

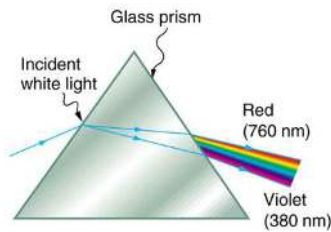


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P15.01 Spectra

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P15.01 Infrared, ultraviolet

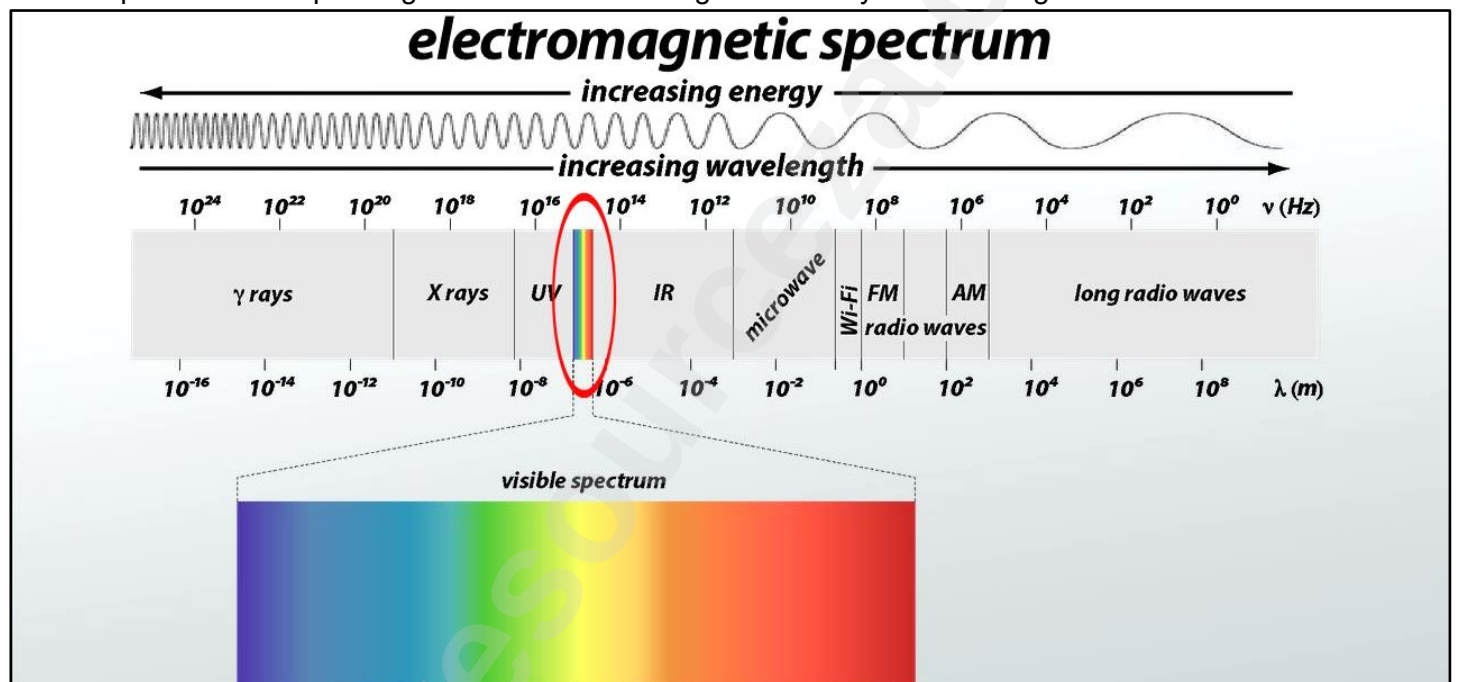


- **infrared radiation:** beyond the red
- **ultraviolet radiation:** beyond the violet

P15.02 Electromagnetic waves

1. The speed of electromagnetic waves

- they all travel at the same speed in a vacuum
- 3×10^8 m/s
- speed varies depending on the material through which they are travelling



gamma rays → X-rays → ultraviolet → visible light → infrared → microwaves → radio waves

2. Wavelength and frequency

- moves by same speed = speed of light
- red light has greater wavelength = red light has less frequency = red light has less energy
- violet light has less wavelength = violet light has greater frequency = violet light has more energy

3. Uses of electromagnetic waves

radio waves - to broadcast radio and television

microwaves - to broadcast TV through satellite / transmit mobile phone signals

infrared radiation: used in remote controls / electrical appliances / intruder fire alarms

X-rays - used in security scanners / see inside patients

4. Electromagnetic hazards

- ultraviolet radiation - cause tanning the skin, sunburn, cancer
- microwave, X-rays - need to minimise exposure

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