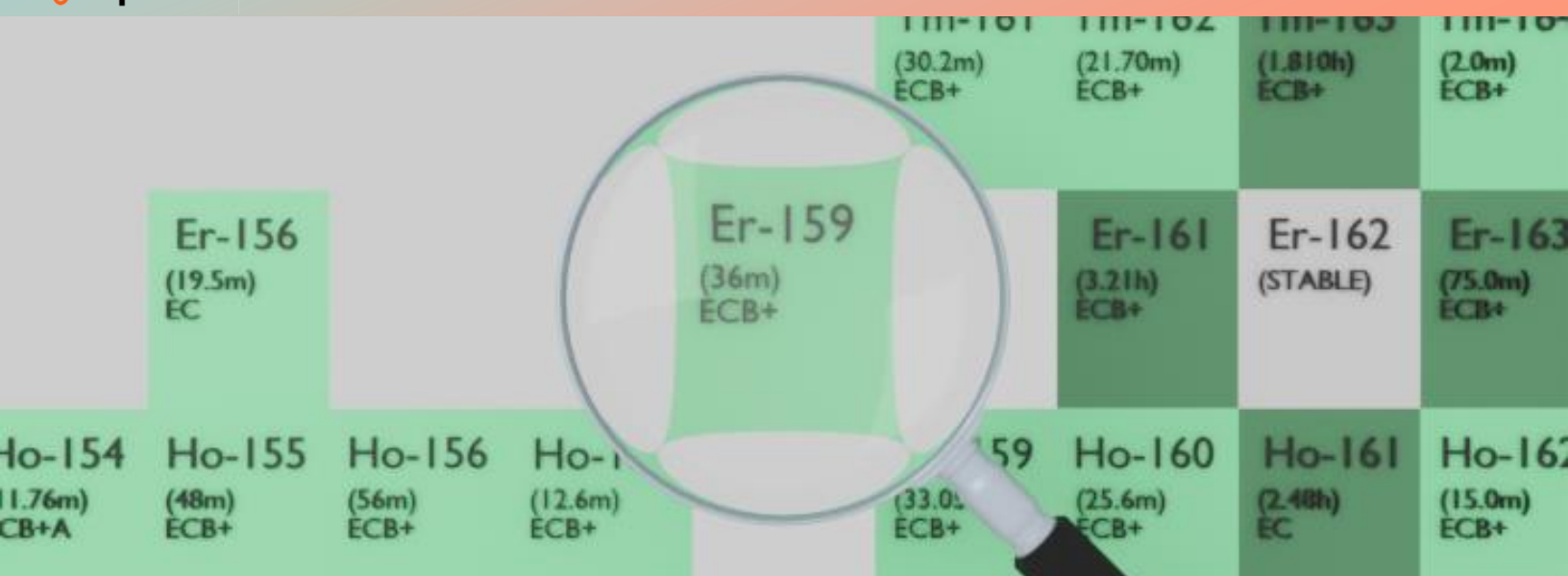




The image shows a portion of a periodic table of radionuclides. A magnifying glass is positioned over the entry for Er-159. The table includes entries for Erbium (Er) and Holmium (Ho) isotopes, showing their half-lives and decay modes.

Isotope	Half-life	Decay Mode
Er-156	(19.5m)	EC
Er-159	(36m)	ECB+
Er-161	(3.21h)	ECB+
Er-162	(STABLE)	
Er-163	(75.0m)	ECB+
Ho-154	(1.76m)	CB+A
Ho-155	(48m)	ECB+
Ho-156	(56m)	ECB+
Ho-159	(33.0s)	ECB+
Ho-160	(25.6m)	ECB+
Ho-161	(2.48h)	EC
Ho-162	(15.0m)	ECB+

ERBIUM-159

SUMMARY DATA

GENERAL

CLASSIFICATION

Isotope: Er-159

Atomic number (Z): 68

Mass number (A): 159

Neutron number (N): 91

RADIOACTIVE DECAY

Decay modes: β^+ , Electron capture

Half-life: 36.0 [m]

Decay constant: 3.2090×10^{-4} [1/s]

Daughters: Ho-159 (100.0%)

Radioactive daughters: Ho-159

DOSIMETRIC CONSTANTS

Mean alpha energy: 0.0 [MeV]

Mean electron energy: 0.07379 [MeV]

Mean photon energy: 0.9635 [MeV]

Air kerma rate constant, Γ_{10} : 3.306×10^{-17} [Gy $\cdot$ m²/Bq $\cdot$ s]

Air kerma coefficient, K_{air} : 3.495×10^{-17} [Gy $\cdot$ m²/Bq $\cdot$ s]

Equilibrium dose constant for weakly-penetrating radiations (α and/or electrons), Δ_{wp} : 1.182×10^{-14} [Gy $\cdot$ kg/Bq $\cdot$ s]

Equilibrium dose constant for alphas, Δ_{α} : 0.000e+00 [Gy $\cdot$ kg/Bq $\cdot$ s]

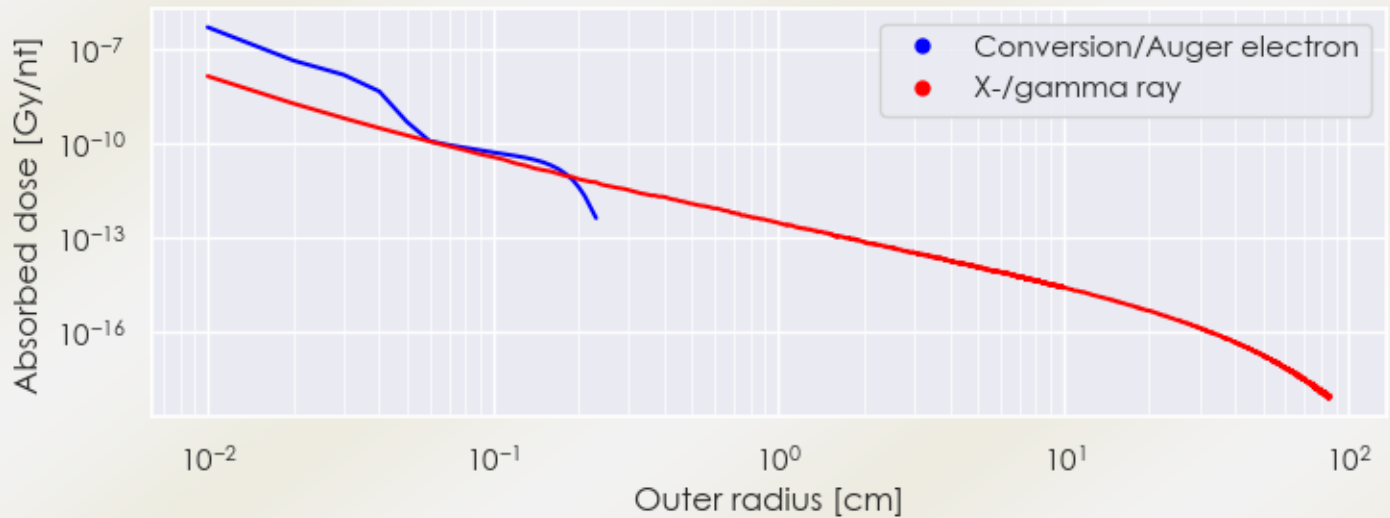
Equilibrium dose constant for betas/electrons, $\Delta_{\beta, \beta^+, e^-}$: 1.182×10^{-14} [Gy·kg/Bq·s]

Equilibrium dose constant for photons, Δ_p : 1.544×10^{-13} [Gy·kg/Bq·s]

DOSE POINT KERNELS (PLOT)

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

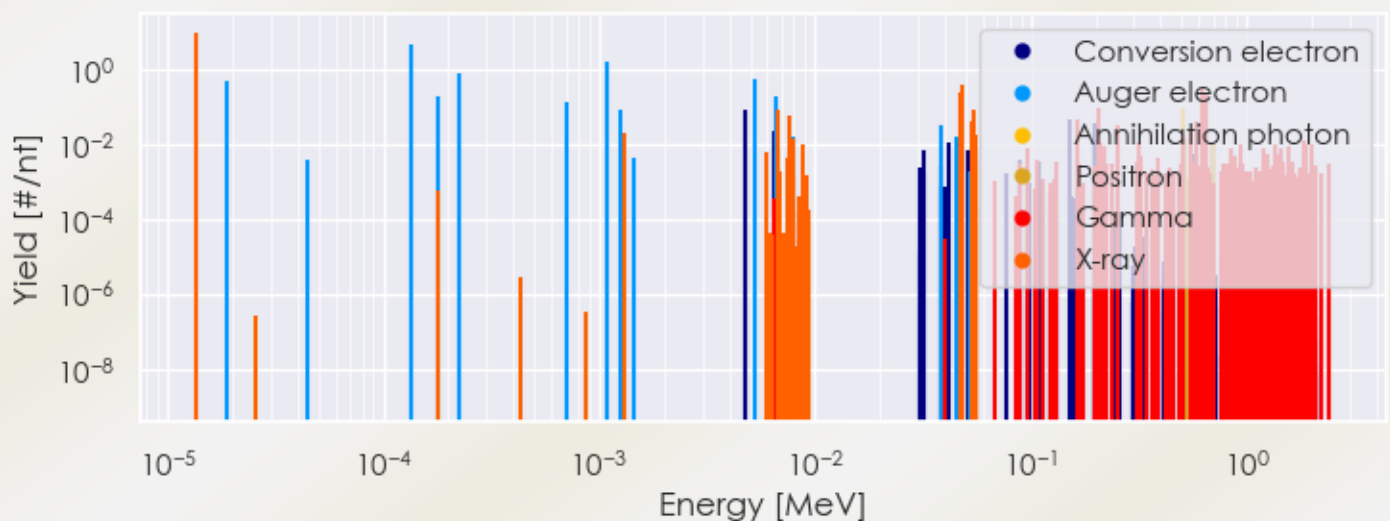
Note: Bins are spaced every 0.1 mm until a radius of 10 cm, and every 1 mm until a radius of 2 m.



Download tabulated dose point kernel file here: www.mirdsoft.org/products/MIRDspecs/Er-159 DPK.csv

SUMMARY SPECTRA (PLOT)

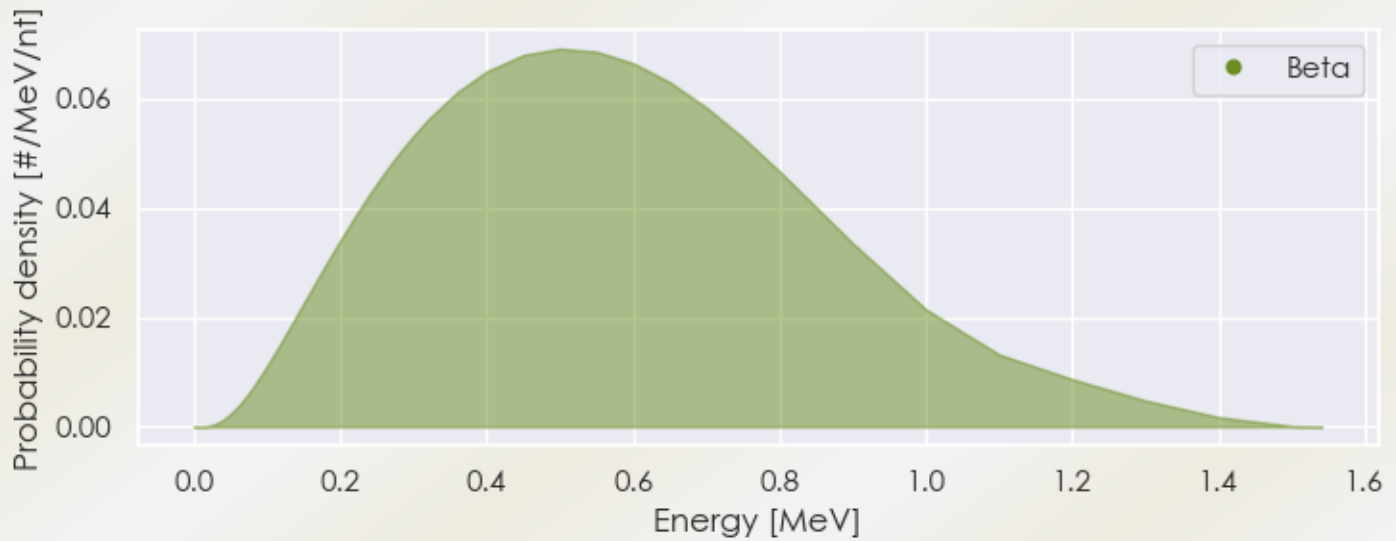
Spectra source: **ICRP Publication 107: Nuclear Decay Data for Dosimetric Calculations. Ann. ICRP 2008, 38 (3).**



Download tabulated summary spectra file here: www.mirdsoft.org/products/MIRDspecs/Er-159 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/Er-159 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/Er-159 Summary Spectrum.csv

Energy [MeV]	Yield [# / nt] if > 0.01	Radiation type
1.36460e-05	1.027e+01	X-ray
1.30193e-03	2.151e-02	X-ray
6.70641e-03	8.212e-02	X-ray
7.53350e-03	5.836e-02	X-ray
7.89548e-03	1.393e-02	X-ray
8.75507e-03	1.028e-02	X-ray
4.67702e-02	2.367e-01	X-ray
4.76373e-02	4.216e-01	X-ray
5.37885e-02	4.366e-02	X-ray
5.39705e-02	8.440e-02	X-ray

5.53966e-02	1.866e-02	X-ray
1.65900e-01	5.010e-02	Gamma
2.05920e-01	9.686e-02	Gamma
2.11480e-01	1.169e-02	Gamma
2.52300e-01	3.340e-02	Gamma
3.14600e-01	1.169e-02	Gamma
5.05400e-01	1.837e-02	Gamma
5.11000e-01	9.763e-02	Annihilation photon
5.51700e-01	2.338e-02	Gamma
5.81000e-01	4.041e-02	Gamma
6.24500e-01	3.340e-01	Gamma
6.49100e-01	2.338e-01	Gamma
9.42500e-01	1.069e-02	Gamma
1.83830e+00	1.236e-02	Gamma
1.89100e+00	1.035e-02	Gamma
5.02388e-01	1.021e-02	Positron
5.13233e-01	1.430e-02	Positron
6.95277e-01	1.021e-02	Positron
6.98348e-01	1.021e-02	Positron
1.89749e-05	5.401e-01	Auger electron
1.34698e-04	4.676e+00	Auger electron
1.80713e-04	1.934e-01	Auger electron
2.24193e-04	8.394e-01	Auger electron
7.00626e-04	1.410e-01	Auger electron
1.07779e-03	1.631e+00	Auger electron
1.25934e-03	8.585e-02	Auger electron
4.77150e-03	8.834e-02	Conversion electron
5.30137e-03	5.468e-01	Auger electron
6.50000e-03	2.486e-02	Conversion electron
6.62033e-03	1.937e-01	Auger electron
7.97269e-03	1.731e-02	Auger electron
3.82545e-02	3.271e-02	Auger electron
4.17510e-02	1.144e-02	Conversion electron
4.54244e-02	1.646e-02	Auger electron
1.50221e-01	4.757e-02	Conversion electron
1.96991e-01	3.701e-02	Conversion electron
1.97858e-01	2.328e-02	Conversion electron
2.04192e-01	1.639e-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/SNMMI-MAIN/iCore/Store/StoreLayouts/Item_Detail.aspx?iProductCode=0-932004-80-6