

$^{154}\text{Gd}(\gamma,\gamma')$ **2013Be38,2014BeZX**

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	N. Nica	NDS 200.2 (2025)	22-Aug-2022

2013Be38 and 2014BeZX were compiled for the XUNDL database by M. S. Basunia (LBNL).

2013Be38, 2014BeZX: $E \leq 4.5$ MeV bremsstrahlung photon beam scattering on 0.579 g Gd_2O_3 powder target surrounding with 1.572 g Al disc used for photon flux calibration. Scattered photons detected by three large-volume HPGe detectors, at polar angles 90° (two detectors) and 130° (one detector) relative to incoming photon beam axis. Populated $J^\pi = 1^+$ scissors mode state at 2934 keV and measured $E\gamma$ and resonant photon-scattering cross sections (using ^{27}Al calibration), deduced reduced transition strengths (with γ -ray branching ratios from ^{154}Tb ε decay from same publications).

 ^{154}Gd Levels

E(level)	J^π	Comments
0.0	0^+	
123.1	2^+	$E(\text{level}), J^\pi$: from ^{154}Gd Adopted Levels.
2934.2	1^+	$E(\text{level})$: identified as scissors mode state from (γ, γ') experiment (2013Be38).
2950	1^-	
3090	1^+	$\Gamma_0 = 0.13$ eV 3.
3122	1^+	

 $\gamma(^{154}\text{Gd})$

$E_i(\text{level})$	J_i^π	E_γ^\dagger	$\Gamma_f/\Gamma_0^{\ddagger\ddagger}$	E_f	J_f^π	$I_{s,f}$ eVb [#]	Comments
123.1	2^+	123.1		0.0	0^+		E_γ : rounded value from ^{154}Gd Adopted Gammas.
2934.2	1^+	2811	45 12	123.1	2^+	64 16	$I_\gamma(90^\circ)/I_\gamma(130^\circ) = 1.53$ 29 (2014BeZX).
		2934	100 11	0.0	0^+	143 16	$B(M1)\downarrow = 0.53$ 6 (2014BeZX)
2950	1^-	2826	63 25	123.1	2^+	22 7	$I_\gamma(90^\circ)/I_\gamma(130^\circ) = 0.81$ 8 and $\Gamma_0 = 0.153$ eV 17 (2014BeZX).
		2950	100 23	0.0	0^+	34 8	E_γ : Observed in two HPGe detectors only.
3090	1^+	2967		123.1	2^+	43 9	$I_\gamma(90^\circ)/I_\gamma(130^\circ) = 0.97$ 58 (2014BeZX).
		3089		0.0	0^+		$B(M1)\downarrow = 0.21$ 5 (2014BeZX)
3122	1^+	3122	100 50	0.0	0^+	27 13	$I_\gamma(90^\circ)/I_\gamma(130^\circ) = 0.64$ 20 and $\Gamma_0 = 0.062$ eV 14 (2014BeZX).
							E_γ : Observed in two HPGe detectors only.
							$I_\gamma(90^\circ)/I_\gamma(130^\circ) = 0.85$ 21 (2014BeZX).
							$B(M1)\downarrow = 0.38$ 8 (2014BeZX)
							E_γ : Superimposed with ^{13}C transition. Not directly observed (2014BeZX).
							$B(M1)\downarrow = 0.13$ 6 (2014BeZX)
							$I_\gamma(90^\circ)/I_\gamma(130^\circ) = 0.53$ 23 and $\Gamma_0 = 0.044$ eV 21 (2014BeZX).

[†] From 2014BeZX.

[‡] Photon branching relative to g.s. branch for each level.

[#] Integrated effective cross section (as defined on page 2 of 2013Be38).

$^{154}\text{Gd}(\gamma, \gamma')$ 2013Be38, 2014BeZXLevel Scheme

Intensities: Relative photon branching from each level

