

<sup>96</sup>Ru(p,p'γ) 1986Ad04

| Type            | Author                        | History | Citation             | Literature Cutoff Date |
|-----------------|-------------------------------|---------|----------------------|------------------------|
| Full Evaluation | D. Abriola(a), A. A. Sonzogni |         | NDS 109, 2501 (2008) | 1-Apr-2008             |

E(p)=7.0 MeV (1986Ad04,1979La15); 8.0 MeV (1979La15).  
 Measured: γ, γγ, γ(θ), γ(t) (DSA) (1986Ad04,1979La15).

<sup>96</sup>Ru Levels

| E(level)                | J <sup>π</sup> †               | T <sub>1/2</sub> ‡ | Comments                                    |
|-------------------------|--------------------------------|--------------------|---|
| 0 <sup>#</sup>          | 0 <sup>+</sup>                 |                    |   |
| 832.58 <sup>#</sup> 5   | 2 <sup>+</sup>                 |                    |   |
| 1518.09 <sup>#</sup> 7  | 4 <sup>+</sup>                 |                    |   |
| 1931.12 7               | 2 <sup>+</sup>                 | 0.38 ps +15-11     |   |
| 2148.82 9               | 0 <sup>+</sup>                 | 0.46 ps +63-18     |   |
| 2149.80 <sup>#</sup> 10 | 6 <sup>+</sup>                 |                    |   |
| 2284.00 21              | 2 <sup>+</sup>                 |                    |   |
| 2462.42 11              | 4,5 <sup>+</sup>               | 0.10 ps +5-3       | J <sup>π</sup> : Adopted 4.                 |
| 2524.83 13              | 3 <sup>+</sup> ,4 <sup>+</sup> |                    |   |
| 2528.49 10              | 1 <sup>+</sup> ,2 <sup>+</sup> |                    |   |
| 2576.02 10              | 2 <sup>+</sup>                 |                    |   |
| 2579.06 15              |                                |                    |   |
| 2588.46 <sup>@</sup> 10 | 5                              | ≥2.8 ps            | J <sup>π</sup> : Adopted 5 <sup>-</sup> .   |
| 2650.01 10              | 2 <sup>+</sup>                 |                    | J <sup>π</sup> : Adopted 3 <sup>(-)</sup> . |
| 2700.12 22              | 4 <sup>+</sup> ,5              |                    |   |
| 2739.82 22              | 2 <sup>+</sup> ,3 <sup>+</sup> |                    | J <sup>π</sup> : Adopted (2 <sup>+</sup> ). |
| 2760.5 3                | 4 <sup>+</sup> ,5              |                    |   |
| 2851.45 19              | 2 <sup>+</sup> ,3              | 0.14 ps +10-5      |   |
| 2897.70 16              | 3 <sup>+</sup> ,4 <sup>+</sup> |                    | J <sup>π</sup> : Adopted 3 <sup>+</sup> .   |
| 2987.8 3                |                                |                    |   |
| 2996.14 24              |                                |                    |   |
| 3060.53 16              |                                |                    |   |
| 3075.86 17              | 3 <sup>-</sup>                 |                    |   |
| 3090.2 3                |                                |                    |   |
| 3166.8 3                |                                |                    |   |
| 3210.16 22              |                                |                    |   |
| 3232.2 5                |                                |                    |   |
| 3261.7 3                | 2 <sup>+</sup>                 |                    |   |

† From 1986Ad04 based on pγ(θ) and Hauser-Feshbach analysis of σ(E).

‡ From 1986Ad04.

# Band(A): g.s. Cascade.

@ Band(B): 5<sup>-</sup> Cascade.

γ(<sup>96</sup>Ru)

| E <sub>γ</sub> † | I <sub>γ</sub> ‡ | E <sub>i</sub> (level) | J <sub>i</sub> <sup>π</sup>    | E <sub>f</sub> | J <sub>f</sub> <sup>π</sup>    | Comments                    |
|------------------|------------------|------------------------|--------------------------------|----------------|--------------------------------|-----------------------------|
| 237.7 2          | 100              | 2700.12                | 4 <sup>+</sup> ,5              | 2462.42        | 4,5 <sup>+</sup>               |                             |
| 425.2 10         | 9 4              | 3075.86                | 3 <sup>-</sup>                 | 2650.01        | 2 <sup>+</sup>                 |                             |
| 472 <sup>a</sup> |                  | 2996.14                |                                | 2524.83        | 3 <sup>+</sup> ,4 <sup>+</sup> | I <sub>γ</sub> : very weak. |
| 487.0 5          | 18 5             | 3075.86                | 3 <sup>-</sup>                 | 2588.46        | 5                              |                             |
| 593.8 2          | 6 2              | 2524.83                | 3 <sup>+</sup> ,4 <sup>+</sup> | 1931.12        | 2 <sup>+</sup>                 |                             |
| 631.71 7         | 100              | 2149.80                | 6 <sup>+</sup>                 | 1518.09        | 4 <sup>+</sup>                 |                             |

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$^{96}\text{Ru}(p,p'\gamma)$  1986Ad04 (continued) $\gamma(^{96}\text{Ru})$  (continued)

| $E_\gamma$ †          | $I_\gamma$ ‡ | $E_i$ (level) | $J_i^\pi$                      | $E_f$   | $J_f^\pi$      | Mult. @ | $\delta^\#$ | $\alpha\&$ | Comments  |
|-----------------------|--------------|---------------|--------------------------------|---------|----------------|---------|-------------|------------|---|
| 647.9 2               | 37 4         | 2579.06       |                                | 1931.12 | 2 <sup>+</sup> | E2+M1   | +2.0 +6-5   | 0.00260    | $\alpha(K)=0.00225$ ; $\alpha(L)=0.00027$<br>$\delta$ : from 1979La15.  |
| 685.49 5              | 100          | 1518.09       | 4 <sup>+</sup>                 | 832.58  | 2 <sup>+</sup> | E2      |             | 0.00225    | $\alpha(K)=0.00194$ ; $\alpha(L)=0.00023$<br>$\delta$ : +0.016 28 for E2+(M3)<br>(1979La15).                        |
| 718.5 2               | 14 2         | 2650.01       | 2 <sup>+</sup>                 | 1931.12 | 2 <sup>+</sup> |         |             |            |   |
| 776.8 3               | 17 5         | 3060.53       |                                | 2284.00 | 2 <sup>+</sup> |         |             |            |   |
| 808.4 3               | 69 2         | 2739.82       | 2 <sup>+</sup> ,3 <sup>+</sup> | 1931.12 | 2 <sup>+</sup> |         |             |            |   |
| 832.57 5              | 100          | 832.58        | 2 <sup>+</sup>                 | 0       | 0 <sup>+</sup> | E2      |             | 0.00137    | $\alpha(K)=0.00119$ ; $\alpha(L)=0.00014$   |
| 920.6 5               | 10 5         | 2851.45       | 2 <sup>+</sup> ,3              | 1931.12 | 2 <sup>+</sup> |         |             |            |   |
| 944.33 9              | 100          | 2462.42       | 4,5 <sup>+</sup>               | 1518.09 | 4 <sup>+</sup> | D+Q     |             |            | $\delta$ : -0.07 +12-10 or +0.94 21 (if<br>$J^\pi=4^+$ ), -0.10 10 (if $J^\pi=4^-$ ),<br>+0.35 5 (if $J^\pi=5^+$ ). |
| 966.8 2               | 52 6         | 2897.70       | 3 <sup>+</sup> ,4 <sup>+</sup> | 1931.12 | 2 <sup>+</sup> |         |             |            |   |
| 1006.7 2              | 9 2          | 2524.83       | 3 <sup>+</sup> ,4 <sup>+</sup> | 1518.09 | 4 <sup>+</sup> |         |             |            |   |
| 1070.36 8             | 100          | 2588.46       | 5                              | 1518.09 | 4 <sup>+</sup> | D+(Q)   | -0.01 4     |            |   |
| 1098.51 5             | 100          | 1931.12       | 2 <sup>+</sup>                 | 832.58  | 2 <sup>+</sup> | E2+M1   | -5.2 +10-14 | 0.00073    | $\alpha(K)=0.00063$<br>$\delta$ : weighted average of -5.5 +8-11<br>(1986Ad04) and -4.2 +14-22<br>(1979La15).       |
| 1129.1 2              | 69 5         | 3060.53       |                                | 1931.12 | 2 <sup>+</sup> |         |             |            |   |
| 1131.9 2              | 12 2         | 2650.01       | 2 <sup>+</sup>                 | 1518.09 | 4 <sup>+</sup> |         |             |            |   |
| 1144.8 2              | 56 16        | 3075.86       | 3 <sup>-</sup>                 | 1931.12 | 2 <sup>+</sup> |         |             |            |   |
| 1182 <sup>a</sup>     |              | 2700.12       | 4 <sup>+</sup> ,5              | 1518.09 | 4 <sup>+</sup> |         |             |            | $I_\gamma$ : very weak.   |
| 1242.4 3              | 100          | 2760.5        | 4 <sup>+</sup> ,5              | 1518.09 | 4 <sup>+</sup> |         |             |            |   |
| 1301.1 5              | 100          | 3232.2        |                                | 1931.12 | 2 <sup>+</sup> |         |             |            |   |
| 1316.23 7             | 100          | 2148.82       | 0 <sup>+</sup>                 | 832.58  | 2 <sup>+</sup> | E2      |             | 0.00049    | $\alpha(K)=0.00043$<br>$I_\gamma$ : very weak.  |
| 1331 <sup>a</sup>     |              | 3261.7        | 2 <sup>+</sup>                 | 1931.12 | 2 <sup>+</sup> |         |             |            |   |
| 1379.5 3              | 31 6         | 2897.70       | 3 <sup>+</sup> ,4 <sup>+</sup> | 1518.09 | 4 <sup>+</sup> |         |             |            |   |
| 1451.6 3              | 93 3         | 2284.00       | 2 <sup>+</sup>                 | 832.58  | 2 <sup>+</sup> | (M1+E2) | +0.03 10    | 0.00044    | $\alpha(K)=0.00038$<br>$\delta$ : from 1979La15.  |
| 1478.0 4              | 15 2         | 2996.14       |                                | 1518.09 | 4 <sup>+</sup> |         |             |            |   |
| 1557.8 3              | 17 11        | 3075.86       | 3 <sup>-</sup>                 | 1518.09 | 4 <sup>+</sup> |         |             |            |   |
| 1648.7 3              | 100          | 3166.8        |                                | 1518.09 | 4 <sup>+</sup> |         |             |            |   |
| 1692.0 3              | 61 9         | 3210.16       |                                | 1518.09 | 4 <sup>+</sup> |         |             |            |   |
| 1692.2 2              | 85 2         | 2524.83       | 3 <sup>+</sup> ,4 <sup>+</sup> | 832.58  | 2 <sup>+</sup> |         |             |            |   |
| 1695.9 1              | 77 3         | 2528.49       | 1 <sup>+</sup> ,2 <sup>+</sup> | 832.58  | 2 <sup>+</sup> | (M1+E2) |             |            | $\delta$ : $\delta=-0.34$ 9 or $\geq 6$ from<br>1979La15.   |
| 1743.4 1              | 70 3         | 2576.02       | 2 <sup>+</sup>                 | 832.58  | 2 <sup>+</sup> | D+Q     |             |            | $\delta$ : $\delta=0.04$ 12 or 1.8 +4-3.<br>$I_\gamma$ : very weak.   |
| 1744 <sup>a</sup>     |              | 3261.7        | 2 <sup>+</sup>                 | 1518.09 | 4 <sup>+</sup> |         |             |            |   |
| 1746.5 <sup>a</sup> 2 | 63 5         | 2579.06       |                                | 832.58  | 2 <sup>+</sup> |         |             |            |   |
| 1817.5 1              | 74 2         | 2650.01       | 2 <sup>+</sup>                 | 832.58  | 2 <sup>+</sup> |         |             |            |   |
| 1907.5 3              | 31 2         | 2739.82       | 2 <sup>+</sup> ,3 <sup>+</sup> | 832.58  | 2 <sup>+</sup> |         |             |            |   |
| 2018.8 2              | 90 5         | 2851.45       | 2 <sup>+</sup> ,3              | 832.58  | 2 <sup>+</sup> |         |             |            |   |
| 2064.7 3              | 17 7         | 2897.70       | 3 <sup>+</sup> ,4 <sup>+</sup> | 832.58  | 2 <sup>+</sup> |         |             |            |   |
| 2155.2 3              | 100          | 2987.8        |                                | 832.58  | 2 <sup>+</sup> |         |             |            |   |
| 2163.5 3              | 85 2         | 2996.14       |                                | 832.58  | 2 <sup>+</sup> |         |             |            |   |
| 2228.3 3              | 14 5         | 3060.53       |                                | 832.58  | 2 <sup>+</sup> |         |             |            |   |
| 2257.6 3              | 94 6         | 3090.2        |                                | 832.58  | 2 <sup>+</sup> |         |             |            |   |
| 2284.2 5              | 7 2          | 2284.00       | 2 <sup>+</sup>                 | 0       | 0 <sup>+</sup> |         |             |            |   |
| 2377.6 3              | 39 15        | 3210.16       |                                | 832.58  | 2 <sup>+</sup> |         |             |            |   |
| 2428.8 4              | 87 3         | 3261.7        | 2 <sup>+</sup>                 | 832.58  | 2 <sup>+</sup> |         |             |            |   |
| 2528.4 3              | 23 3         | 2528.49       | 1 <sup>+</sup> ,2 <sup>+</sup> | 0       | 0 <sup>+</sup> |         |             |            |   |
| 2576.2 3              | 30 3         | 2576.02       | 2 <sup>+</sup>                 | 0       | 0 <sup>+</sup> |         |             |            |   |

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$^{96}\text{Ru}(\text{p,p}'\gamma)$  1986Ad04 (continued) $\gamma(^{96}\text{Ru})$  (continued)

| $E_\gamma$ <sup>†</sup> | $I_\gamma$ <sup>‡</sup> | $E_i(\text{level})$ | $J_i^\pi$      | $E_f$ | $J_f^\pi$      |
|-------------------------|-------------------------|---------------------|----------------|-------|----------------|
| 3090.2 5                | 6 2                     | 3090.2              |                | 0     | 0 <sup>+</sup> |
| 3262.0 7                | 13 3                    | 3261.7              | 2 <sup>+</sup> | 0     | 0 <sup>+</sup> |

<sup>†</sup> From 1986Ad04.

<sup>‡</sup> Branching for each level from 1986Ad04.

# From  $p\gamma(\theta)$  and recommended upper limits, for details see 1986Ad04.

@ From  $\gamma(\theta)$ .

& Total theoretical internal conversion coefficients, calculated using the BrIcc code (2008Ki07) with Frozen orbital approximation based on  $\gamma$ -ray energies, assigned multiplicities, and mixing ratios, unless otherwise specified.

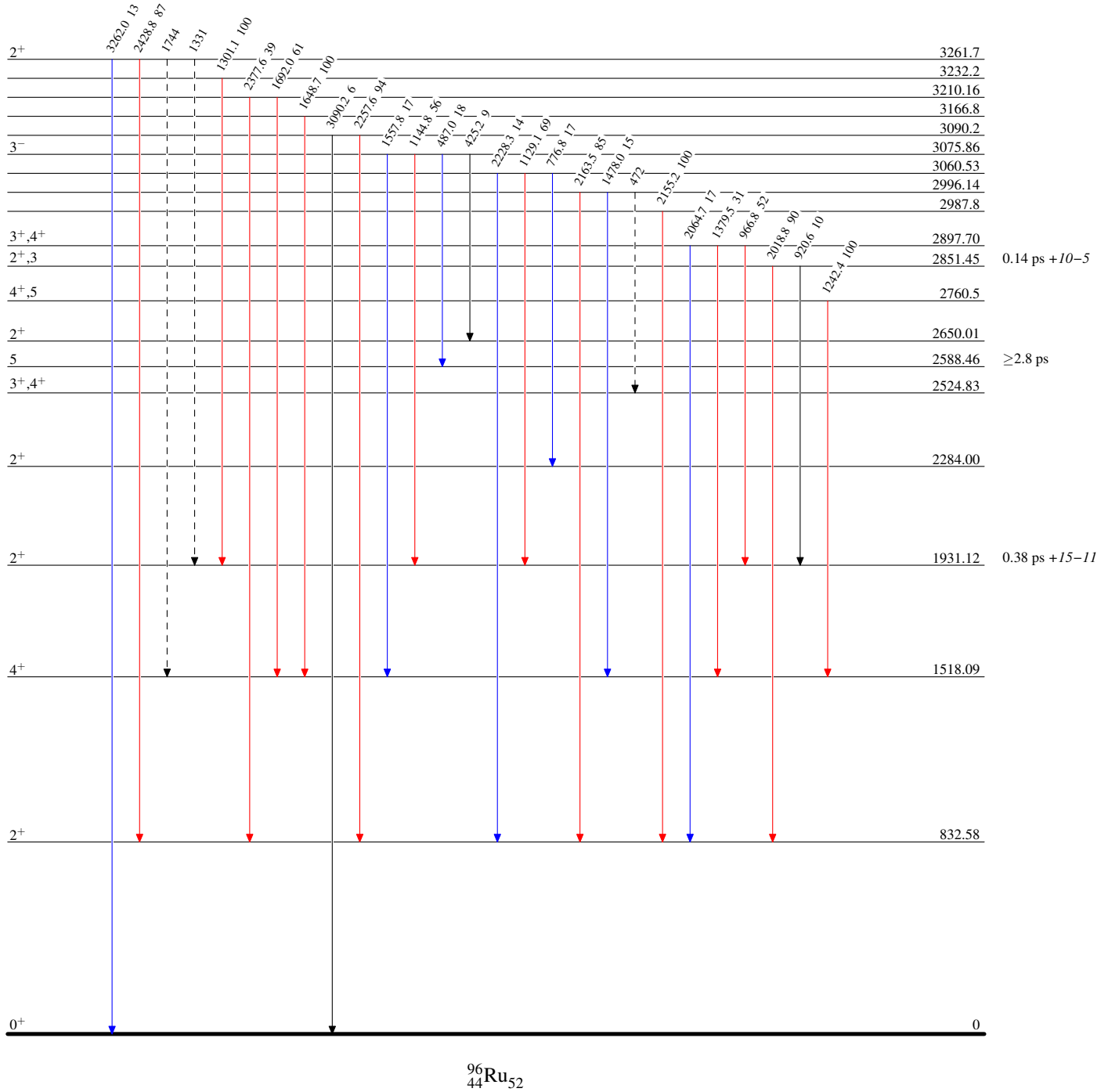
<sup>a</sup> Placement of transition in the level scheme is uncertain.

$^{96}\text{Ru}(p,p'\gamma)$  1986Ad04

Legend

Level Scheme  
Intensities: Relative  $I_\gamma$

- $I_\gamma < 2\% \times I_\gamma^{max}$
- $I_\gamma < 10\% \times I_\gamma^{max}$
- $I_\gamma > 10\% \times I_\gamma^{max}$
- - - - -  $\gamma$  Decay (Uncertain)



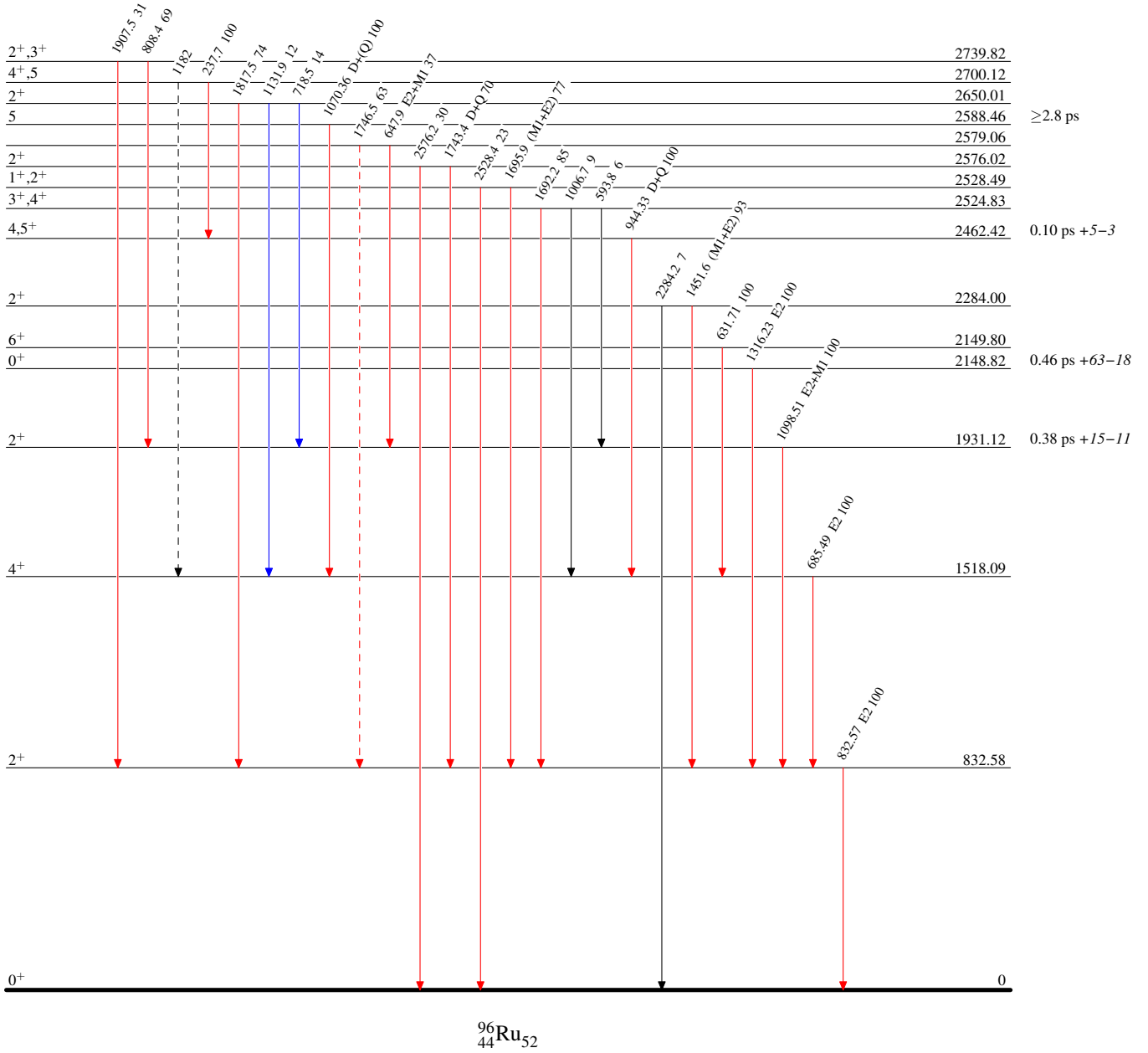
$^{96}\text{Ru}(p,p'\gamma)$  1986Ad04

Level Scheme (continued)

Intensities: Relative  $I_\gamma$

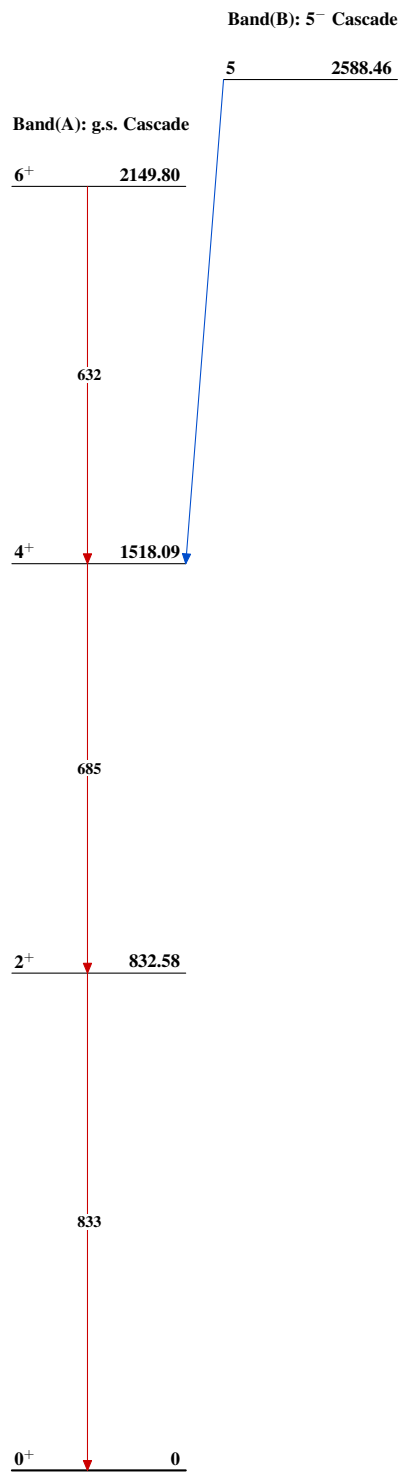
Legend

- $I_\gamma < 2\% \times I_\gamma^{max}$
- $I_\gamma < 10\% \times I_\gamma^{max}$
- $I_\gamma > 10\% \times I_\gamma^{max}$
- - - - -→  $\gamma$  Decay (Uncertain)



$^{96}_{44}\text{Ru}_{52}$

$^{96}\text{Ru}(p,p'\gamma)$  1986Ad04



$^{96}_{44}\text{Ru}_{52}$