



PROMETHIUM-137M

SUMMARY DATA

GENERAL

CLASSIFICATION

Isotope: Pm-137m
Atomic number (Z): 61
Mass number (A): 137
Neutron number (N): 76

RADIOACTIVE DECAY

Decay modes: β^+ , Electron capture
Half-life: 2.4 [m]
Decay constant: 4.8135e-03 [1/s]
Daughters: Nd-137 (100.0%)
Radioactive daughters: Nd-137

DOSIMETRIC CONSTANTS

Mean alpha energy: 0.0 [MeV]
Mean electron energy: 1.11202 [MeV]
Mean photon energy: 1.78348 [MeV]
Air kerma rate constant, Γ_{10} : 4.178e-17 [Gy·m²/Bq·s]
Air kerma coefficient, K_{air} : 6.713e-17 [Gy·m²/Bq·s]
Equilibrium dose constant for weakly-penetrating radiations (α and/or electrons), Δ_{wp} : 1.782e-13 [Gy·kg/Bq·s]
Equilibrium dose constant for alphas, Δ_{α} : 0.000e+00 [Gy·kg/Bq·s]

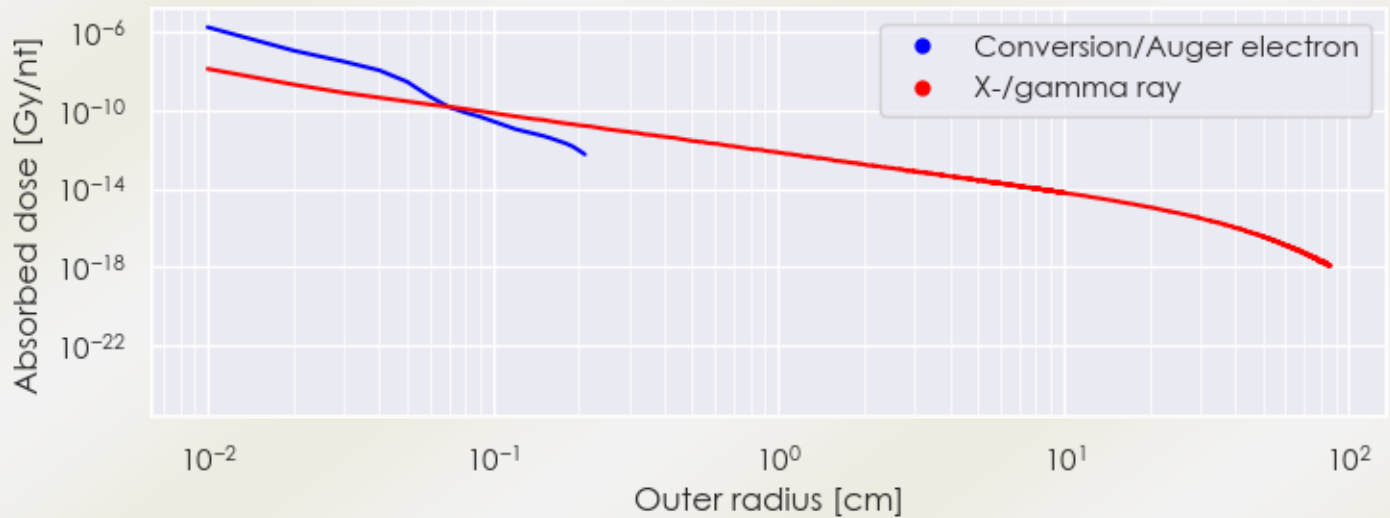
Equilibrium dose constant for betas/electrons, $\Delta_{\beta, \beta^+, e^-}$: 1.782×10^{-13} [Gy·kg/Bq·s]

Equilibrium dose constant for photons, Δ_p : 2.857×10^{-13} [Gy·kg/Bq·s]

DOSE POINT KERNELS (PLOT)

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

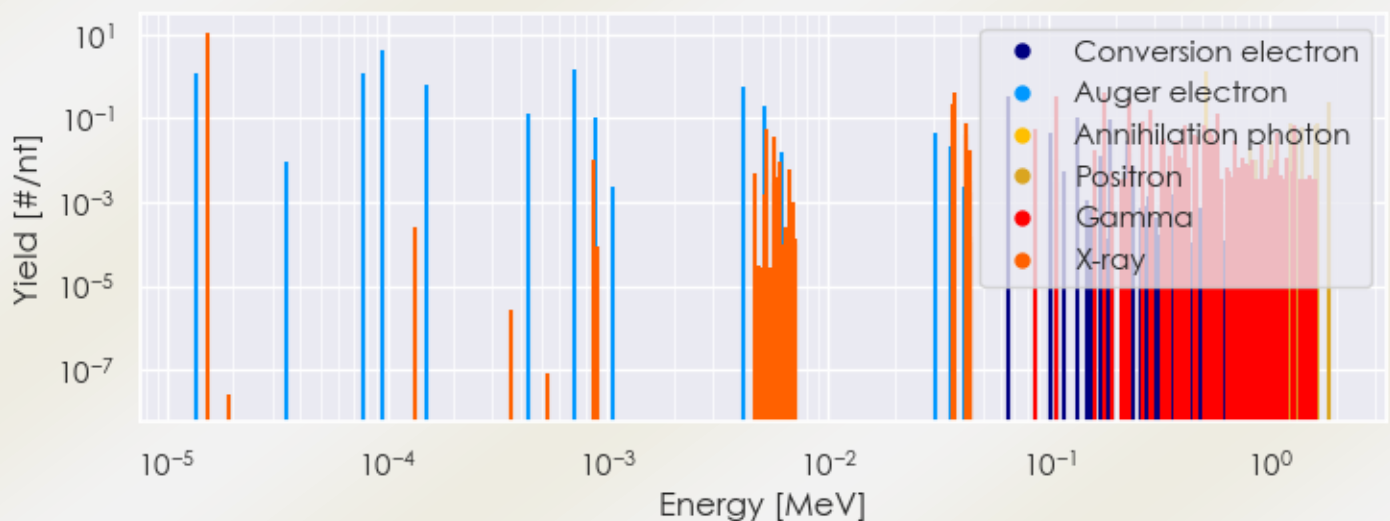
Note: Bins are spaced every 0.1 mm until a radius of 10 cm, and every 1 mm until a radius of 2 m.



Download tabulated dose point kernel file here: www.mirdsoft.org/products/MIRDspecs/Pm-137m DPK.csv

SUMMARY SPECTRA (PLOT)

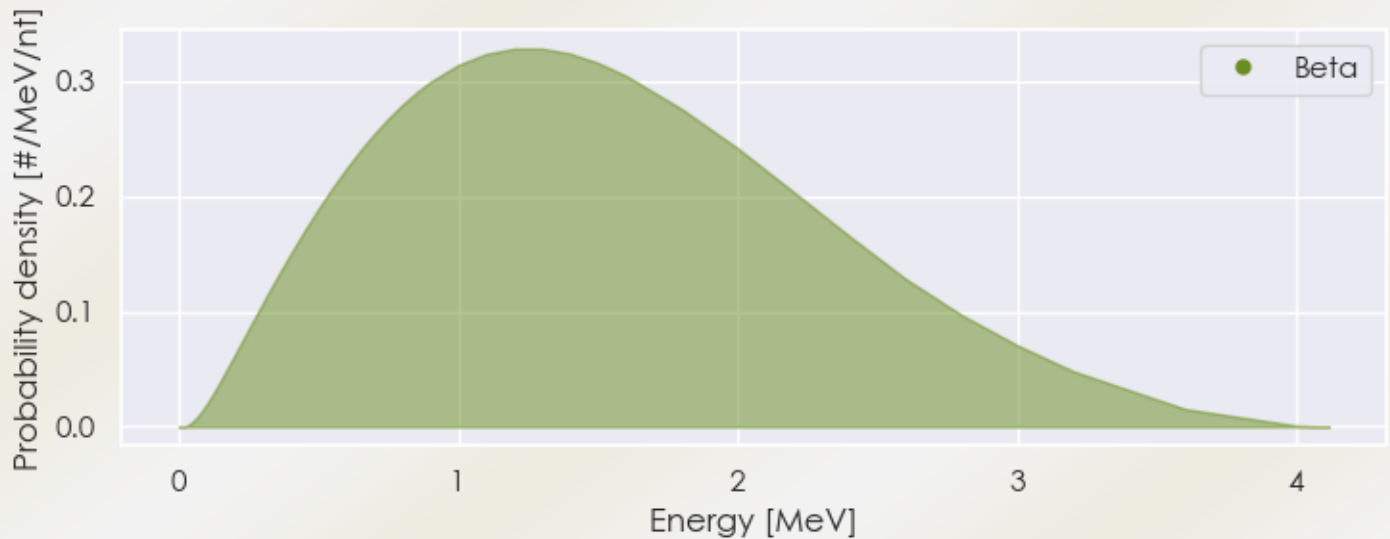
Spectra source: **ICRP Publication 107: Nuclear Decay Data for Dosimetric Calculations. Ann. ICRP 2008, 38 (3).**



Download tabulated summary spectra file here: www.mirdsoft.org/products/MIRDspecs/Pm-137m 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/Pm-137m 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/Pm-137m Summary Spectrum.csv

Energy [MeV]	Yield [# / nt] if > 0.01	Radiation type
1.52029e-05	1.128e+01	X-ray
8.63687e-04	1.001e-02	X-ray
5.21638e-03	5.491e-02	X-ray
5.72010e-03	3.577e-02	X-ray
3.68696e-02	2.266e-01	X-ray
3.73962e-02	4.127e-01	X-ray
4.22041e-02	4.077e-02	X-ray
4.23100e-02	7.889e-02	X-ray
4.33673e-02	1.701e-02	X-ray

8.70000e-02	5.740e-02	Gamma
1.08600e-01	3.500e-01	Gamma
1.60500e-01	1.645e-02	Gamma
1.77500e-01	4.028e-01	Gamma
2.33600e-01	2.958e-01	Gamma
2.68700e-01	8.470e-02	Gamma
2.86000e-01	1.606e-01	Gamma
3.25100e-01	2.905e-02	Gamma
3.28500e-01	3.290e-02	Gamma
3.52300e-01	1.295e-02	Gamma
3.70600e-01	2.905e-02	Gamma
3.89200e-01	2.940e-02	Gamma
3.97700e-01	1.190e-02	Gamma
4.10600e-01	7.000e-02	Gamma
4.14000e-01	2.170e-02	Gamma
4.57300e-01	4.235e-02	Gamma
4.59200e-01	1.890e-02	Gamma
4.70700e-01	3.640e-02	Gamma
5.06000e-01	7.000e-02	Gamma
5.11000e-01	1.310e+00	Annihilation photon
5.25100e-01	1.400e-02	Gamma
5.29200e-01	2.485e-02	Gamma
5.33800e-01	5.180e-02	Gamma
5.33800e-01	5.180e-02	Gamma
5.48800e-01	3.955e-02	Gamma
5.65600e-01	2.590e-02	Gamma
5.65600e-01	2.590e-02	Gamma
5.81000e-01	1.330e-01	Gamma
6.90800e-01	2.905e-02	Gamma
7.59500e-01	1.085e-02	Gamma
9.23000e-01	2.380e-02	Gamma
1.09220e+00	4.445e-02	Gamma
1.18990e+00	1.155e-02	Gamma
1.28470e+00	6.755e-02	Gamma
1.29350e+00	1.050e-02	Gamma
8.24899e-01	1.961e-02	Positron
1.02135e+00	2.941e-02	Positron
1.23687e+00	7.941e-02	Positron

1.28800e+00	1.961e-02	Positron
1.32557e+00	3.922e-02	Positron
1.41650e+00	5.882e-02	Positron
1.60750e+00	6.863e-02	Positron
1.66505e+00	7.549e-02	Positron
1.87951e+00	2.353e-01	Positron
1.36628e-05	1.128e+00	Auger electron
7.80873e-05	1.151e+00	Auger electron
9.39918e-05	4.272e+00	Auger electron
1.51659e-04	6.558e-01	Auger electron
4.39448e-04	1.330e-01	Auger electron
7.10712e-04	1.516e+00	Auger electron
8.73382e-04	1.041e-01	Auger electron
4.14816e-03	5.750e-01	Auger electron
5.09888e-03	1.933e-01	Auger electron
6.08299e-03	1.606e-02	Auger electron
3.03768e-02	4.361e-02	Auger electron
3.58432e-02	2.092e-02	Auger electron
6.50030e-02	3.405e-01	Conversion electron
1.01507e-01	4.366e-02	Conversion electron
1.07313e-01	1.013e-02	Conversion electron
1.33903e-01	9.899e-02	Conversion electron
1.70407e-01	1.262e-02	Conversion electron
1.90003e-01	9.347e-02	Conversion electron
2.26507e-01	1.003e-02	Conversion electron
2.26873e-01	2.934e-02	Conversion electron
2.27399e-01	1.935e-02	Conversion electron
2.32313e-01	1.362e-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