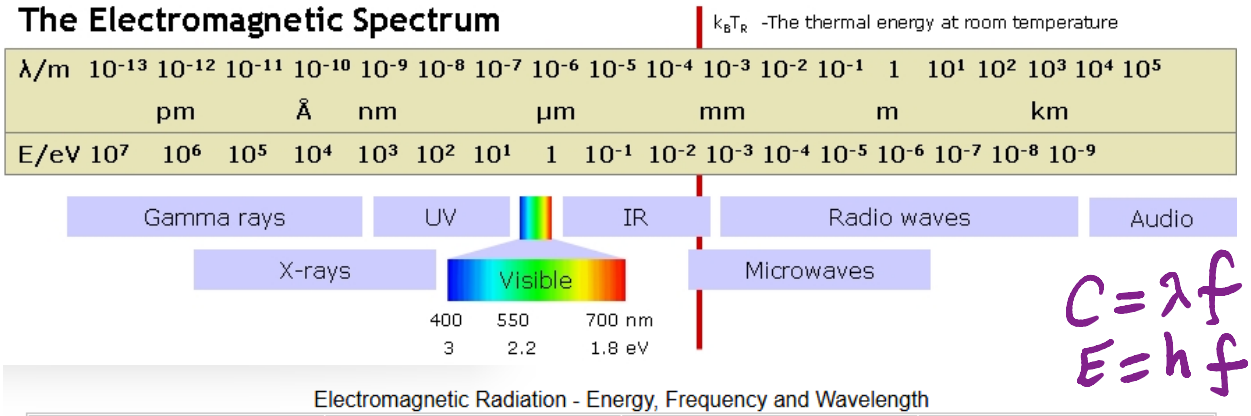

Electromagnetic Radiation - Energy, Frequency and Wavelength

Type	Wavelength (m) λ	Frequency (Hz) f	Energy (eV)* E
Electricity	$5\ 10^5$	50 - 60	
Long wave, television	10^5 - 10^2	< $3\ 10^9$	
Short wave, radio	10^2 - 10^{-1}	10^8 - $3\ 10^9$	< 10^{-5}
Microwaves	10^{-1} - 10^{-3}	$3\ 10^9$ - $3\ 10^{12}$	10^{-5} - 10^{-2}
Infrared light	10^{-3} - $7\ 10^{-7}$	$3\ 10^{12}$ - $3\ 10^{14}$	10^{-2} - 2
Visible light	$7\ 10^{-7}$ - $4\ 10^{-7}$	$4.3\ 10^{14}$ - $7.5\ 10^{14}$	2 - 3
Ultraviolet light	$4\ 10^{-7}$ - 10^{-9}	$7.5\ 10^{14}$ - $3\ 10^{17}$	3 - 10^3
X-rays	10^{-9} - 10^{-11}	$3\ 10^{17}$ - $3\ 10^{19}$	10^3 - 10^5
Gamma rays	10^{-11} - 10^{-13}	$3\ 10^{19}$ - 10^{21}	> 10^5
Cosmic rays	10^{-13} - 10^{-20}	10^{21} - 10^{25}	

* eV = electron-volts

Figure 2: The electromagnetic spectrum, which is the range of all possible electromagnetic radiation. Note that $1K = 8.625 \times 10^{-5}eV \sim 10^{-4}eV$. Also, nearly all objects in the universe emit, reflect or transmit some light. The distribution of this light along the electromagnetic spectrum (called the spectrum of the object) is determined by what the object is made of.

$1\ k = 8.625 \times 10^{-5}\ eV$