



XENON-120

SUMMARY DATA

GENERAL

CLASSIFICATION

Isotope: Xe-120
Atomic number (Z): 54
Mass number (A): 120
Neutron number (N): 66

RADIOACTIVE DECAY

Decay modes: β^+ , Electron capture
Half-life: 40.0 [m]
Decay constant: 2.8881×10^{-4} [1/s]
Daughters: I-120 (100.0%)
Radioactive daughters: I-120

DOSIMETRIC CONSTANTS

Mean alpha energy: 0.0 [MeV]
Mean electron energy: 0.0461 [MeV]
Mean photon energy: 0.40146 [MeV]
Air kerma rate constant, Γ_{10} : 2.207×10^{-17} [Gy $\cdot$ m²/Bq $\cdot$ s]
Air kerma coefficient, K_{air} : 2.228×10^{-17} [Gy $\cdot$ m²/Bq $\cdot$ s]
Equilibrium dose constant for weakly-penetrating radiations (α and/or electrons), Δ_{wp} : 7.386×10^{-15} [Gy $\cdot$ kg/Bq $\cdot$ s]
Equilibrium dose constant for alphas, Δ_{α} : 0.000×10^0 [Gy $\cdot$ kg/Bq $\cdot$ s]

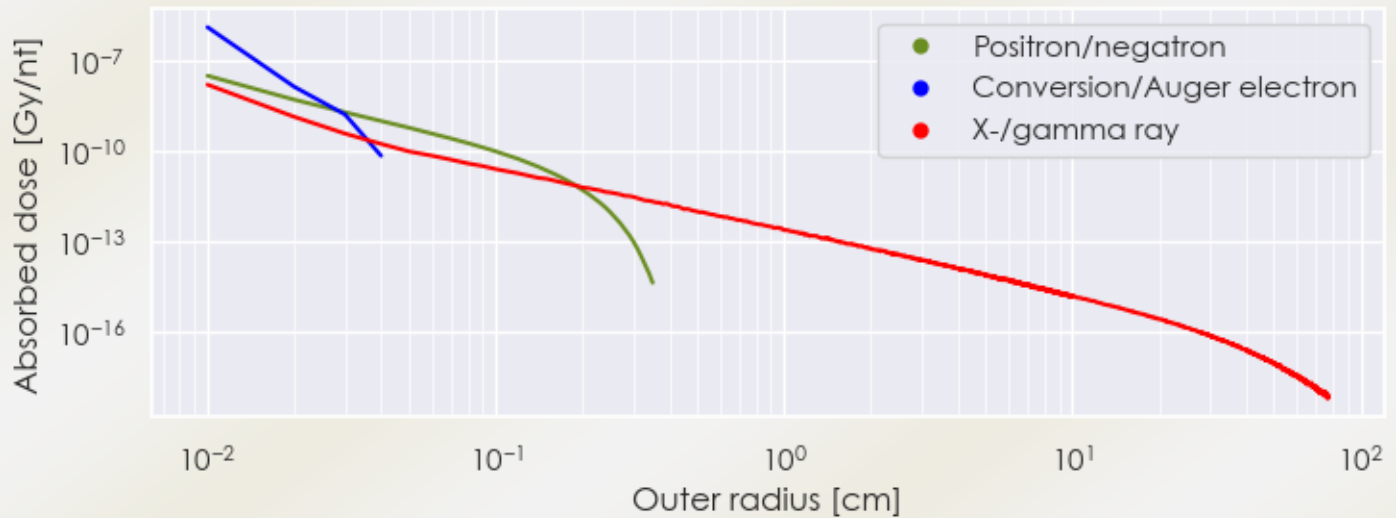
Equilibrium dose constant for betas/electrons, $\Delta_{\beta, \beta^+, e^-}$: 7.386×10^{-15} [Gy·kg/Bq·s]

Equilibrium dose constant for photons, Δ_p : 6.432×10^{-14} [Gy·kg/Bq·s]

DOSE POINT KERNELS (PLOT)

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

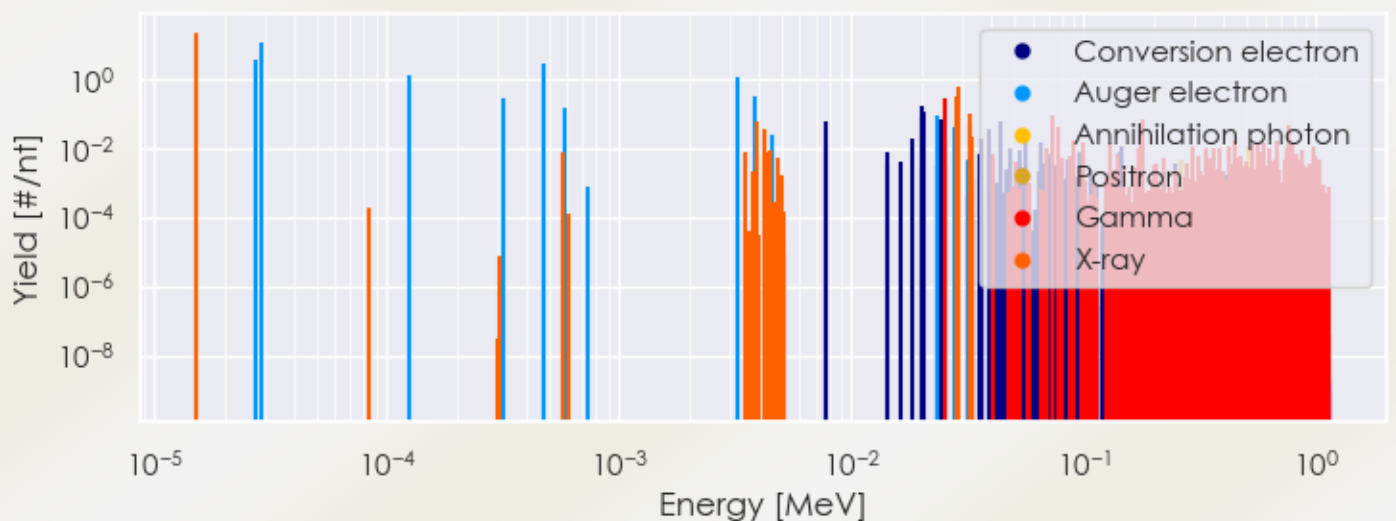
Note: Bins are spaced every 0.1 mm until a radius of 10 cm, and every 1 mm until a radius of 2 m.



Download tabulated dose point kernel file here: www.mirdsoft.org/products/MIRDspecs/Xe-120 DPK.csv

SUMMARY SPECTRA (PLOT)

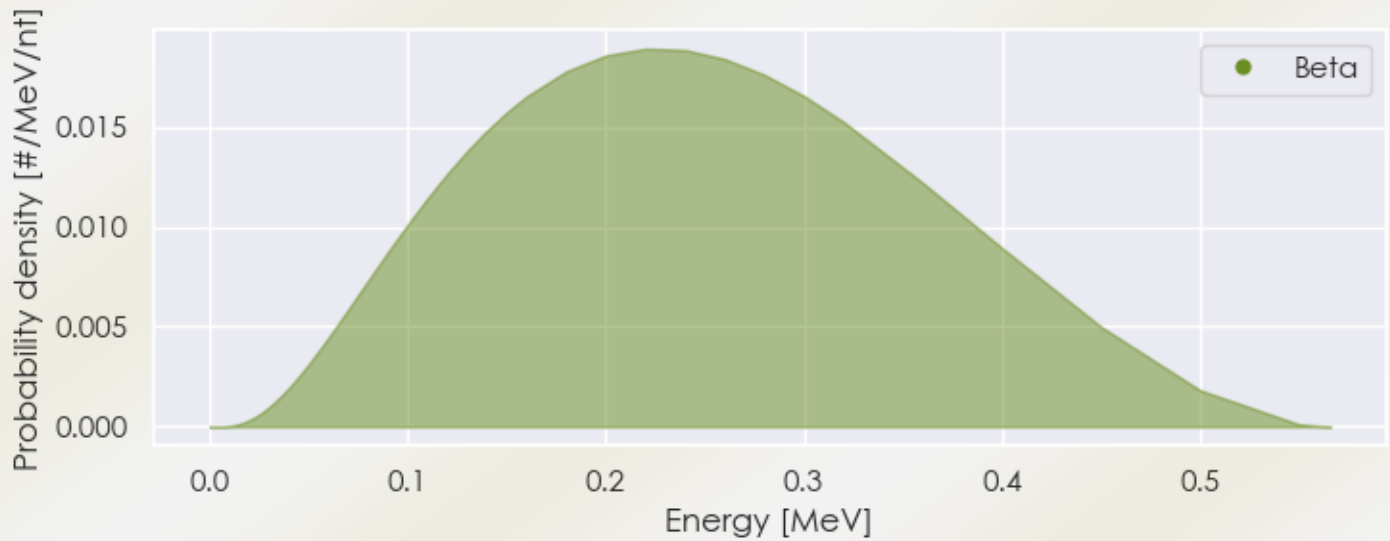
Spectra source: **ICRP Publication 107: Nuclear Decay Data for Dosimetric Calculations. Ann. ICRP 2008, 38 (3).**



Download tabulated summary spectra file here: www.mirdsoft.org/products/MIRDspecs/Xe-120 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/Xe-120 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/Xe-120 Summary Spectrum.csv

Energy [MeV]	Yield [# / nt] if > 0.01	Radiation type
1.52639e-05	2.272e+01	X-ray
3.92520e-03	6.261e-02	X-ray
4.21605e-03	3.720e-02	X-ray
2.51000e-02	2.904e-01	Gamma
2.83065e-02	3.031e-01	X-ray
2.86096e-02	5.626e-01	X-ray
3.22368e-02	5.233e-02	X-ray
3.22942e-02	1.015e-01	X-ray
3.30185e-02	1.091e-02	X-ray
3.30298e-02	2.135e-02	X-ray

7.26000e-02	8.800e-02	Gamma
7.72000e-02	3.872e-02	Gamma
8.98000e-02	1.751e-02	Gamma
9.90000e-02	1.540e-02	Gamma
1.28800e-01	1.540e-02	Gamma
1.76000e-01	4.400e-02	Gamma
1.78100e-01	6.600e-02	Gamma
2.95600e-01	1.100e-02	Gamma
3.35900e-01	1.021e-02	Gamma
4.24200e-01	1.188e-02	Gamma
4.49200e-01	1.619e-02	Gamma
5.11000e-01	1.117e-02	Annihilation photon
5.29400e-01	1.346e-02	Gamma
5.55600e-01	1.452e-02	Gamma
5.90400e-01	1.540e-02	Gamma
6.31100e-01	1.021e-02	Gamma
6.78900e-01	1.602e-02	Gamma
7.48400e-01	1.038e-02	Gamma
7.53300e-01	1.417e-02	Gamma
7.62500e-01	4.435e-02	Gamma
7.93400e-01	1.276e-02	Gamma
9.65500e-01	1.170e-02	Gamma
2.71295e-05	3.432e+00	Auger electron
2.89708e-05	1.094e+01	Auger electron
1.25161e-04	1.271e+00	Auger electron
3.20649e-04	2.938e-01	Auger electron
4.77619e-04	2.872e+00	Auger electron
5.80277e-04	1.371e-01	Auger electron
3.21796e-03	1.124e+00	Auger electron
3.85441e-03	3.326e-01	Auger electron
4.51572e-03	2.429e-02	Auger electron
7.73600e-03	1.234e-02	Conversion electron
7.73600e-03	5.706e-02	Conversion electron
1.83360e-02	1.884e-02	Conversion electron
1.99381e-02	1.689e-01	Conversion electron
2.02425e-02	7.232e-02	Conversion electron
2.05455e-02	1.143e-01	Conversion electron
2.35598e-02	9.099e-02	Auger electron

2.42302e-02	7.145e-02	Conversion electron
2.51000e-02	1.638e-02	Conversion electron
2.75866e-02	4.074e-02	Auger electron
3.64360e-02	1.845e-02	Conversion electron
3.94360e-02	3.755e-02	Conversion electron
4.40360e-02	6.023e-02	Conversion electron
4.79360e-02	1.027e-02	Conversion electron
5.66360e-02	2.643e-02	Conversion electron
6.58360e-02	1.372e-02	Conversion electron
1.44936e-01	1.078e-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