



U-232 (33.7m) ECA	U-234 (8.8h) ECA	U-235 (25.3m) A	U-236 (2.858y) A SF	U-237 (45.2d) ECA	U-238 (87.7y) A SF	U-239 (2.411E+4y) A
Np-232 (14.7m) ECB+	Np-233 (3.7d) EC	Np-234 (4.4d) ECB+	Np-235 (3.2d) EC	Np-236 (1.54E+5y) ECB-A	Np-237 (2.144E+6y) A	Np-238 (2.117d) B-
U-230 (20.8d) A	U-231 (4.2d) ECA	U-232 (68.9y) A	U-234 (2.45E+5y) A	U-235 (7.04E+8y) A	U-236 (2.342E+7y) A	U-237 (6.75d) B-

NEPTUNIUM-234

SUMMARY DATA

GENERAL

CLASSIFICATION

Isotope: Np-234
Atomic number (Z): 93
Mass number (A): 234
Neutron number (N): 141

RADIOACTIVE DECAY

Decay modes: β^+ , Electron capture
Half-life: 4.4 [d]
Decay constant: 1.8233e-06 [1/s]
Daughters: U-234 (100.0%)
Radioactive daughters: U-234

DOSIMETRIC CONSTANTS

Mean alpha energy: 0.0 [MeV]
Mean electron energy: 0.05742 [MeV]
Mean photon energy: 1.10861 [MeV]
Air kerma rate constant, Γ_{10} : 5.055e-17 [Gy·m²/Bq·s]
Air kerma coefficient, K_{air} : 5.057e-17 [Gy·m²/Bq·s]
Equilibrium dose constant for weakly-penetrating radiations (α and/or electrons), Δ_{wp} : 9.200e-15 [Gy·kg/Bq·s]
Equilibrium dose constant for alphas, Δ_{α} : 0.000e+00 [Gy·kg/Bq·s]

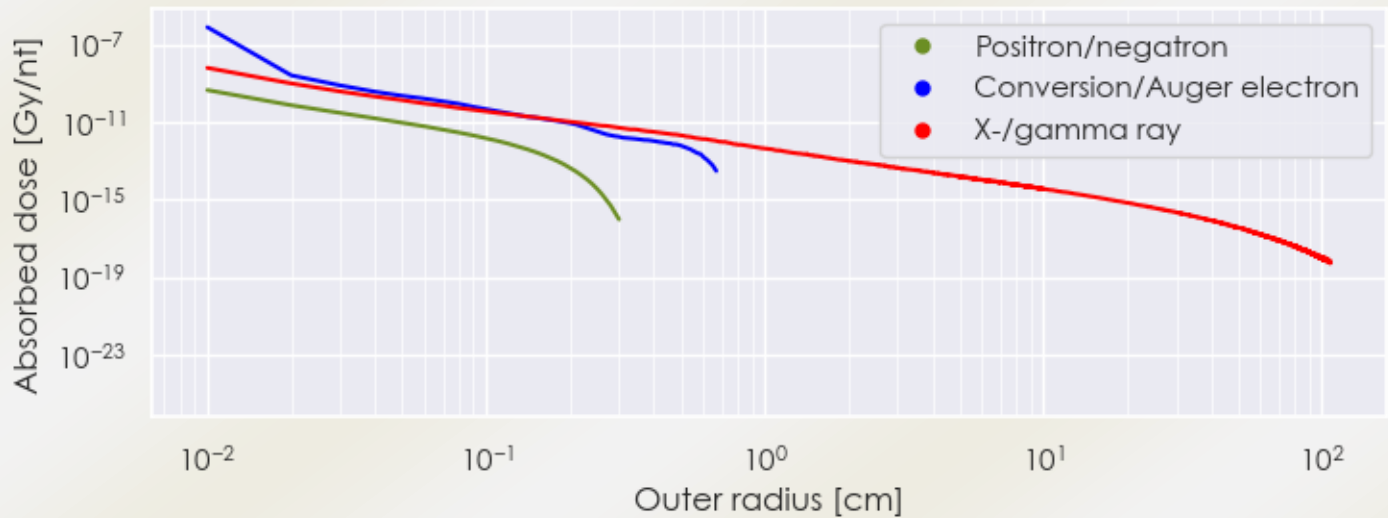
Equilibrium dose constant for betas/electrons, $\Delta_{\beta,\beta^+,e^-}$: 9.200×10^{-15} [Gy·kg/Bq·s]

Equilibrium dose constant for photons, Δ_p : 1.776×10^{-13} [Gy·kg/Bq·s]

DOSE POINT KERNELS (PLOT)

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

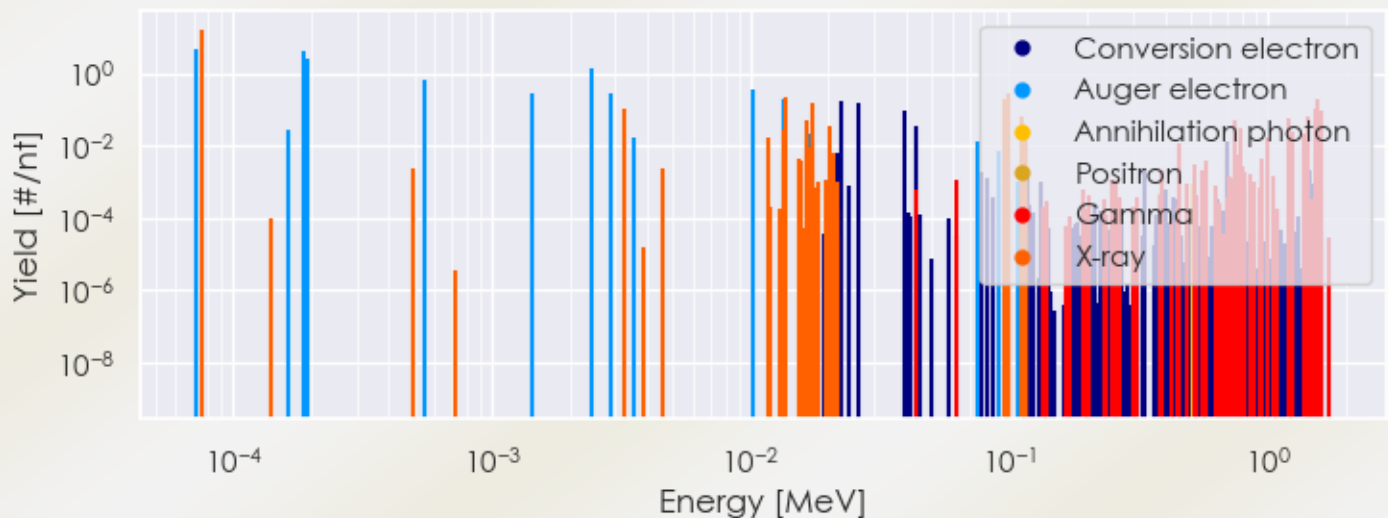
Note: Bins are spaced every 0.1 mm until a radius of 10 cm, and every 1 mm until a radius of 2 m.



Download tabulated dose point kernel file here: www.mirdsoft.org/products/MIRDspecs/Np-234 DPK.csv

SUMMARY SPECTRA (PLOT)

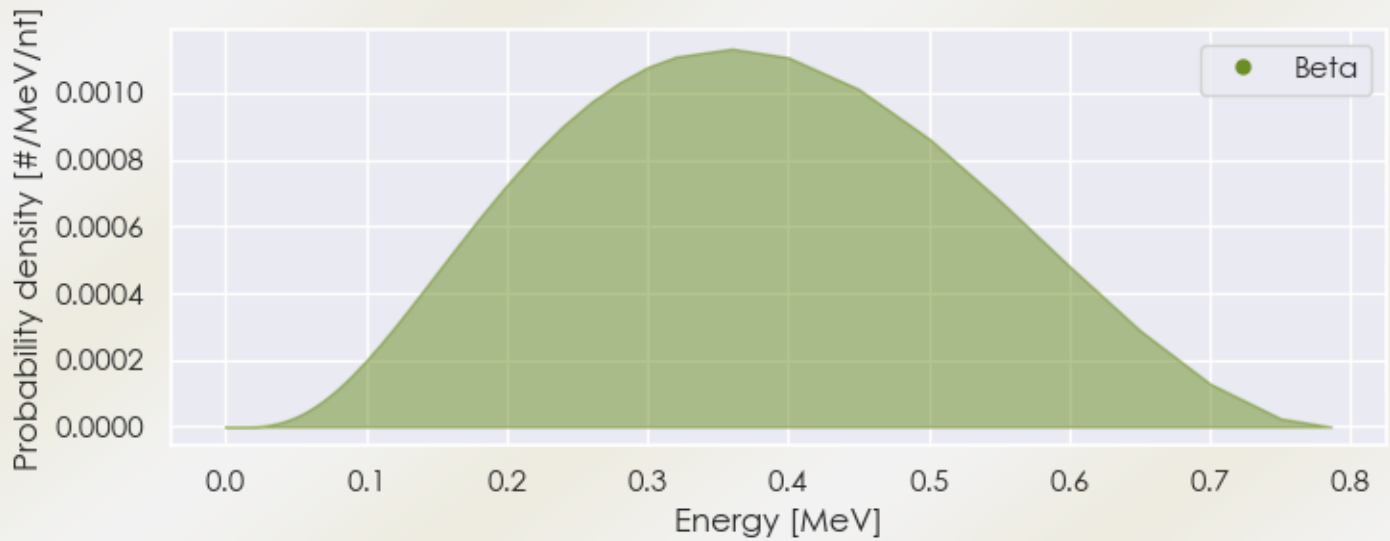
Spectra source: **ICRP Publication 107: Nuclear Decay Data for Dosimetric Calculations. Ann. ICRP 2008, 38 (3).**



Download tabulated summary spectra file here: www.mirdsoft.org/products/MIRDspecs/Np-234 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/Np-234 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/Np-234 Summary Spectrum.csv

Energy [MeV]	Yield [# / nt] if > 0.01	Radiation type
7.54707e-05	1.691e+01	X-ray
3.25263e-03	1.025e-01	X-ray
1.16607e-02	1.611e-02	X-ray
1.34452e-02	2.626e-02	X-ray
1.36268e-02	2.307e-01	X-ray
1.64468e-02	4.839e-02	X-ray
1.65865e-02	1.480e-02	X-ray
1.73072e-02	1.510e-01	X-ray
1.74784e-02	1.287e-02	X-ray
2.02658e-02	3.421e-02	X-ray

9.50660e-02	1.877e-01	X-ray
9.89281e-02	3.004e-01	X-ray
1.10929e-01	3.464e-02	X-ray
1.11820e-01	6.774e-02	X-ray
1.15080e-01	1.752e-02	X-ray
4.50930e-01	1.150e-02	Gamma
7.42780e-01	5.270e-02	Gamma
7.86280e-01	3.190e-02	Gamma
1.00105e+00	1.590e-02	Gamma
1.19378e+00	6.020e-02	Gamma
1.23722e+00	2.300e-02	Gamma
1.39187e+00	2.270e-02	Gamma
1.43536e+00	6.380e-02	Gamma
1.52721e+00	1.120e-01	Gamma
1.55831e+00	1.872e-01	Gamma
1.57068e+00	5.090e-02	Gamma
1.60180e+00	9.100e-02	Gamma
7.21794e-05	4.564e+00	Auger electron
1.62995e-04	2.909e-02	Auger electron
1.86045e-04	4.459e+00	Auger electron
1.92558e-04	2.537e+00	Auger electron
5.45419e-04	6.773e-01	Auger electron
1.43290e-03	2.880e-01	Auger electron
2.43436e-03	1.466e+00	Auger electron
2.90525e-03	2.750e-01	Auger electron
3.52237e-03	1.617e-02	Auger electron
1.01478e-02	3.647e-01	Auger electron
1.34742e-02	1.853e-01	Auger electron
1.68353e-02	2.216e-02	Auger electron
2.24460e-02	1.800e-01	Conversion electron
2.63080e-02	1.602e-01	Conversion electron
3.92004e-02	9.568e-02	Conversion electron
4.34900e-02	3.366e-02	Conversion electron
7.54320e-02	1.294e-02	Auger electron
6.93690e-01	1.364e-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