

|                          |                          |                           |                           |                          |                          |                          |                           |                   |
|--------------------------|--------------------------|---------------------------|---------------------------|--------------------------|--------------------------|--------------------------|---------------------------|-------------------|
| Zn-60<br>(2.38m)<br>ECB+ | Zn-61<br>(89.1s)<br>ECB+ | Zn-62<br>(9.186h)<br>ECB+ | Zn-63<br>(38.47m)<br>ECB+ | Ga-65<br>(15.2m)<br>ECB+ | Ga-66<br>(2.26h)<br>ECB+ | Ga-67<br>(3.2612d)<br>EC | Ga-68<br>(67.71m)<br>ECB+ | Ga-69<br>(STABLE) |
|--------------------------|--------------------------|---------------------------|---------------------------|--------------------------|--------------------------|--------------------------|---------------------------|-------------------|

# GALLIUM-65

## SUMMARY DATA

## GENERAL

## CLASSIFICATION

Isotope: Ga-65  
Atomic number (Z): 31  
Mass number (A): 65  
Neutron number (N): 34

## RADIOACTIVE DECAY

Decay modes:  $\beta^+$ , Electron capture  
Half-life: 15.2 [m]  
Decay constant: 7.6003e-04 [1/s]  
Daughters: Zn-65 (100.0%)  
Radioactive daughters: Zn-65

## DOSIMETRIC CONSTANTS

Mean alpha energy: 0.0 [MeV]  
Mean electron energy: 0.81581 [MeV]  
Mean photon energy: 1.16497 [MeV]  
Air kerma rate constant,  $\Gamma_{10}$ : 8.563e-18 [Gy · m<sup>2</sup>/Bq · s]  
Air kerma coefficient,  $K_{\text{air}}$ : 4.311e-17 [Gy · m<sup>2</sup>/Bq · s]  
Equilibrium dose constant for weakly-penetrating radiations (a and/or electrons),  $\Delta_{\text{wp}}$ : 1.307e-13 [Gy · kg/Bq · s]  
Equilibrium dose constant for alphas,  $\Delta_{\alpha}$ : 0.000e+00 [Gy · kg/Bq · s]

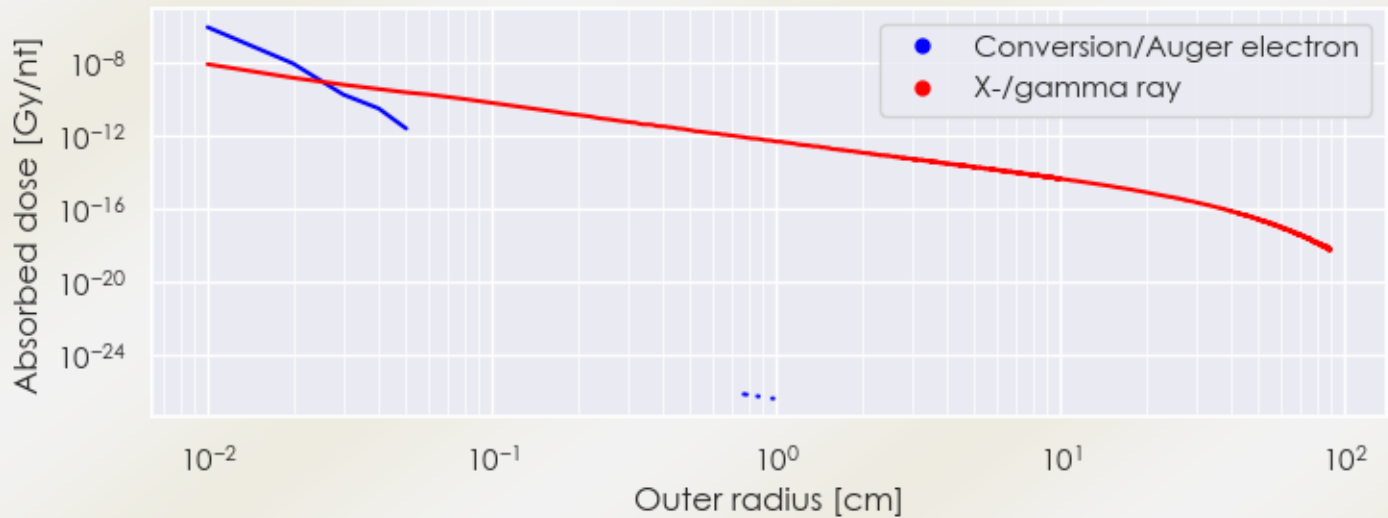
Equilibrium dose constant for betas/electrons,  $\Delta_{\beta-\beta^+,e^-}$ :  $1.307\text{e-}13$  [Gy·kg/Bq·s]

Equilibrium dose constant for photons,  $\Delta_p$ :  $1.866\text{e-}13$  [Gy·kg/Bq·s]

### DOSE POINT KERNELS (PLOT)

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

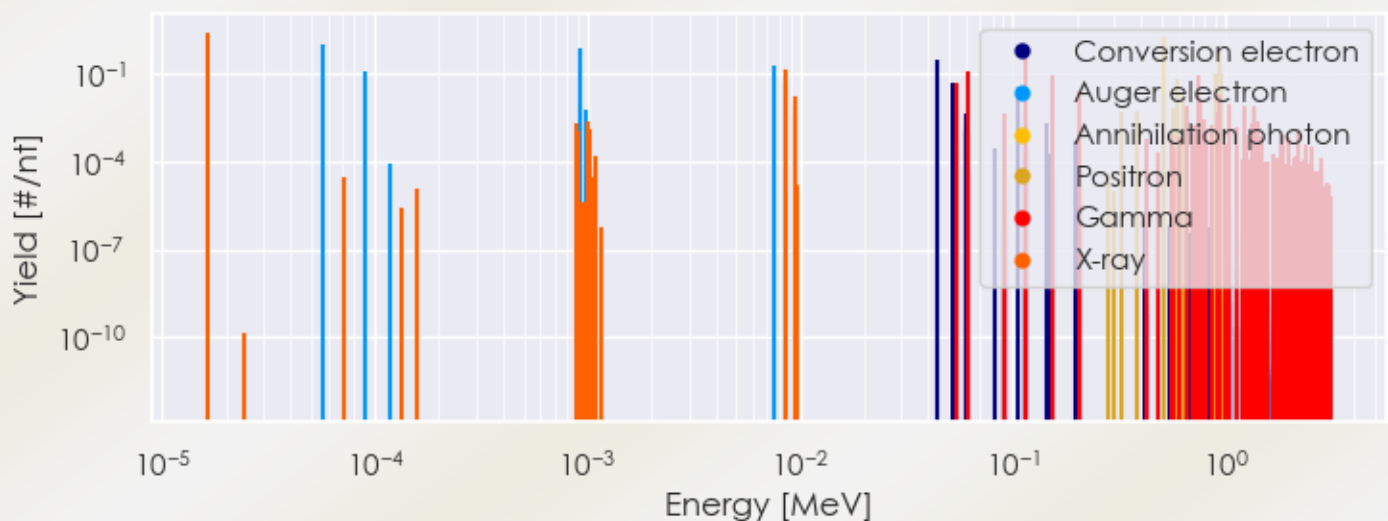
Note: Bins are spaced every 0.1 mm until a radius of 10 cm, and every 1 mm until a radius of 2 m.



Download tabulated dose point kernel file here: [www.mirdsoft.org/products/MIRDspecs/Ga-65 DPK.csv](http://www.mirdsoft.org/products/MIRDspecs/Ga-65 DPK.csv)

### SUMMARY SPECTRA (PLOT)

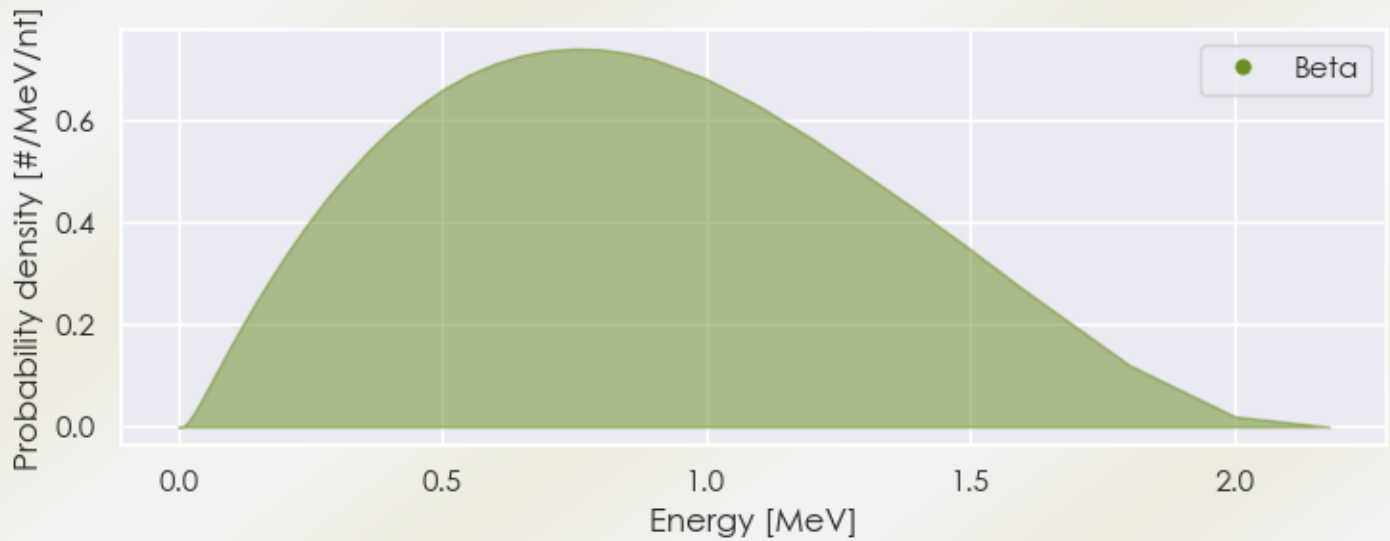
Spectra source: **ICRP Publication 107: Nuclear Decay Data for Dosimetric Calculations. Ann. ICRP 2008, 38 (3).**



Download tabulated summary spectra file here: [www.mirdsoft.org/products/MIRDspecs/Ga-65 Summary Spectrum.csv](http://www.mirdsoft.org/products/MIRDspecs/Ga-65 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/Ga-65 Beta Spectrum.csv](http://www.mirdsoft.org/products/MIRDspecs/Ga-65 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/Ga-65 Summary Spectrum.csv](http://www.mirdsoft.org/products/MIRDspecs/Ga-65 Summary Spectrum.csv)

| Energy [MeV] | Yield [# / nt] if > 0.01 | Radiation type      |
|--------------|--------------------------|---------------------|
| 1.63568e-05  | 2.453e+00                | X-ray               |
| 8.57190e-03  | 6.404e-02                | X-ray               |
| 8.59639e-03  | 1.247e-01                | X-ray               |
| 9.53181e-03  | 1.548e-02                | X-ray               |
| 5.39300e-02  | 4.860e-02                | Gamma               |
| 6.12000e-02  | 1.139e-01                | Gamma               |
| 1.15090e-01  | 5.400e-01                | Gamma               |
| 1.53000e-01  | 8.856e-02                | Gamma               |
| 2.06900e-01  | 2.538e-02                | Gamma               |
| 5.11000e-01  | 1.785e+00                | Annihilation photon |

|             |           |                     |
|-------------|-----------|---------------------|
| 7.51800e-01 | 8.100e-02 | Gamma               |
| 7.68900e-01 | 1.269e-02 | Gamma               |
| 9.32200e-01 | 1.793e-02 | Gamma               |
| 5.12397e-01 | 1.881e-02 | Positron            |
| 5.93133e-01 | 6.436e-02 | Positron            |
| 6.37221e-01 | 1.782e-02 | Positron            |
| 8.94371e-01 | 1.010e-01 | Positron            |
| 9.36932e-01 | 5.743e-01 | Positron            |
| 9.65369e-01 | 9.902e-02 | Positron            |
| 5.68468e-05 | 8.856e-01 | Auger electron      |
| 8.96298e-05 | 1.166e-01 | Auger electron      |
| 9.29250e-04 | 6.721e-01 | Auger electron      |
| 7.48697e-03 | 1.911e-01 | Auger electron      |
| 8.45550e-03 | 4.877e-02 | Auger electron      |
| 4.43076e-02 | 2.752e-01 | Conversion electron |
| 5.15776e-02 | 4.922e-02 | Conversion electron |
| 5.27456e-02 | 2.349e-02 | Conversion electron |
| 5.29040e-02 | 1.227e-02 | Conversion electron |
| 1.05468e-01 | 3.320e-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](https://sites.snmmi.org/SNMMI-MAIN/iCore/Store/StoreLayouts/Item_Detail.aspx?iProductCode=0-932004-80-6)