}$

## Adopted Levels, Gammas

### Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given



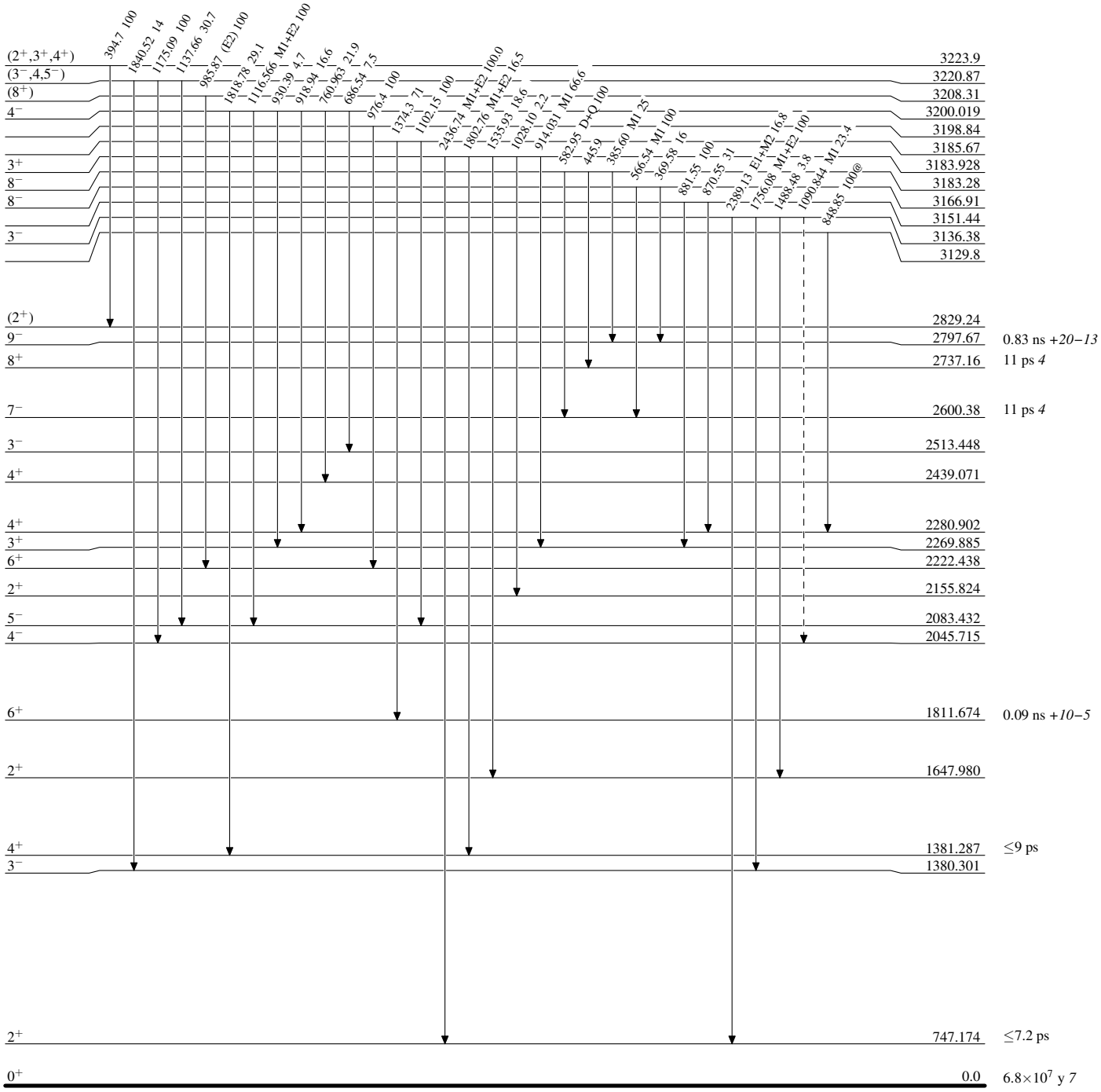

$^{146}_{62}Sm_{84}$

## Adopted Levels, Gammas

### Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given
@ Multiply placed: intensity suitably divided

Legend
- - - - - - ► γ Decay (Uncertain)




$^{146}_{62}Sm_{84}$

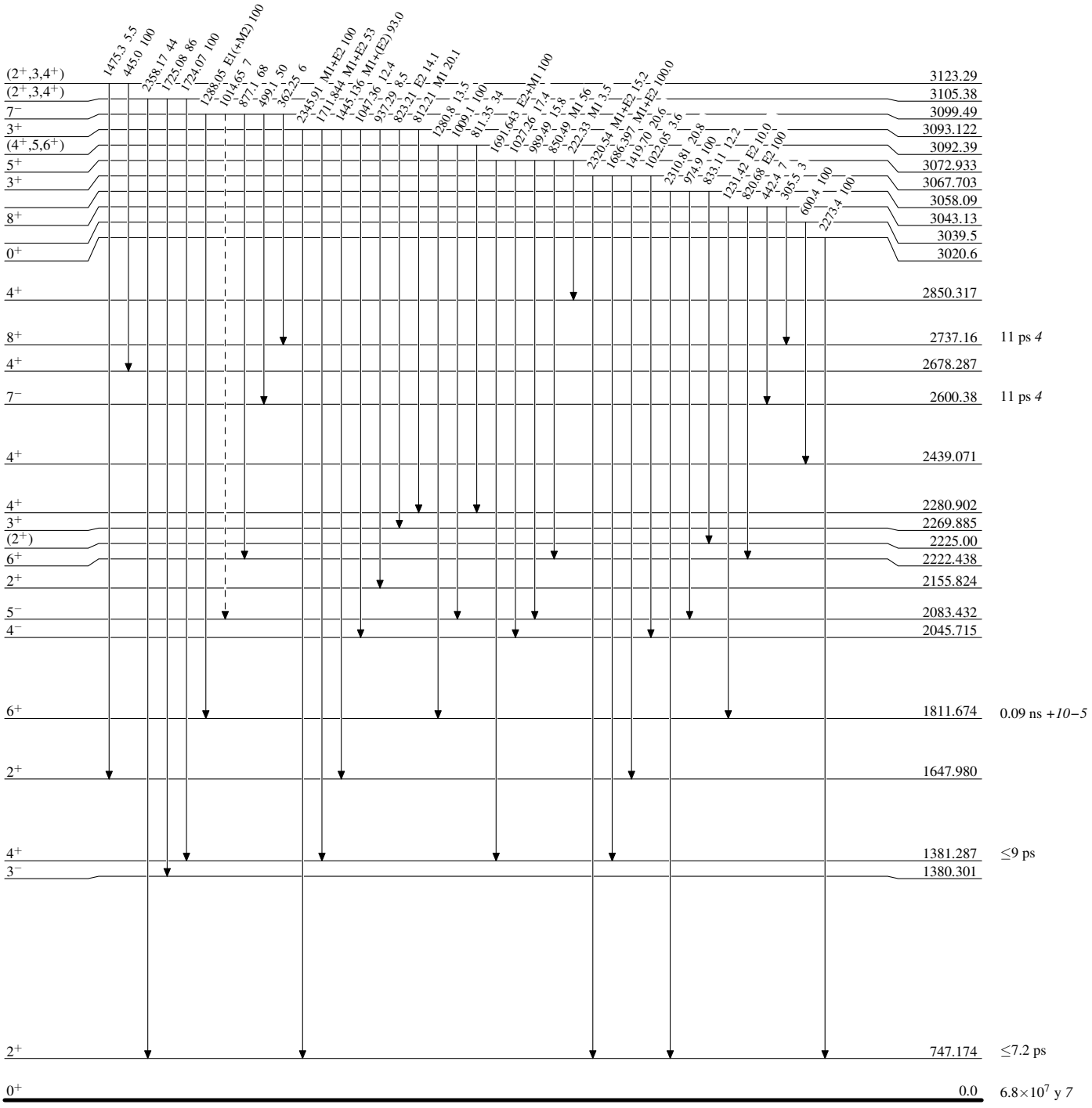
## Adopted Levels, Gammas

### Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given
@ Multiply placed: intensity suitably divided

Legend

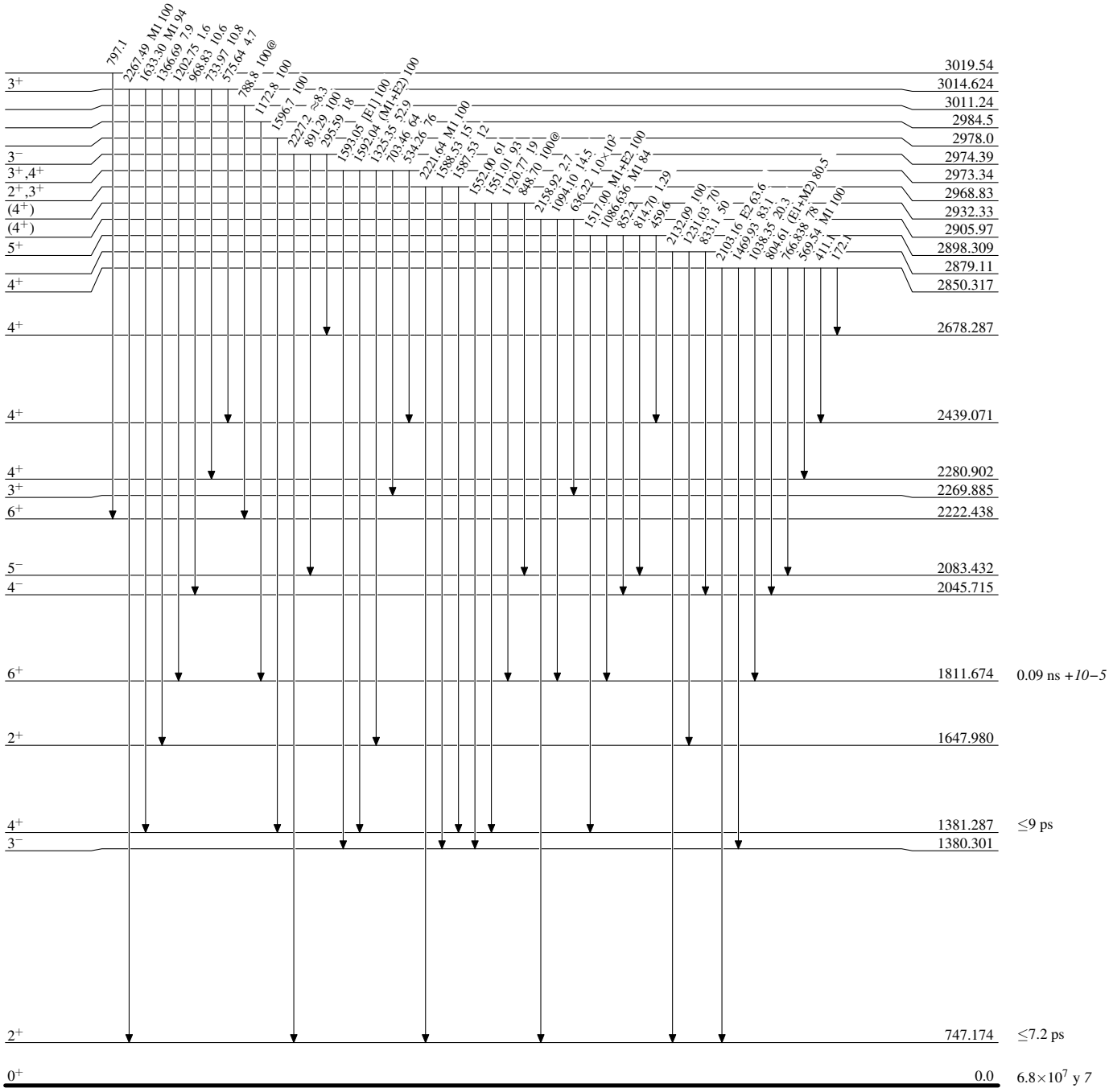
– – – – – – ► γ Decay (Uncertain)



## Adopted Levels, Gammas

### Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given
@ Multiply placed: intensity suitably divided




$^{146}_{62}Sm_{84}$

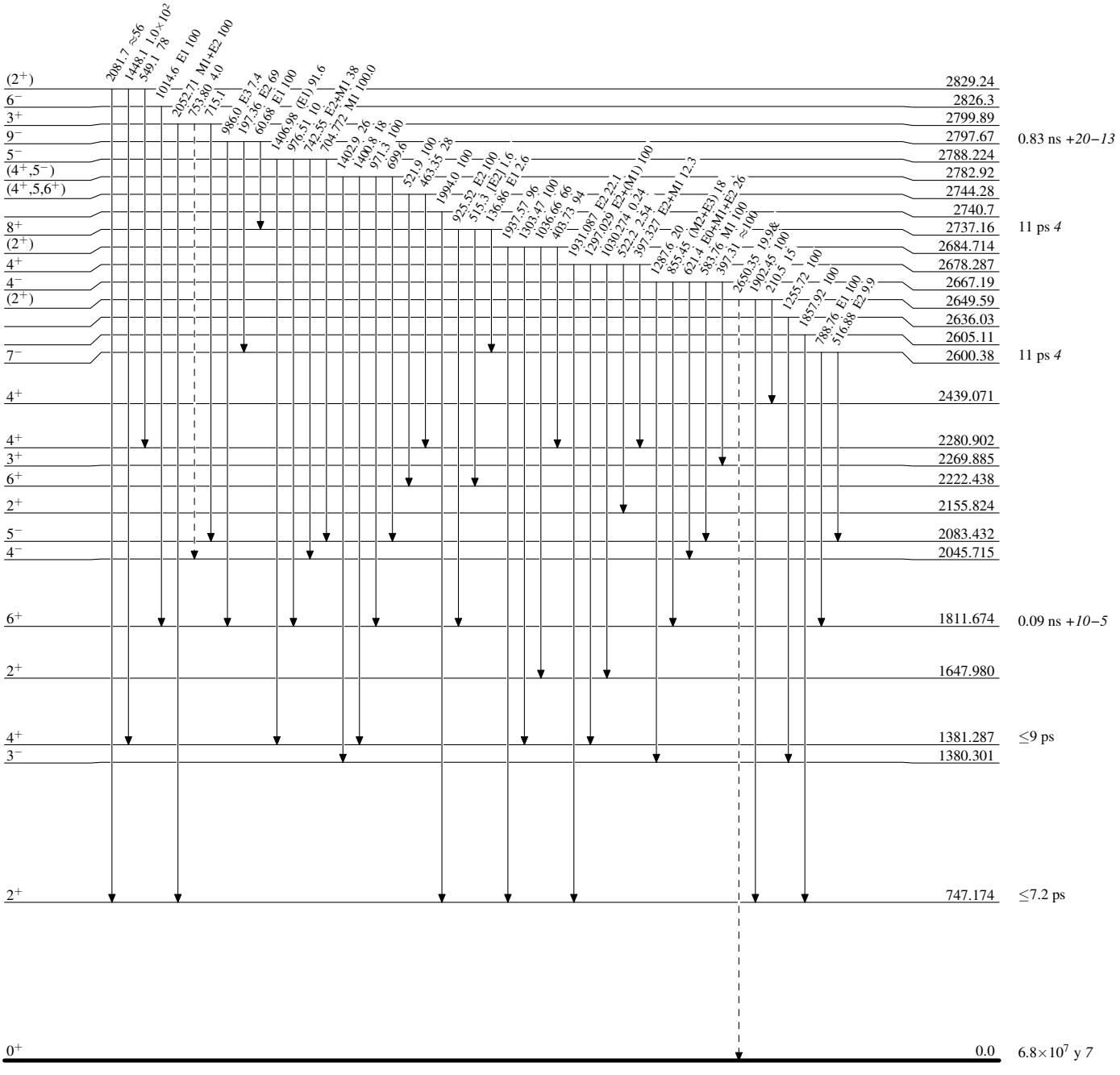
## Adopted Levels, Gammas

### Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given
@ Multiply placed: intensity suitably divided

Legend

- - - - - - ► γ Decay (Uncertain)




$^{146}_{62}Sm_{84}$

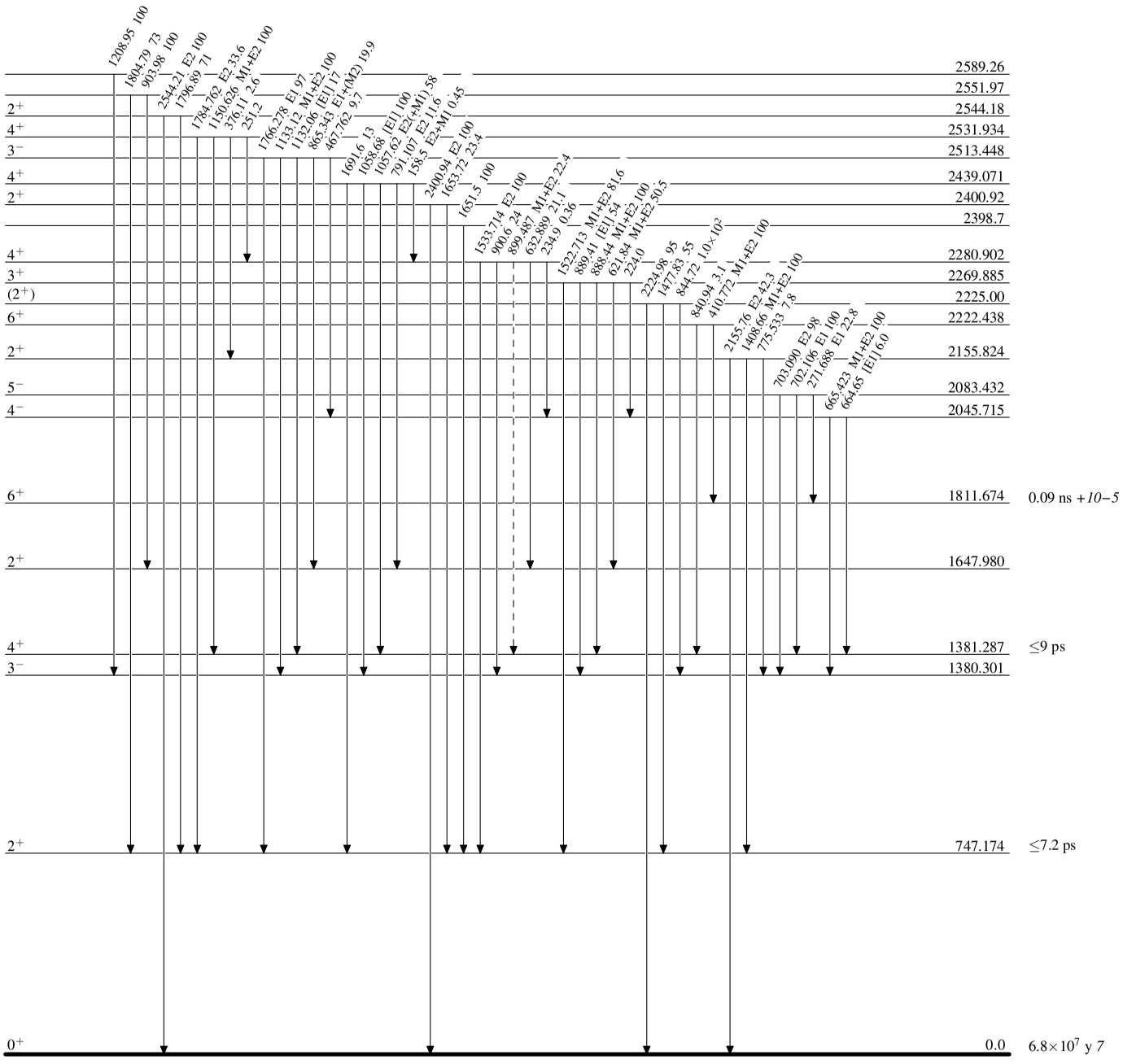
## Adopted Levels, Gammas

### Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given
@ Multiply placed: intensity suitably divided

Legend

- - - - - - ► γ Decay (Uncertain)

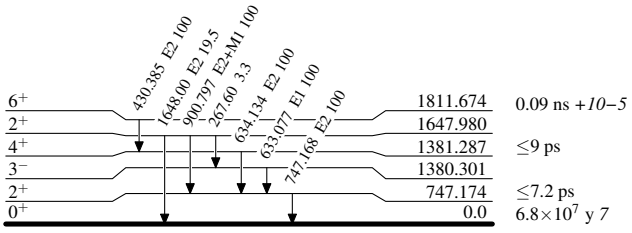


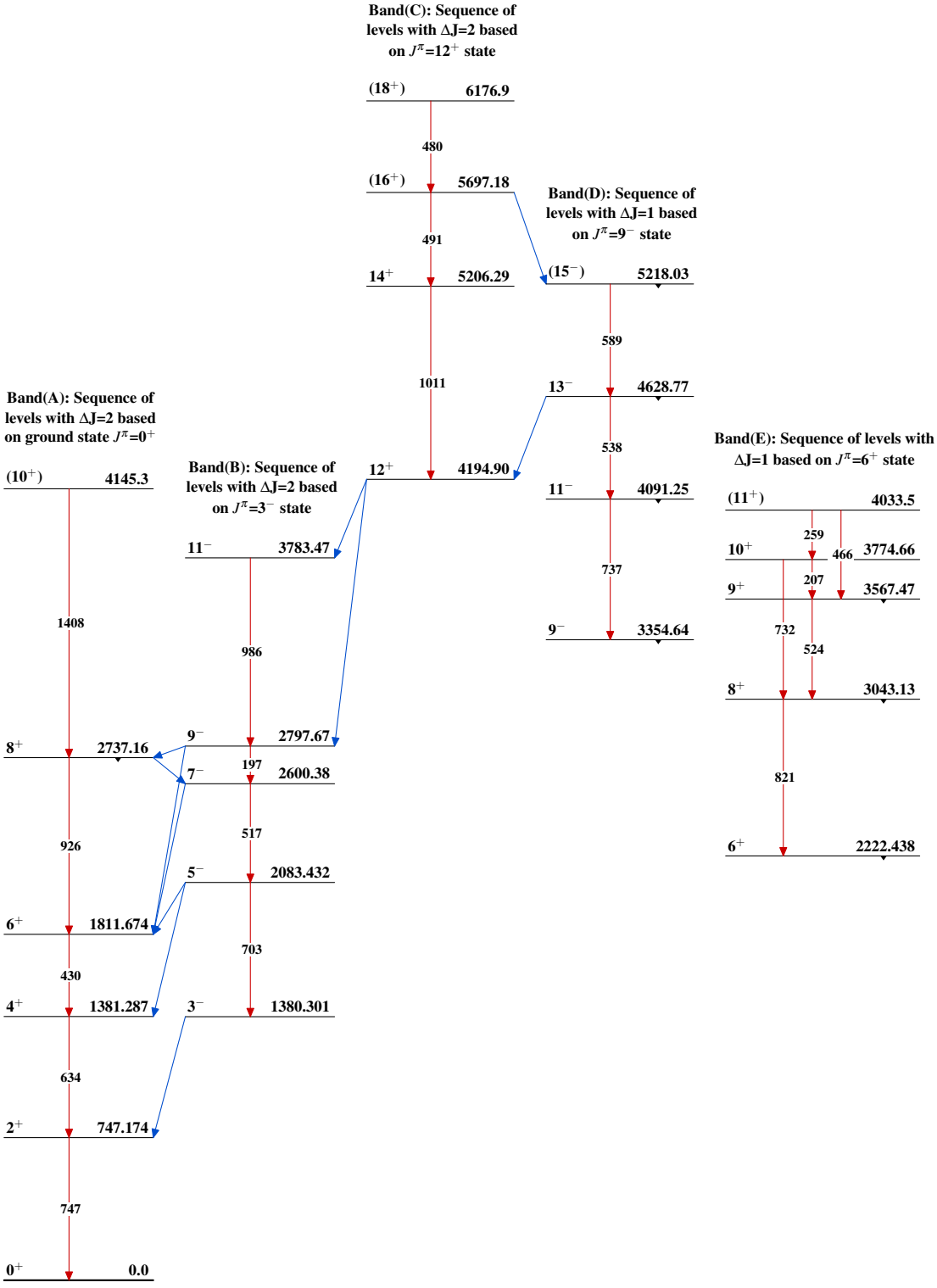

$^{146}_{62}Sm_{84}$

## Adopted Levels, Gammas

### Level Scheme (continued)

Intensities: Relative photon branching from each level
& Multiply placed: undivided intensity given
@ Multiply placed: intensity suitably divided




$^{146}_{62}Sm_{84}$

## Adopted Levels, Gammas