



XENON-121

SUMMARY DATA

GENERAL

CLASSIFICATION

Isotope: Xe-121
Atomic number (Z): 54
Mass number (A): 121
Neutron number (N): 67

RADIOACTIVE DECAY

Decay modes: β^+ , Electron capture
Half-life: 40.1 [m]
Decay constant: 2.8809×10^{-4} [1/s]
Daughters: I-121 (100.0%)
Radioactive daughters: I-121

DOSIMETRIC CONSTANTS

Mean alpha energy: 0.0 [MeV]
Mean electron energy: 0.58189 [MeV]
Mean photon energy: 1.47199 [MeV]
Air kerma rate constant, Γ_{10} : 3.358×10^{-17} [Gy $\cdot$ m²/Bq $\cdot$ s]
Air kerma coefficient, K_{air} : 5.217×10^{-17} [Gy $\cdot$ m²/Bq $\cdot$ s]
Equilibrium dose constant for weakly-penetrating radiations (α and/or electrons), Δ_{wp} : 9.323×10^{-14} [Gy $\cdot$ kg/Bq $\cdot$ s]
Equilibrium dose constant for alphas, Δ_{α} : 0.000e+00 [Gy $\cdot$ kg/Bq $\cdot$ s]

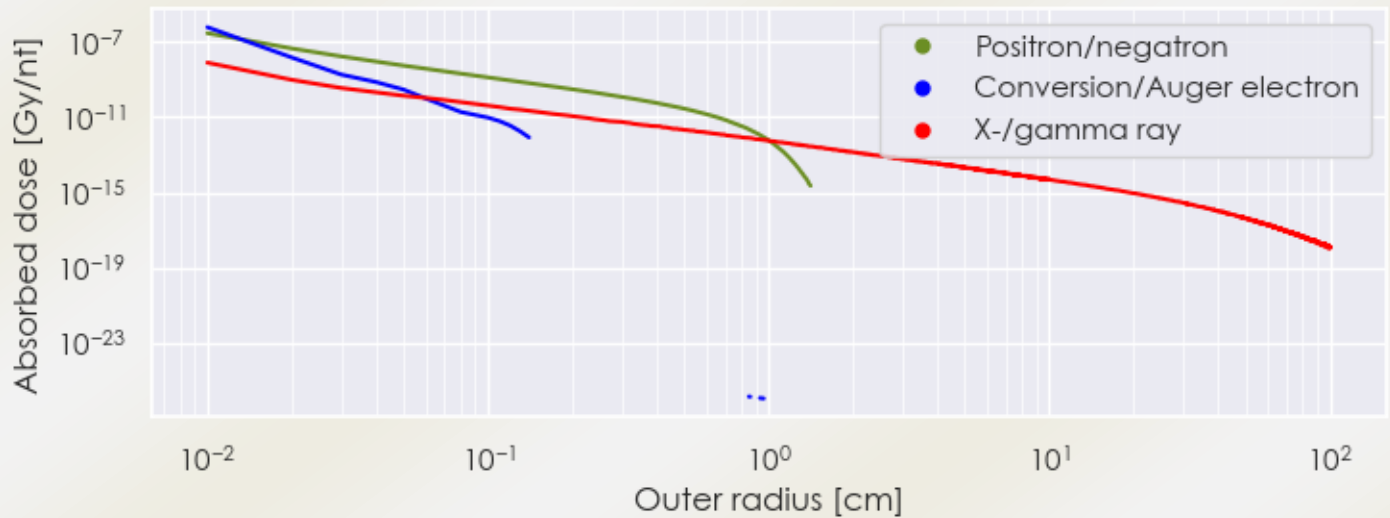
Equilibrium dose constant for betas/electrons, $\Delta_{\beta,\beta^+,e^-}$: 9.323×10^{-14} [Gy·kg/Bq·s]

Equilibrium dose constant for photons, Δ_p : 2.358×10^{-13} [Gy·kg/Bq·s]

DOSE POINT KERNELS (PLOT)

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

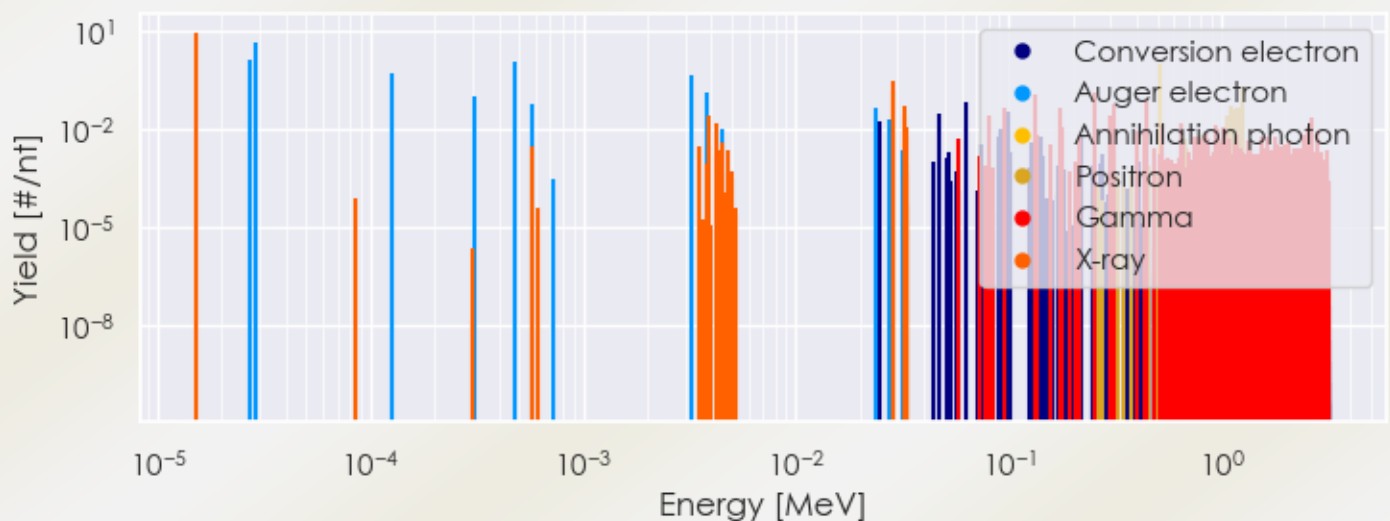
Note: Bins are spaced every 0.1 mm until a radius of 10 cm, and every 1 mm until a radius of 2 m.



Download tabulated dose point kernel file here: www.mirdsoft.org/products/MIRDspecs/Xe-121 DPK.csv

SUMMARY SPECTRA (PLOT)

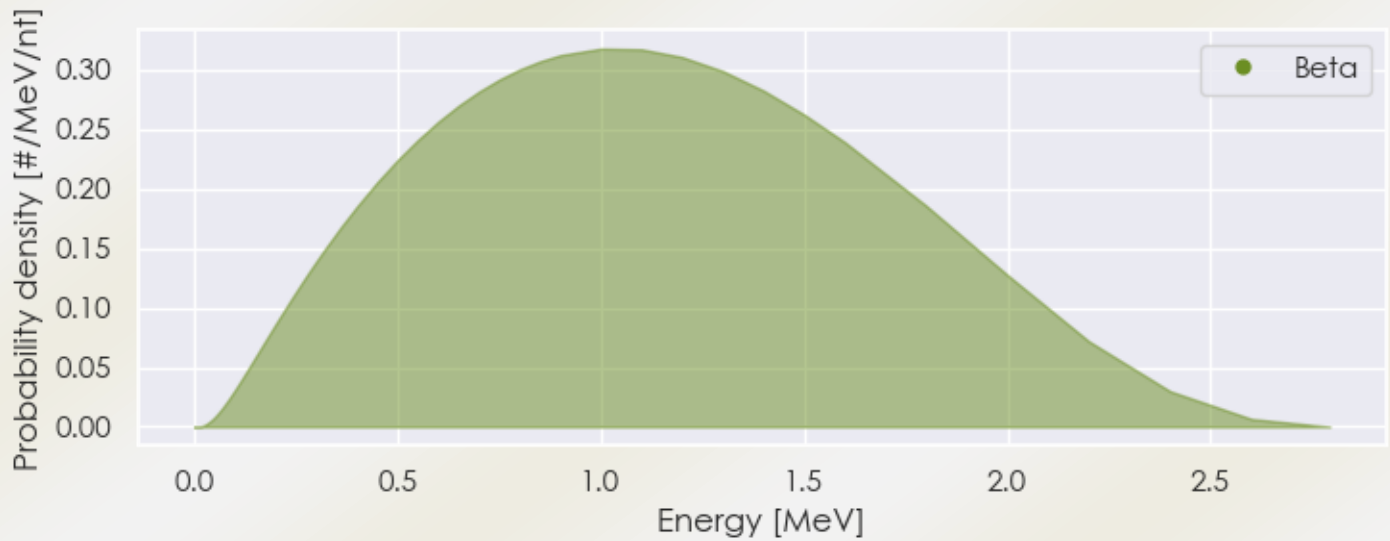
Spectra source: **ICRP Publication 107: Nuclear Decay Data for Dosimetric Calculations. Ann. ICRP 2008, 38 (3).**



Download tabulated summary spectra file here: www.mirdsoft.org/products/MIRDspecs/Xe-121 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-121 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-121 Summary Spectrum.csv

Energy [MeV]	Yield [# / nt] if > 0.01	Radiation type
1.52658e-05	8.990e+00	X-ray
3.92520e-03	2.625e-02	X-ray
4.21605e-03	1.539e-02	X-ray
2.83065e-02	1.548e-01	X-ray
2.86096e-02	2.873e-01	X-ray
3.22368e-02	2.672e-02	X-ray
3.22942e-02	5.182e-02	X-ray
3.30298e-02	1.090e-02	X-ray
8.01000e-02	2.394e-02	Gamma
9.57000e-02	4.536e-02	Gamma

1.32800e-01	1.096e-01	Gamma
1.75800e-01	4.284e-02	Gamma
1.77700e-01	1.071e-02	Gamma
2.52700e-01	1.260e-01	Gamma
3.00700e-01	2.583e-02	Gamma
3.10500e-01	5.418e-02	Gamma
4.33400e-01	1.058e-02	Gamma
4.45200e-01	7.812e-02	Gamma
5.11000e-01	9.609e-01	Annihilation photon
5.29100e-01	1.386e-02	Gamma
6.49700e-01	1.537e-02	Gamma
9.31000e-01	1.336e-02	Gamma
1.02390e+00	1.109e-02	Gamma
1.03560e+00	1.058e-02	Gamma
2.54470e+00	1.071e-02	Gamma
2.64340e+00	2.205e-02	Gamma
1.05698e+00	2.710e-02	Positron
1.07372e+00	1.807e-02	Positron
1.11899e+00	5.119e-02	Positron
1.14568e+00	3.614e-02	Positron
1.18120e+00	4.517e-02	Positron
1.20108e+00	4.617e-02	Positron
1.26266e+00	2.008e-01	Positron
2.70197e-05	1.348e+00	Auger electron
2.89514e-05	4.333e+00	Auger electron
1.25059e-04	4.971e-01	Auger electron
3.05737e-04	9.508e-02	Auger electron
4.76981e-04	1.154e+00	Auger electron
5.78509e-04	5.493e-02	Auger electron
3.20497e-03	4.525e-01	Auger electron
3.83965e-03	1.337e-01	Auger electron
2.35598e-02	4.647e-02	Auger electron
2.46360e-02	1.697e-02	Conversion electron
2.75866e-02	2.080e-02	Auger electron
4.69360e-02	2.969e-02	Conversion electron
6.25360e-02	6.195e-02	Conversion electron
9.11455e-02	1.049e-02	Conversion electron
9.96360e-02	3.237e-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