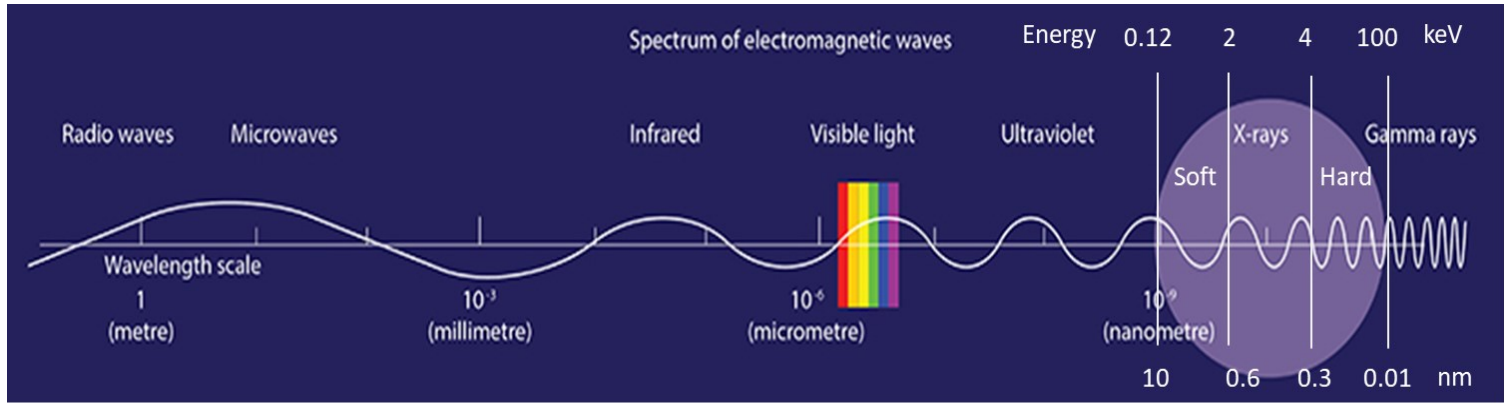
Relation between wavelength and energy for X-ray

This is a rule of thumb to calculate easily the wavelength from energy, because energies are usually used in X-ray range rather than wavelengths

!!! The sign = here means conversion not = mathematically

Because the dimension [keV nm] of the denominator is neglected

$$\lambda\ [nm] = 1.24 / E\ [keV]$$



Explanation

Notations, constants, units:

λ - the wavelength of the wave in [nm]

ν - frequency of the wave in [Hz]

c – speed of light in vacuum [m/s]

E – energy of the photon in Joule [J] : $E = h\nu$;

1eV= 1.6 10^{-19} [J]

h – Planck constant, h = 6.62607015 × 10^{-34} [J s]

Relations:

$\lambda = hc / E$

$hc \approx 2 \times 10^{-26}$ [J m]

$E\ [J] = E\ [ev]\ 1.6 \times 10^{-19}$

$\lambda\ [m] = \lambda\ [nm] \times 10^{-9}$

$\lambda\ [nm] \times 10^{-9} = 1.984 \times 10^{-25} / E\ [keV] \times 1.6\ 10^{-16}$

$$\lambda\ [nm] = 1.24 / E\ [keV]$$