



Co-55 (17.53h) ECB+	Co-56 (77.23d) ECB+	Co-57 (271.74d) EC	Co-58 (70.86d) ECB+
Fe-53m (2.526m) IT	Fe-55 (2.737y) EC	Fe-56 (STABLE)	Fe-57 (STABLE)
Mn-53 (46.2m) ECB+	Mn-54 (312.12d) ECB+B-	Mn-55 (STABLE)	Mn-56 (2.5789h) B-

IRON-53M

SUMMARY DATA

GENERAL

CLASSIFICATION

Isotope: Fe-53m
Atomic number (Z): 26
Mass number (A): 53
Neutron number (N): 27

RADIOACTIVE DECAY

Decay modes: Internal transition
Half-life: 2.526 [m]
Decay constant: 4.5734×10^{-3} [1/s]
Daughters: Fe-53 (100.0%)
Radioactive daughters: Fe-53

DOSIMETRIC CONSTANTS

Mean alpha energy: 0.0 [MeV]
Mean electron energy: 0.0023 [MeV]
Mean photon energy: 3.05469 [MeV]
Air kerma rate constant, Γ_{10} : 1.054×10^{-16} [Gy $\cdot$ m²/Bq $\cdot$ s]
Air kerma coefficient, K_{air} : 1.054×10^{-16} [Gy $\cdot$ m²/Bq $\cdot$ s]
Equilibrium dose constant for weakly-penetrating radiations (α and/or electrons), Δ_{wp} : 3.685×10^{-16} [Gy $\cdot$ kg/Bq $\cdot$ s]
Equilibrium dose constant for alphas, Δ_{α} : 0.000e+00 [Gy $\cdot$ kg/Bq $\cdot$ s]

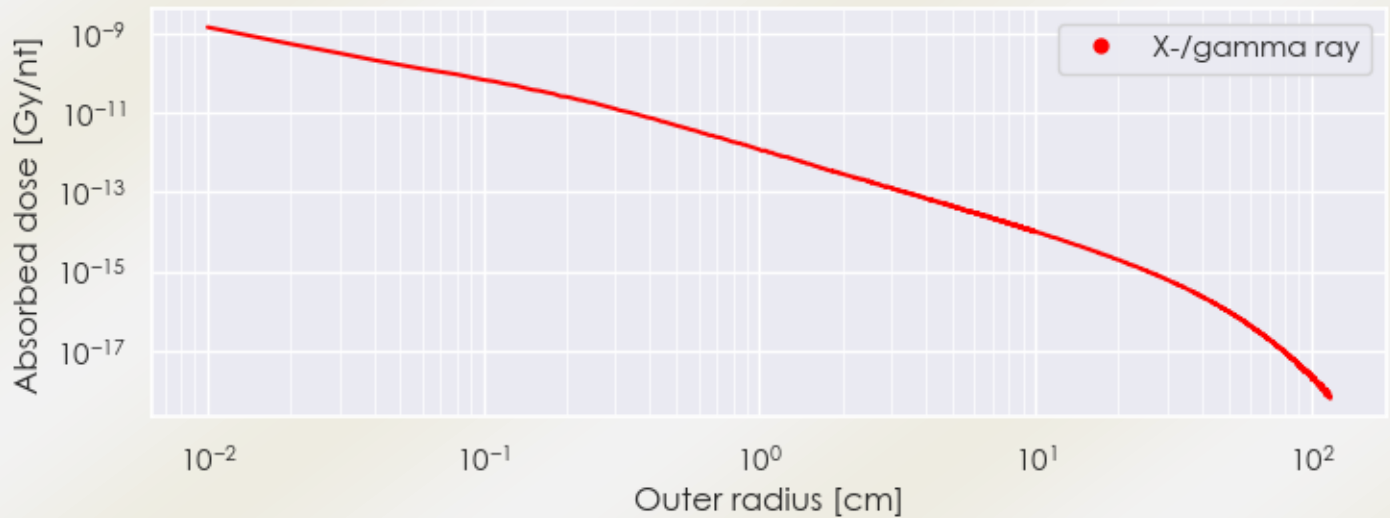
Equilibrium dose constant for betas/electrons, $\Delta_{\beta-\beta+,e-}$: 3.685×10^{-16} [Gy·kg/Bq·s]

Equilibrium dose constant for photons, Δ_p : 4.894×10^{-13} [Gy·kg/Bq·s]

DOSE POINT KERNELS (PLOT)

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

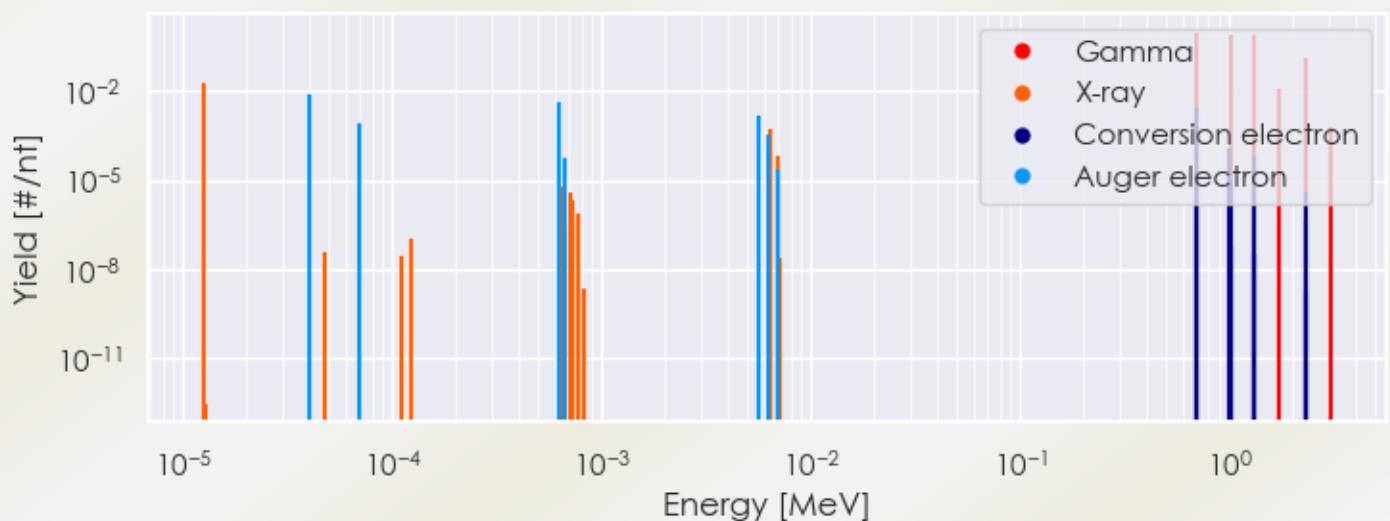
Note: Bins are spaced every 0.1 mm until a radius of 10 cm, and every 1 mm until a radius of 2 m.



Download tabulated dose point kernel file here: www.mirdsoft.org/products/MIRDspecs/Fe-53m 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/Fe-53m Summary 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/Fe-53m Summary Spectrum.csv](http://www.mirdsoft.org/products/MIRDspecs/Fe-53m%20Summary%20Spectrum.csv)

Energy [MeV]	Yield [# /n] if > 0.01	Radiation type
1.25339e-05	1.826e-02	X-ray
7.01100e-01	1.000e+00	Gamma
1.01150e+00	8.600e-01	Gamma
1.32810e+00	8.700e-01	Gamma
1.71260e+00	1.300e-02	Gamma
2.33970e+00	1.300e-01	Gamma

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