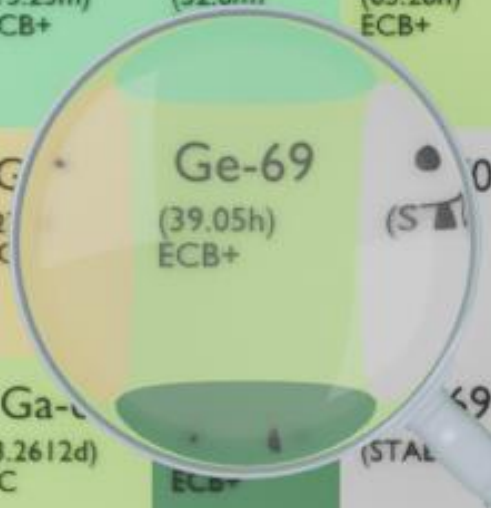




As-66 (151.6s) ECB+	As-67 (15.23m) ECB+	As-69 (52.6m)	As-71 (65.28h) ECB+	As-72 (26.0h) ECB+	As-73 (80.30d) EC	As-74 (17.77d) ECB+B-
Ge-66 (2.26h) ECB+	Ge-67 (18.9m) ECB+	Ge-69 (39.05h) ECB+	Ge-70 (1.1h) EC	Ge-71 (11.43d) EC	Ge-72 (STABLE)	Ge-73 (STABLE)
Ga-64 (2.627m) ECB+	Ga-65 (15.2m) ECB+	Ga-66 (9.49h) ECB+	Ga-67 (3.2612d) EC	Ga-69 (STABLE)	Ga-70 (21.14m) B-EC	Ga-71 (STABLE)
						Ga-72 (14.10h) B-

GERMANIUM-69

SUMMARY DATA

GENERAL

CLASSIFICATION

Isotope: Ge-69
Atomic number (Z): 32
Mass number (A): 69
Neutron number (N): 37

RADIOACTIVE DECAY

Decay modes: β^+ , Electron capture
Half-life: 39.05 [h]
Decay constant: 4.9306e-06 [1/s]
Daughters: Ga-69 (100.0%)
Radioactive daughters: None

DOSIMETRIC CONSTANTS

Mean alpha energy: 0.0 [MeV]
Mean electron energy: 0.1203 [MeV]
Mean photon energy: 0.95049 [MeV]
Air kerma rate constant, Γ_{10} : 2.709e-17 [Gy·m²/Bq·s]
Air kerma coefficient, K_{air} : 3.621e-17 [Gy·m²/Bq·s]
Equilibrium dose constant for weakly-penetrating radiations (α and/or electrons), Δ_{wp} : 1.927e-14 [Gy·kg/Bq·s]
Equilibrium dose constant for alphas, Δ_{α} : 0.000e+00 [Gy·kg/Bq·s]

Equilibrium dose constant for betas/electrons, $\Delta_{\beta,\beta^+,e^-}$: 1.927×10^{-14} [Gy·kg/Bq·s]

Equilibrium dose constant for photons, Δ_p : 1.523×10^{-13} [Gy·kg/Bq·s]

DOSE POINT KERNELS (PLOT)

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

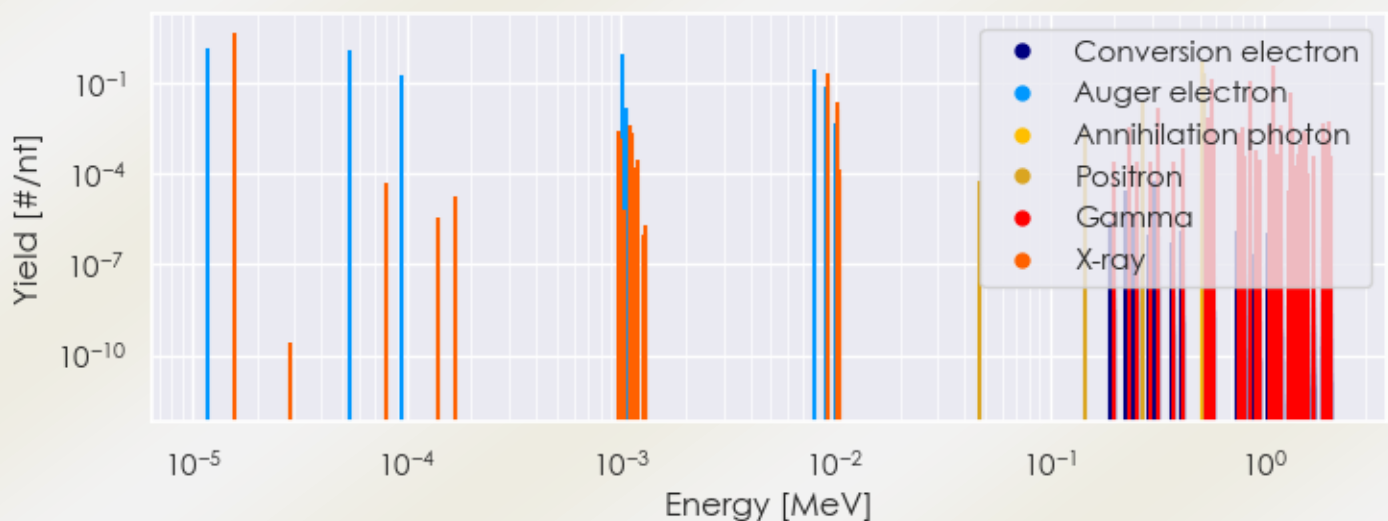
Note: Bins are spaced every 0.1 mm until a radius of 10 cm, and every 1 mm until a radius of 2 m.



Download tabulated dose point kernel file here: www.mirdsoft.org/products/MIRDspecs/Ge-69 DPK.csv

SUMMARY SPECTRA (PLOT)

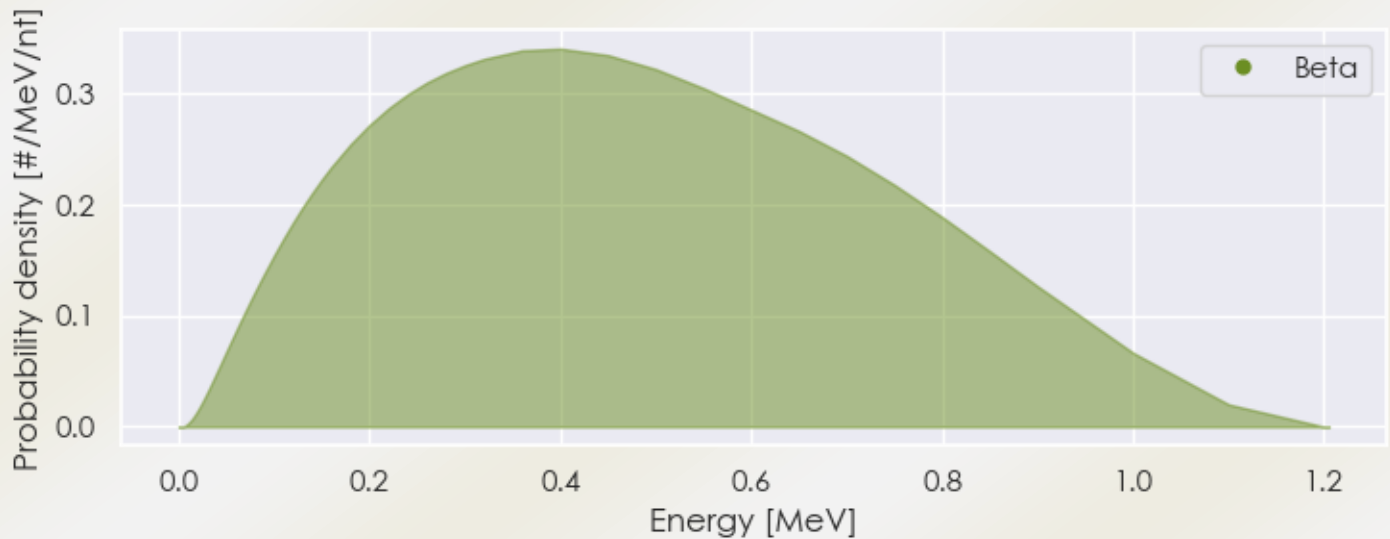
Spectra source: **ICRP Publication 107: Nuclear Decay Data for Dosimetric Calculations. Ann. ICRP 2008, 38 (3).**



Download tabulated summary spectra file here: www.mirdsoft.org/products/MIRDspecs/Ge-69 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/Ge-69 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/Ge-69 Summary Spectrum.csv

Energy [MeV]	Yield [# / nt] if > 0.01	Radiation type
1.57868e-05	4.751e+00	X-ray
9.18060e-03	1.011e-01	X-ray
9.20900e-03	1.966e-01	X-ray
1.02200e-02	1.278e-02	X-ray
1.02237e-02	2.497e-02	X-ray
3.18630e-01	1.548e-02	Gamma
5.11000e-01	4.709e-01	Annihilation photon
5.74110e-01	1.332e-01	Gamma
8.71980e-01	1.188e-01	Gamma
1.10677e+00	3.600e-01	Gamma

1.33660e+00	4.500e-02	Gamma
2.71521e-01	2.298e-02	Positron
5.22189e-01	2.098e-01	Positron
1.17412e-05	1.306e+00	Auger electron
5.44248e-05	1.198e+00	Auger electron
9.44559e-05	1.809e-01	Auger electron
1.00292e-03	9.469e-01	Auger electron
1.05287e-03	1.469e-02	Auger electron
7.99646e-03	2.645e-01	Auger electron
9.04875e-03	6.985e-02	Auger 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