# $^{155}$Gd($\gamma$,$\gamma'$) 1996No10

| Type | Author | History Citation | Literature Cutoff Date |
|---|---|---|---|
| Full Evaluation | N. Nica | NDS 160, 1 (2019) | 21-Oct-2019 |

Additional information 1.

Enriched (92.8%) $Gd_2O_3$ target, mass=919 mg, between Al discs of mass 759 mg, irradiated in a bremsstrahlung beam of 4.1 MeV endpoint energy. Scattered $\gamma'$s detected by three high-resolution, high-efficiency (≈25% to ≈100%, relative to a 3-in × 3-in NaI(Tl) detector), HPGe detectors, placed at angles of 90, 127, and 150° with respect to the incident beam direction. Report excitation energies, integrated cross sections, and $g\Gamma_0$. Deduce reduced transition probabilities and B(M1) values, assuming that the exciting transitions are M1.

Some of this information is included in 1997PiZZ, which involves many of the same authors as 1996No10.

## $^{155}$Gd Levels

The listed B(M1) values are those given by 1996No10. They were computed assuming that the exciting $\gamma$ transitions are M1, but this has not been established.

| E(level)[†] | $J^\pi$[‡#] | S[@] | Comments |
|---|---|---|---|
| 0 | $3/2^-$ | | |
| 60 | $5/2^-$ | | E(level): nominal value from adopted values. |
| 118 | $7/2^+$ | | E(level): nominal value from adopted values. |
| 1675 *1* | 1/2,3/2,5/2 | 5.3 *6* | B(M1)↑=0.097 *11* |
| 1982 *1* | 1/2,3/2,5/2 | 2.5 *7* | B(M1)↑=0.027 *7* |
| 2017 *1* | 1/2,3/2,5/2 | 6.7 *7* | B(M1)↑=0.071 *7* |
| 2283 *1* | 1/2,3/2,5/2 | 1.9 *4* | B(M1)↑=0.014 *3* |
| 2329 *1* | 1/2,3/2,5/2 | 2.2 *6* | B(M1)↑=0.015 *4* |
| 2456 *1* | $1/2^-$,3/2,5/2 | 4.1 *7* | B(M1)↑=0.024 *4* |
| 2558 *1* | 1/2,3/2,5/2 | 3.5 *6* | B(M1)↑=0.018 *3* |
| 2596 *1* | 1/2,3/2,5/2 | 5.5 *7* | B(M1)↑=0.027 *3* |
| 2645 *1* | 1/2,3/2,5/2 | 2.4 *8* | B(M1)↑=0.011 *4* |
| 2655 *1* | $(3/2^+)$,5/2 | 11.3 *11* | B(M1)↑=0.052 *5* |
| 2689 *1* | 1/2,3/2,5/2 | 2.5 *8* | B(M1)↑=0.011 *4* |
| 2728 *1* | 1/2,3/2,5/2 | 7.5 *10* | B(M1)↑=0.032 *4* |
| 2743 *1* | 1/2,3/2,5/2 | 5.1 *8* | B(M1)↑=0.021 *3* |
| 2755 *1* | $(1/2^-)$,3/2,5/2 | 7.4 *11* | B(M1)↑=0.031 *5* |
| 2768 *1* | 1/2,3/2,5/2 | 5.7 *7* | B(M1)↑=0.023 *3* |
| 2814 *1* | 1/2,3/2,5/2 | 2.8 *7* | B(M1)↑=0.011 *3* |
| 2819 *1* | 1/2,3/2,5/2 | 2.8 *6* | B(M1)↑=0.011 *2* |
| 2826 *1* | 1/2,3/2,5/2 | 2.6 *7* | B(M1)↑=0.010 *3* |
| 2854 *1* | $(3/2^+)$,5/2 | 17.0 *12* | B(M1)↑=0.063 *4* |
| 2865 *1* | $1/2^-$,3/2,5/2 | 6.0 *9* | B(M1)↑=0.022 *3* |
| 2872 *1* | 1/2,3/2,5/2 | 5.6 *7* | B(M1)↑=0.020 *3* |
| 3011 *1* | 1/2,3/2,5/2 | 3.2 *7* | B(M1)↑=0.010 *2* |
| 3123 *1* | $1/2^-$,3/2,5/2 | 5.9 *11* | B(M1)↑=0.017 *3* |
| 3199 *1* | 1/2,3/2,5/2 | 3.0 *8* | B(M1)↑=0.008 *2* |
| 3305 *1* | 1/2,3/2,5/2 | 5.0 *10* | B(M1)↑=0.012 *2* |

[†] Authors state that the excitation energies have uncertainties ≤1 keV.

[‡] Since $^{155}$Gd has a half-integral spin ($J^\pi=3/2^-$), the angular distributions do not provide definitive multipolarities for the scattered $\gamma'$s and, hence, $J^\pi$ assignments for the levels.

[#] From adopted values.

[@] Label=$g\Gamma_0$ (meV).

## $^{155}$Gd($\gamma,\gamma'$) 1996No10 (continued)

### $\gamma(^{155}Gd)$

| $E_i$(level) | $J_i^\pi$ | $E_\gamma$[†] | $I_\gamma$[‡] | $E_f$ | $J_f^\pi$ | $E_i$(level) | $J_i^\pi$ | $E_\gamma$[†] | $I_\gamma$[‡] | $E_f$ | $J_f^\pi$ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1675 | 1/2,3/2,5/2 | 1675 | 100 | 0 | $3/2^-$ | 2755 | $(1/2^-)$,3/2,5/2 | 2755 | 100 | 0 | $3/2^-$ |
| 1982 | 1/2,3/2,5/2 | 1982 | 100 | 0 | $3/2^-$ | 2768 | 1/2,3/2,5/2 | 2768 | 100 | 0 | $3/2^-$ |
| 2017 | 1/2,3/2,5/2 | 2017 | 100 | 0 | $3/2^-$ | 2814 | 1/2,3/2,5/2 | 2814 | 100 | 0 | $3/2^-$ |
| 2283 | 1/2,3/2,5/2 | 2283 | 100 | 0 | $3/2^-$ | 2819 | 1/2,3/2,5/2 | 2819 | 100 | 0 | $3/2^-$ |
| 2329 | 1/2,3/2,5/2 | 2329 | 100 | 0 | $3/2^-$ | 2826 | 1/2,3/2,5/2 | 2826 | 100 | 0 | $3/2^-$ |
| 2456 | $1/2^-$,3/2,5/2 | 2396 | 98 *4* | 60 | $5/2^-$ | 2854 | $(3/2^+)$,5/2 | 2736 | 76 *10* | 118 | $7/2^+$ |
| | | 2456 | 100 | 0 | $3/2^-$ | | | 2794 | 48 *9* | 60 | $5/2^-$ |
| 2558 | 1/2,3/2,5/2 | 2558 | 100 | 0 | $3/2^-$ | | | 2854 | 100 | 0 | $3/2^-$ |
| 2596 | 1/2,3/2,5/2 | 2596 | 100 | 0 | $3/2^-$ | 2865 | $1/2^-$,3/2,5/2 | 2805 | $1.1\times10^2$ *3* | 60 | $5/2^-$ |
| 2645 | 1/2,3/2,5/2 | 2645 | 100 | 0 | $3/2^-$ | | | 2865 | 100 | 0 | $3/2^-$ |
| 2655 | $(3/2^+)$,5/2 | 2537 | 225 *24* | 118 | $7/2^+$ | 2872 | 1/2,3/2,5/2 | 2872 | 100 | 0 | $3/2^-$ |
| | | 2655 | 100 | 0 | $3/2^-$ | 3011 | 1/2,3/2,5/2 | 3011 | 100 | 0 | $3/2^-$ |
| 2689 | 1/2,3/2,5/2 | 2689 | 100 | 0 | $3/2^-$ | 3123 | $1/2^-$,3/2,5/2 | 3063 | 59 *25* | 60 | $5/2^-$ |
| 2728 | 1/2,3/2,5/2 | 2728 | 100 | 0 | $3/2^-$ | | | 3123 | 100 | 0 | $3/2^-$ |
| 2743 | 1/2,3/2,5/2 | 2743 | 100 | 0 | $3/2^-$ | 3199 | 1/2,3/2,5/2 | 3199 | 100 | 0 | $3/2^-$ |
| 2755 | $(1/2^-)$,3/2,5/2 | 2698 | $1.7\times10^2$ *5* | 60 | $5/2^-$ | 3305 | 1/2,3/2,5/2 | 3305 | 100 | 0 | $3/2^-$ |

[†] Computed from the level-energy difference. Authors do not report $\gamma$-ray energies.
[‡] Relative branching from each level. In most instances, 1996No10 report only one $\gamma$ deexciting the various levels.

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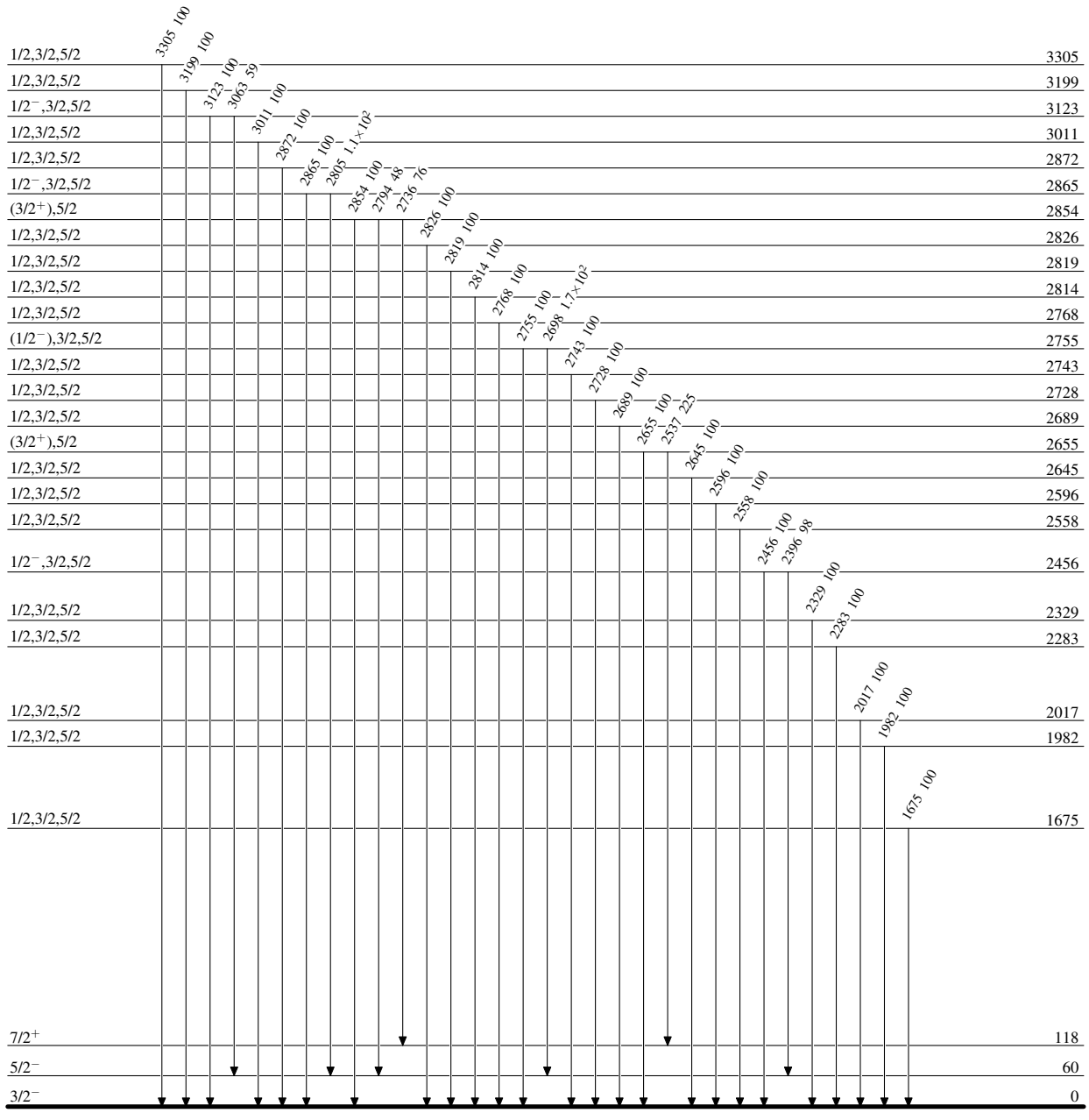
Level Scheme

Intensities: Relative photon branching from each level




$^{155}_{64}Gd_{91}$