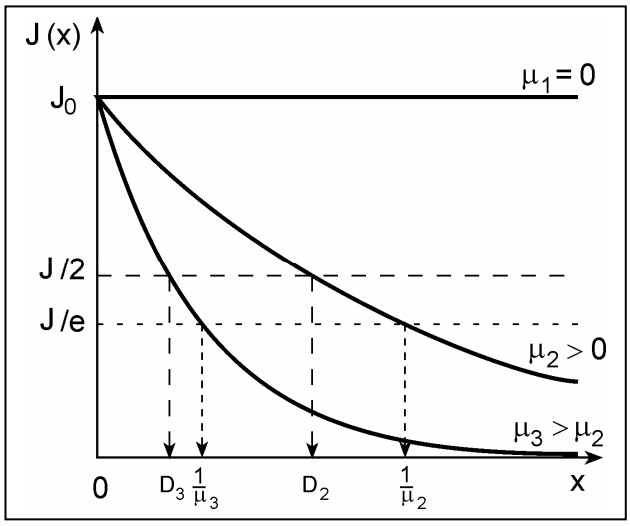
Decrease in radiation intensity while passing through matter
Energy absorption, reflection, dispersion

Outgoing intensity (J) depends on both the type (μ) and depth (x) of the traversed medium, as well as the intensity of the incident radiation (J_0).
Small distances linear proportionality holds.



$$\Delta J_E = -\mu \Delta x J_E \qquad \frac{dJ}{dx} = -\mu J$$

Solution ($J = J_0$ when $x = 0$)

$$J = J_0 \mathrm{e}^{-\mu x}$$

The validity of the law depends on the interaction between matter and radiation, but in most cases it provides a very good approximation.

The attenuation coefficient is the inverse of the distance that reduces the intensity by a factor of $1/e$.

D is called the layer thickness for half-intensity.

Types of radiation
electromagnetic radiation (such as light and gamma rays)
mechanical radiation (e.g. sound and ultrasound in particular)
particle radiation (such as alpha or beta rays)

non-ionizing types of radiation
(electromagnetic radiation 1: light; and mechanical radiation: sound, ultrasound)
ionizing radiations
(electromagnetic radiation 2: x-rays, gamma rays; and particle radiations: alpha and beta rays).

Spectrum of EMR

Emission spectrum and its different representations