



CESIUM-121M

SUMMARY DATA

GENERAL

CLASSIFICATION

Isotope: Cs-121m
Atomic number (Z): 55
Mass number (A): 121
Neutron number (N): 66

RADIOACTIVE DECAY

Decay modes: β^+ , Electron capture, Internal transition
Half-life: 122.0 [s]
Decay constant: 5.6815×10^{-3} [1/s]
Daughters: Xe-121 (83.0%), Cs-121 (17.0%)
Radioactive daughters: Xe-121, Cs-121

DOSIMETRIC CONSTANTS

Mean alpha energy: 0.0 [MeV]
Mean electron energy: 1.34751 [MeV]
Mean photon energy: 1.18208 [MeV]
Air kerma rate constant, Γ_{10} : 1.706×10^{-17} [Gy $\cdot$ m²/Bq $\cdot$ s]
Air kerma coefficient, K_{air} : 4.514×10^{-17} [Gy $\cdot$ m²/Bq $\cdot$ s]
Equilibrium dose constant for weakly-penetrating radiations (α and/or electrons), Δ_{wp} : 2.159×10^{-13} [Gy $\cdot$ kg/Bq $\cdot$ s]
Equilibrium dose constant for alphas, Δ_{α} : 0.000e+00 [Gy $\cdot$ kg/Bq $\cdot$ s]

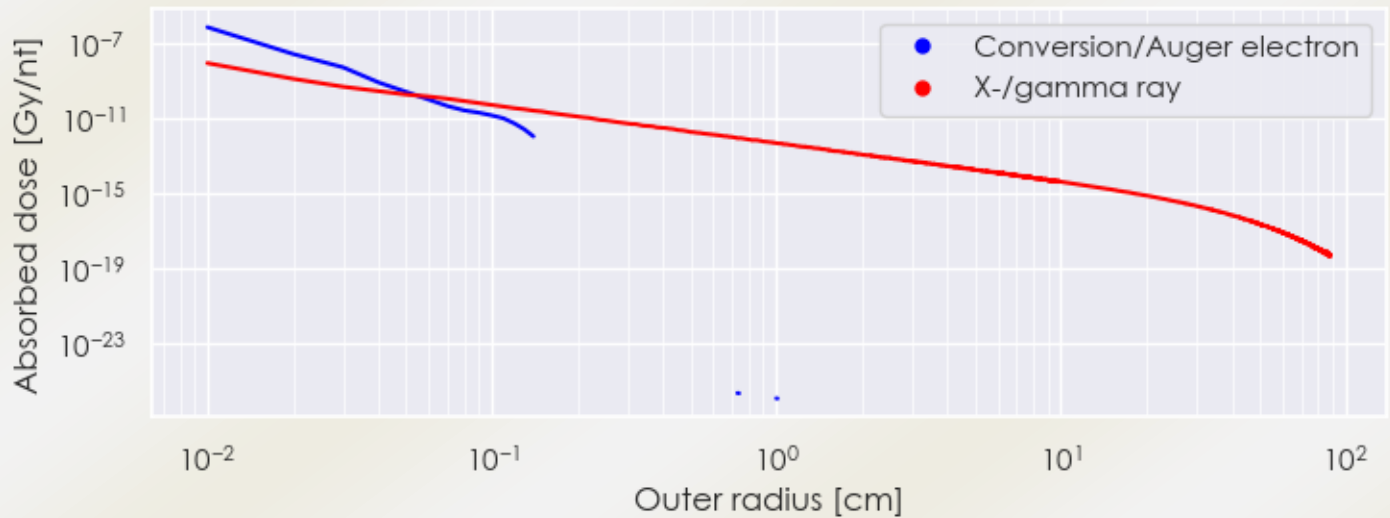
Equilibrium dose constant for betas/electrons, $\Delta_{\beta,\beta^+,e^-}$: 2.159×10^{-13} [Gy·kg/Bq·s]

Equilibrium dose constant for photons, Δ_p : 1.894×10^{-13} [Gy·kg/Bq·s]

DOSE POINT KERNELS (PLOT)

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

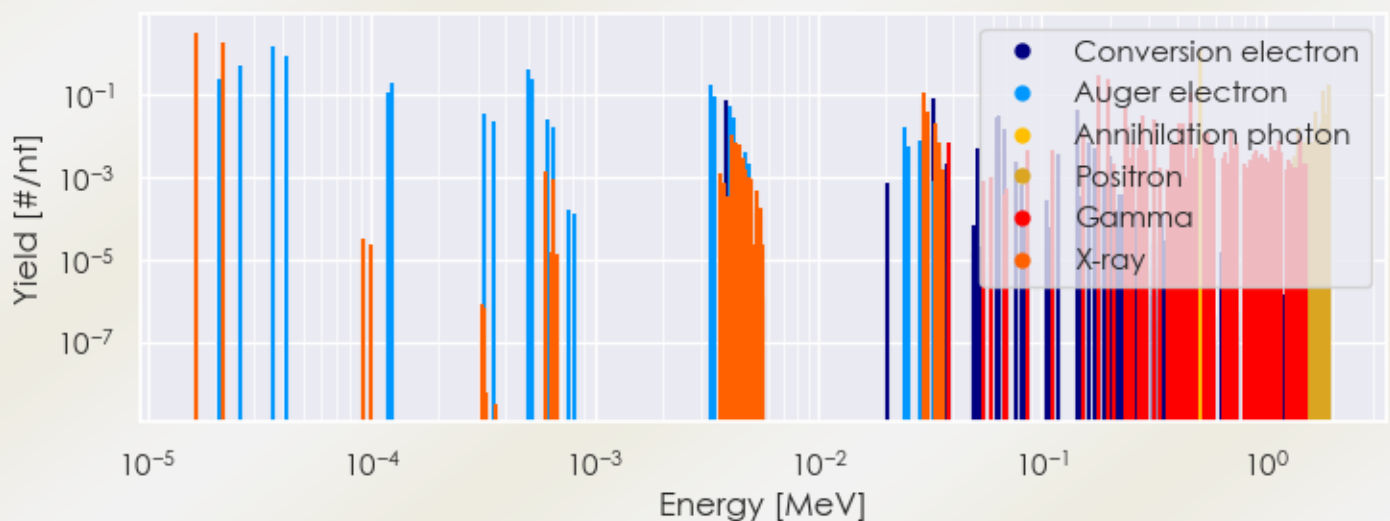
Note: Bins are spaced every 0.1 mm until a radius of 10 cm, and every 1 mm until a radius of 2 m.



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

SUMMARY SPECTRA (PLOT)

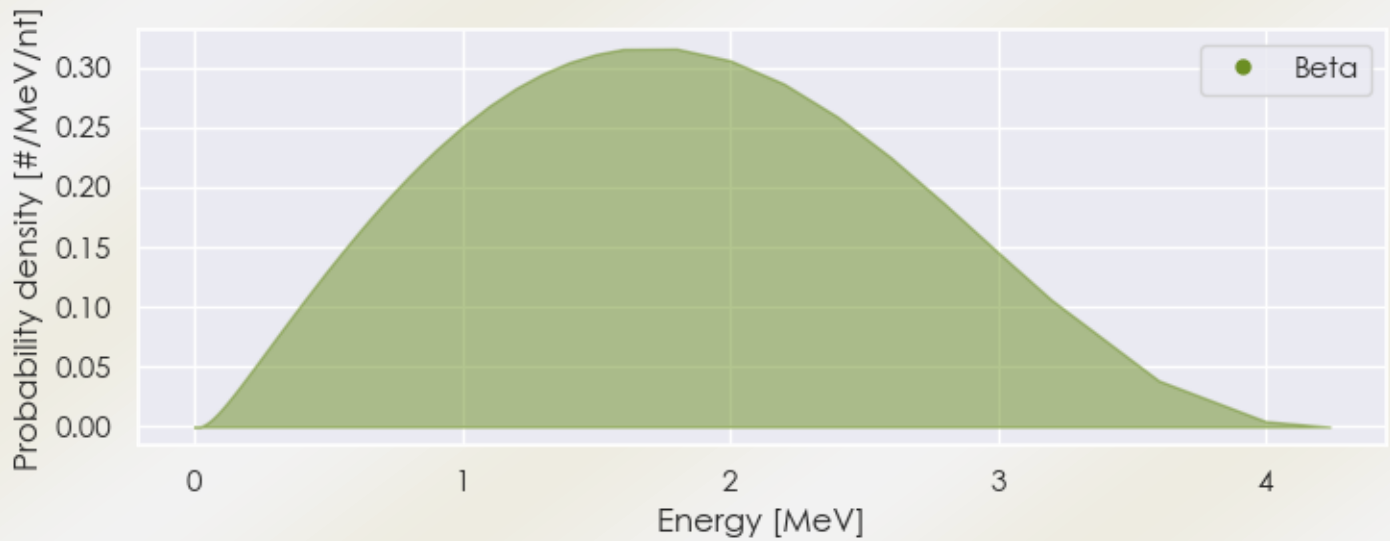
Spectra source: **ICRP Publication 107: Nuclear Decay Data for Dosimetric Calculations. Ann. ICRP 2008, 38 (3).**



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

Energy [MeV]	Yield [# / nt] if > 0.01	Radiation type
1.66176e-05	3.388e+00	X-ray
2.18915e-05	1.901e+00	X-ray
4.09719e-03	1.088e-02	X-ray
2.94521e-02	6.232e-02	X-ray
2.97812e-02	1.154e-01	X-ray
3.06218e-02	2.142e-02	X-ray
3.09789e-02	3.956e-02	X-ray
3.35665e-02	1.083e-02	X-ray
3.36295e-02	2.100e-02	X-ray

1.53900e-01	1.173e-02	Gamma
1.79400e-01	3.021e-01	Gamma
1.96000e-01	2.413e-01	Gamma
2.34500e-01	4.691e-02	Gamma
2.39600e-01	1.746e-02	Gamma
2.78900e-01	1.303e-02	Gamma
2.80100e-01	1.564e-02	Gamma
2.80100e-01	3.127e-02	Gamma
3.20900e-01	2.606e-02	Gamma
4.14100e-01	2.163e-02	Gamma
4.27100e-01	2.111e-02	Gamma
4.50100e-01	1.303e-02	Gamma
4.59700e-01	1.199e-01	Gamma
5.11000e-01	1.451e+00	Annihilation photon
5.26700e-01	1.251e-02	Gamma
5.55000e-01	1.199e-02	Gamma
7.06200e-01	1.407e-02	Gamma
1.43270e+00	1.042e-02	Gamma
1.41438e+00	1.685e-02	Positron
1.67922e+00	2.006e-02	Positron
1.68765e+00	3.911e-02	Positron
1.70952e+00	1.093e-02	Positron
1.72087e+00	1.123e-02	Positron
1.76109e+00	2.006e-02	Positron
1.79355e+00	1.404e-02	Positron
1.80895e+00	1.324e-01	Positron
1.83037e+00	3.410e-02	Positron
1.91542e+00	8.726e-02	Positron
1.93367e+00	7.823e-02	Positron
1.94151e+00	1.855e-01	Positron
2.10709e-05	2.555e-01	Auger electron
2.61667e-05	5.279e-01	Auger electron
3.62396e-05	1.612e+00	Auger electron
4.14575e-05	9.015e-01	Auger electron
1.17974e-04	1.139e-01	Auger electron
1.23767e-04	1.983e-01	Auger electron
3.19845e-04	3.741e-02	Auger electron
3.52105e-04	2.416e-02	Auger electron

5.05091e-04	4.422e-01	Auger electron
5.28931e-04	2.447e-01	Auger electron
6.17233e-04	2.530e-02	Auger electron
6.54643e-04	1.611e-02	Auger electron
3.32460e-03	1.743e-01	Auger electron
3.44242e-03	9.525e-02	Auger electron
3.84400e-03	7.839e-02	Conversion electron
4.00175e-03	5.171e-02	Auger electron
4.16445e-03	2.937e-02	Auger electron
2.44715e-02	1.752e-02	Auger electron
3.25150e-02	8.315e-02	Conversion electron
6.28151e-02	2.924e-02	Conversion electron
6.34939e-02	3.271e-02	Conversion electron
6.75093e-02	1.578e-02	Conversion electron
1.44844e-01	4.252e-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