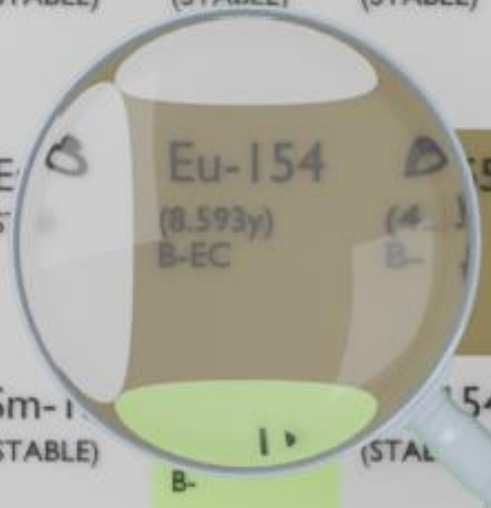




Gd-151 (24d) CA	Gd-152 (1.08E+14y) A	Gd-153 (240.4d) EC	Gd-154 (STABLE)	Gd-155 (STABLE)	Gd-156 (STABLE)	Gd-157 (STABLE)	Gd-158 (STABLE)	Gd-159 (18.479h) B-
Eu-150 (6.9y) CB+		Eu-152 (13.537y) ECB+B-	Eu-154 (8.593y) B-EC	Eu-155 (4.81y) B-	Eu-156 (15.19d) B-	Eu-157 (15.18h) B-	Eu-158 (45.9m) B-	
Sm-149 (STABLE)	Sm-150 (STABLE)	Sm-151 (90y) B-	Sm-152 (STABLE)	Sm-153 (STABLE)	Sm-154 (STABLE)	Sm-155 (22.3m) B-	Sm-156 (9.4h) B-	Sm-157 (8.03m) B-

EUROPIUM-154

SUMMARY DATA

GENERAL

CLASSIFICATION

Isotope: Eu-154
Atomic number (Z): 63
Mass number (A): 154
Neutron number (N): 91

RADIOACTIVE DECAY

Decay modes: β^- , Electron capture
Half-life: 8.593 [y]
Decay constant: 2.5561×10^{-9} [1/s]
Daughters: Gd-154 (100.0%), Sm-154 (0.02%)
Radioactive daughters: None

DOSIMETRIC CONSTANTS

Mean alpha energy: 0.0 [MeV]
Mean electron energy: 0.27301 [MeV]
Mean photon energy: 1.24929 [MeV]
Air kerma rate constant, Γ_{10} : 4.421×10^{-17} [Gy $\cdot$ m²/Bq $\cdot$ s]
Air kerma coefficient, K_{air} : 4.421×10^{-17} [Gy $\cdot$ m²/Bq $\cdot$ s]
Equilibrium dose constant for weakly-penetrating radiations (α and/or electrons), Δ_{wp} : 4.374×10^{-14} [Gy $\cdot$ kg/Bq $\cdot$ s]
Equilibrium dose constant for alphas, Δ_{α} : 0.000×10^0 [Gy $\cdot$ kg/Bq $\cdot$ s]

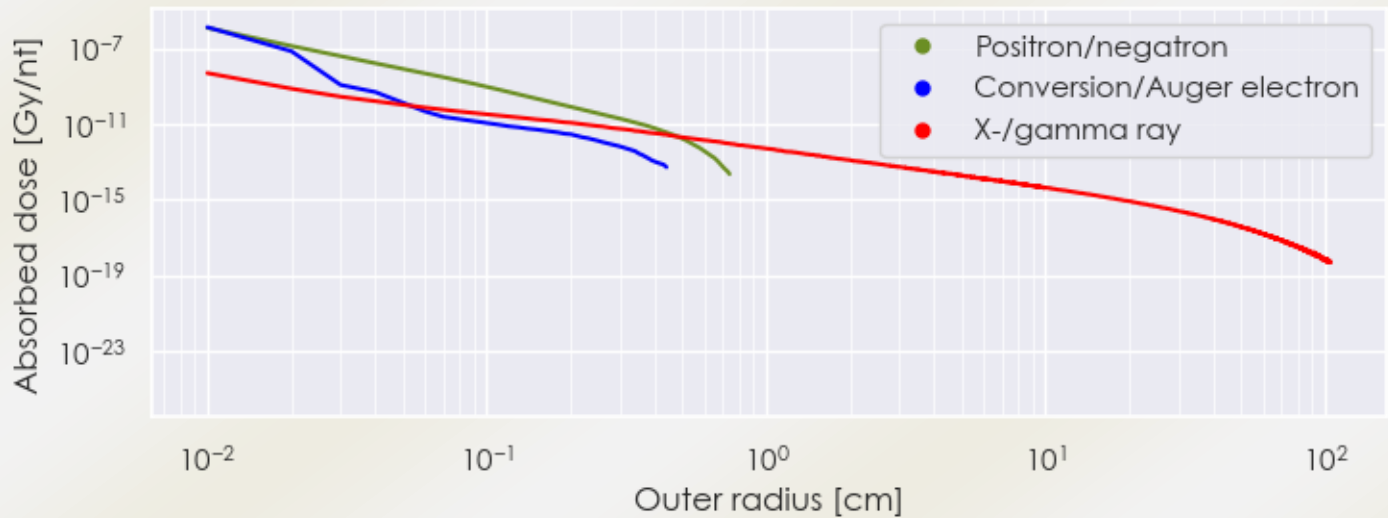
Equilibrium dose constant for betas/electrons, $\Delta_{\beta, \beta^+, e^-}$: 4.374×10^{-14} [Gy·kg/Bq·s]

Equilibrium dose constant for photons, Δ_p : 2.002×10^{-13} [Gy·kg/Bq·s]

DOSE POINT KERNELS (PLOT)

Dose point kernel source: **Graves, et al. Medical Physics. 2019 Nov.; 46(11):5284-5293.**

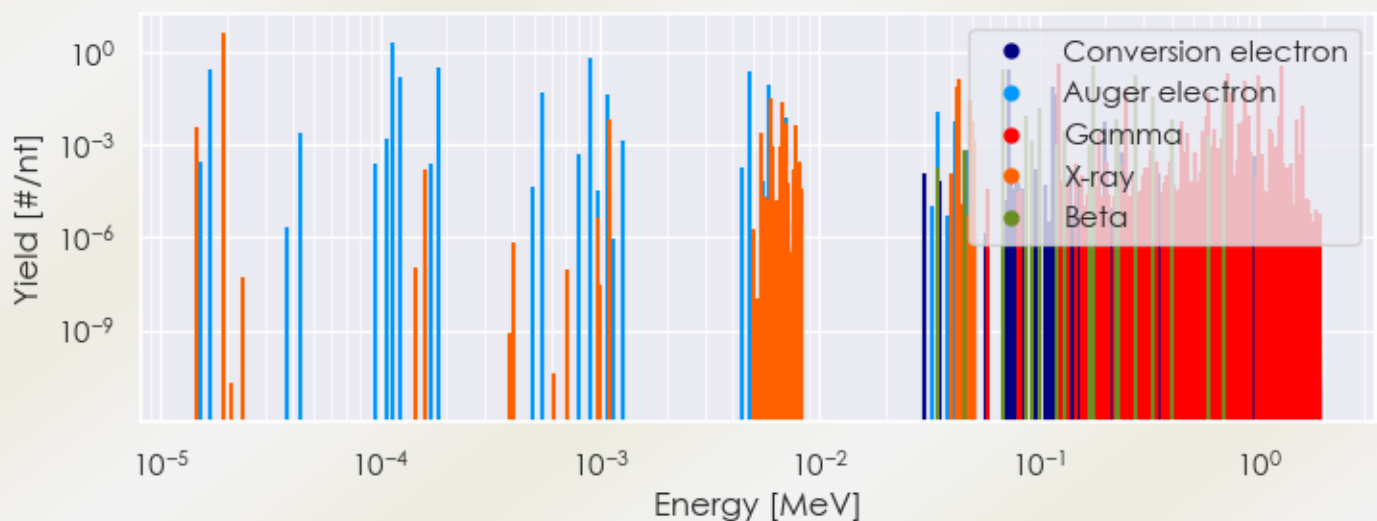
Note: Bins are spaced every 0.1 mm until a radius of 10 cm, and every 1 mm until a radius of 2 m.



Download tabulated dose point kernel file here: www.mirdsoft.org/products/MIRDspecs/Eu-154 DPK.csv

SUMMARY SPECTRA (PLOT)

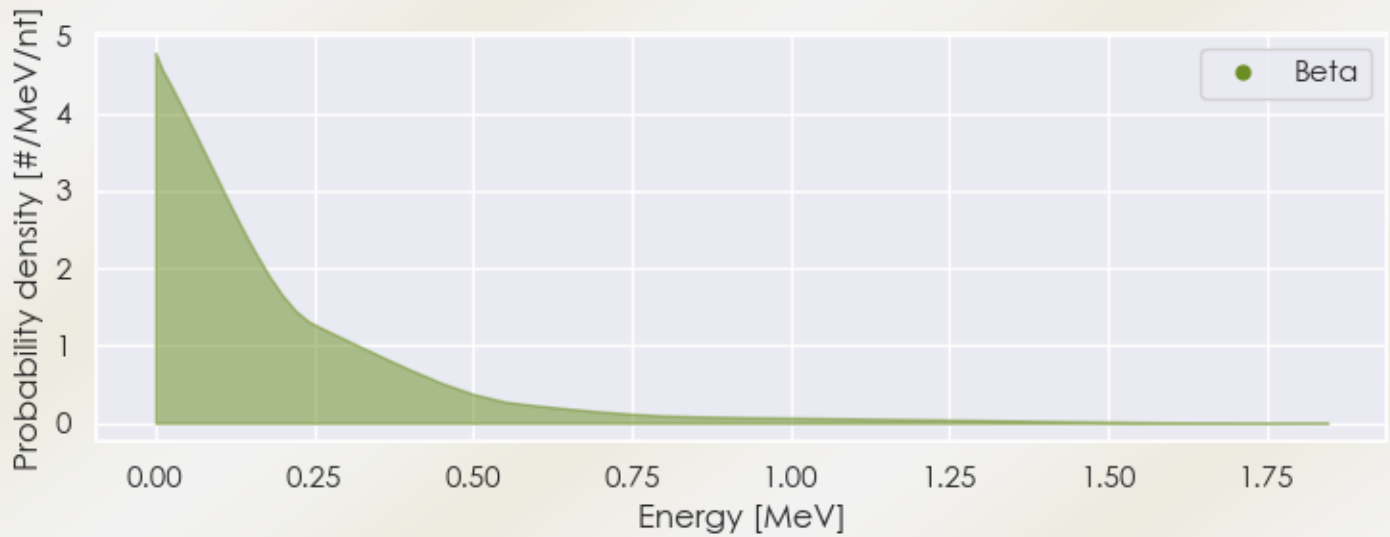
Spectra source: **ICRP Publication 107: Nuclear Decay Data for Dosimetric Calculations. Ann. ICRP 2008, 38 (3).**



Download tabulated summary spectra file here: www.mirdsoft.org/products/MIRDspecs/Eu-154 Summary Spectrum.csv

BETA SPECTRA (PLOT)

Spectra source: **ICRP Publication 107: Nuclear Decay Data for Dosimetric Calculations. Ann. ICRP 2008, 38 (3).**



Download tabulated beta spectra file here: www.mirdsoft.org/products/MIRDspecs/Eu-154 Beta Spectrum.csv

TABULATED DATA

SUMMARY SPECTRA (TABLE)

Spectra source: **ICRP Publication 107: Nuclear Decay Data for Dosimetric Calculations. Ann. ICRP 2008, 38 (3).**

Note: Radiations with yield < 0.01 are excluded from the table, but are available in the linked *.csv data.

Download tabulated summary spectra file here: www.mirdsoft.org/products/MIRDspecs/Eu-154 Summary Spectrum.csv

Energy [MeV]	Yield [# / nt] if > 0.01	Radiation type
1.94259e-05	4.312e+00	X-ray
6.04290e-03	2.988e-02	X-ray
6.71540e-03	2.327e-02	X-ray
4.23559e-02	7.368e-02	X-ray
4.30603e-02	1.325e-01	X-ray
4.86161e-02	1.346e-02	X-ray
4.87612e-02	2.604e-02	X-ray
1.23071e-01	4.056e-01	Gamma
2.47930e-01	6.915e-02	Gamma
5.91762e-01	4.962e-02	Gamma

6.92425e-01	1.792e-02	Gamma
7.23305e-01	2.011e-01	Gamma
7.56804e-01	4.542e-02	Gamma
8.73190e-01	1.220e-01	Gamma
9.96262e-01	1.053e-01	Gamma
1.00472e+00	1.791e-01	Gamma
1.27444e+00	3.499e-01	Gamma
1.59650e+00	1.788e-02	Gamma
6.91827e-02	2.851e-01	Beta
1.01356e-01	1.635e-02	Beta
1.76174e-01	3.618e-01	Beta
2.76519e-01	1.675e-01	Beta
3.28022e-01	3.489e-02	Beta
6.95483e-01	9.968e-02	Beta
1.68638e-05	2.879e-01	Auger electron
1.13459e-04	1.938e+00	Auger electron
1.22437e-04	1.606e-01	Auger electron
1.83939e-04	2.989e-01	Auger electron
5.43906e-04	4.644e-02	Auger electron
8.97660e-04	6.631e-01	Auger electron
1.07447e-03	4.492e-02	Auger electron
4.77043e-03	2.417e-01	Auger electron
5.92447e-03	8.475e-02	Auger electron
3.47387e-02	1.149e-02	Auger electron
7.27680e-02	2.648e-01	Conversion electron
1.14721e-01	2.518e-02	Conversion electron
1.15124e-01	7.367e-02	Conversion electron
1.15828e-01	7.071e-02	Conversion electron
1.21529e-01	3.981e-02	Conversion electron
1.23071e-01	1.060e-02	Conversion electron

USEFUL LINKS

Isotope decay characteristics are periodically updated as better measurements can be made - changes that may not be reflected on this page. Please see useful links:

National Nuclear Data Center (NNDC): <https://www.nndc.bnl.gov/nudat3/mird/>

International Atomic Energy Agency (IAEA) Livechart: <https://www-nds.iaea.org/relnsd/vcharthtml/VChartHTML.html>

REFERENCE LINKS

ICRP Report 107: <https://www.icrp.org/publication.asp?id=ICRP%20Publication%20107>

Graves et al. Dose Point Kernels: <https://doi.org/10.1002/mp.13789>

MIRD Decay Schemes 2nd Edition: https://sites.snmmi.org/SNMML-MAIN/iCore/Store/StoreLayouts/Item_Detail.aspx?iProductCode=0-932004-80-6