HYDROGEN SPECTRUM

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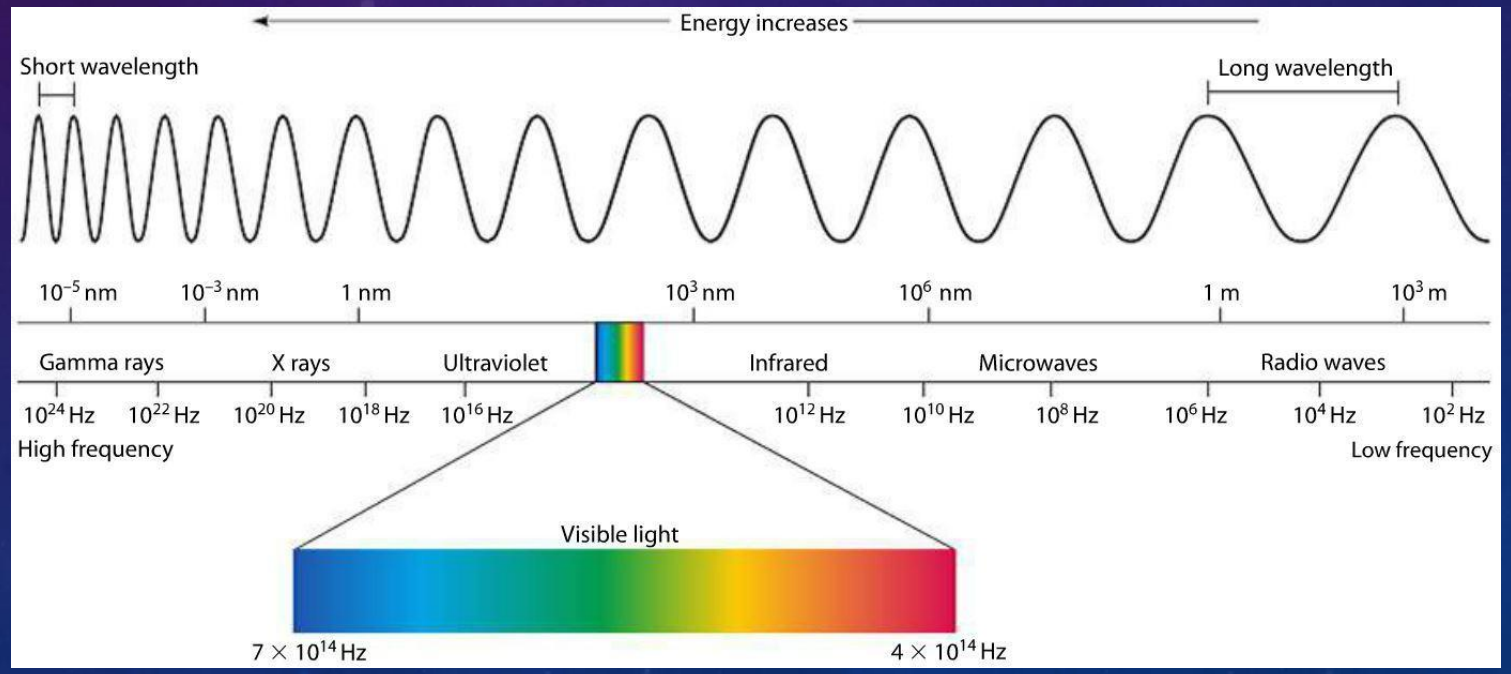
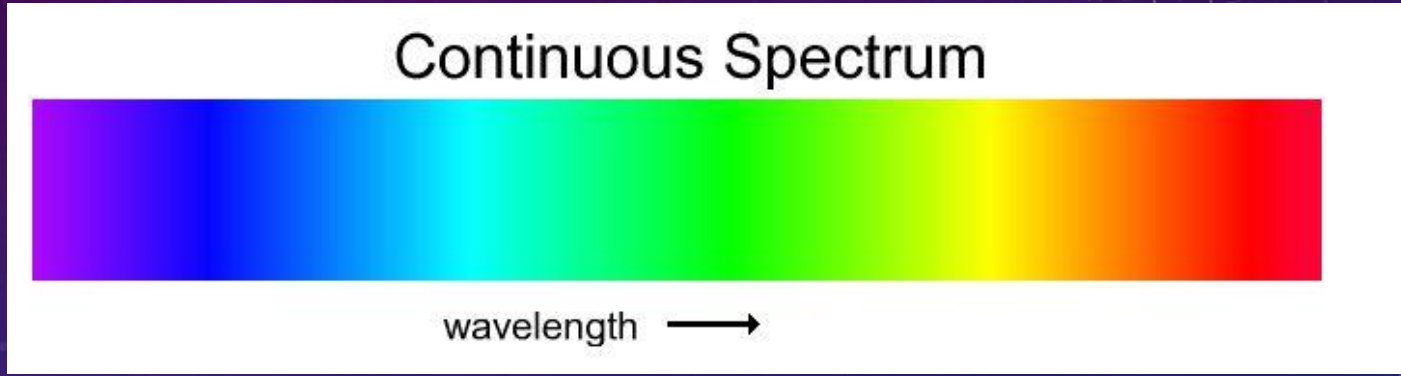
2.3.1 WHAT IS THE ELECTROMAGNETIC SPECTRUM?

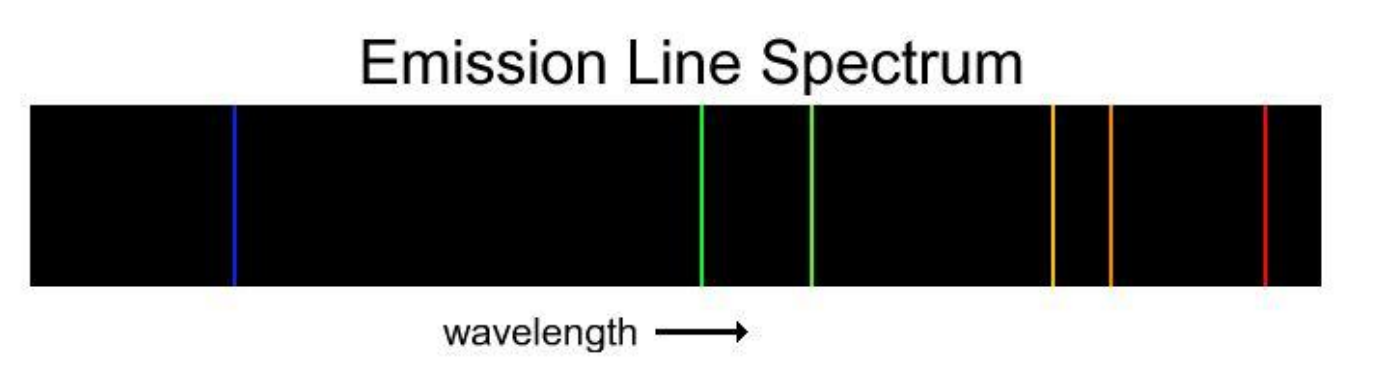
- Is a spectrum made up of waves such us x-ray waves, infrared waves, gamma waves, microwaves, radiowaves, UV waves and visible light waves. Frequency is measured in Hertz (Hz) and Wavelength is measured in nanometres or metres (nm or m).



• 2.3.2 THE DIFFERENCE BETWEEN THE CONTINUOUS SPECTRUM AND THE LINE SPECTRUM

The continuous spectrum is an emission spectrum where the lines overlap with each other and can no longer be distinguished as individual emission lines.
Contains all frequencies of light
Light coming from the sun (thermal radiation)

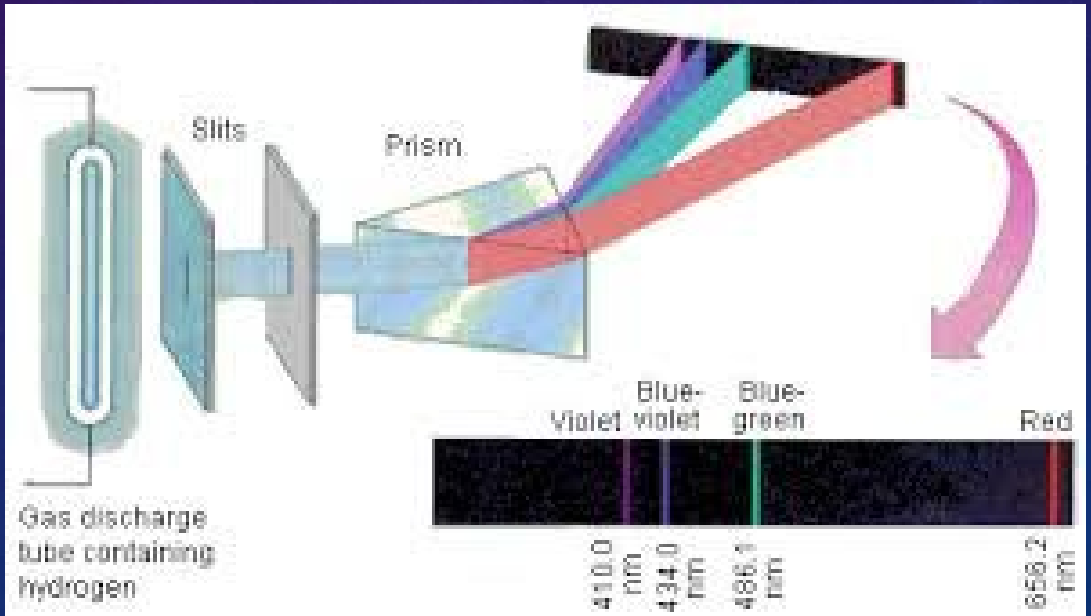


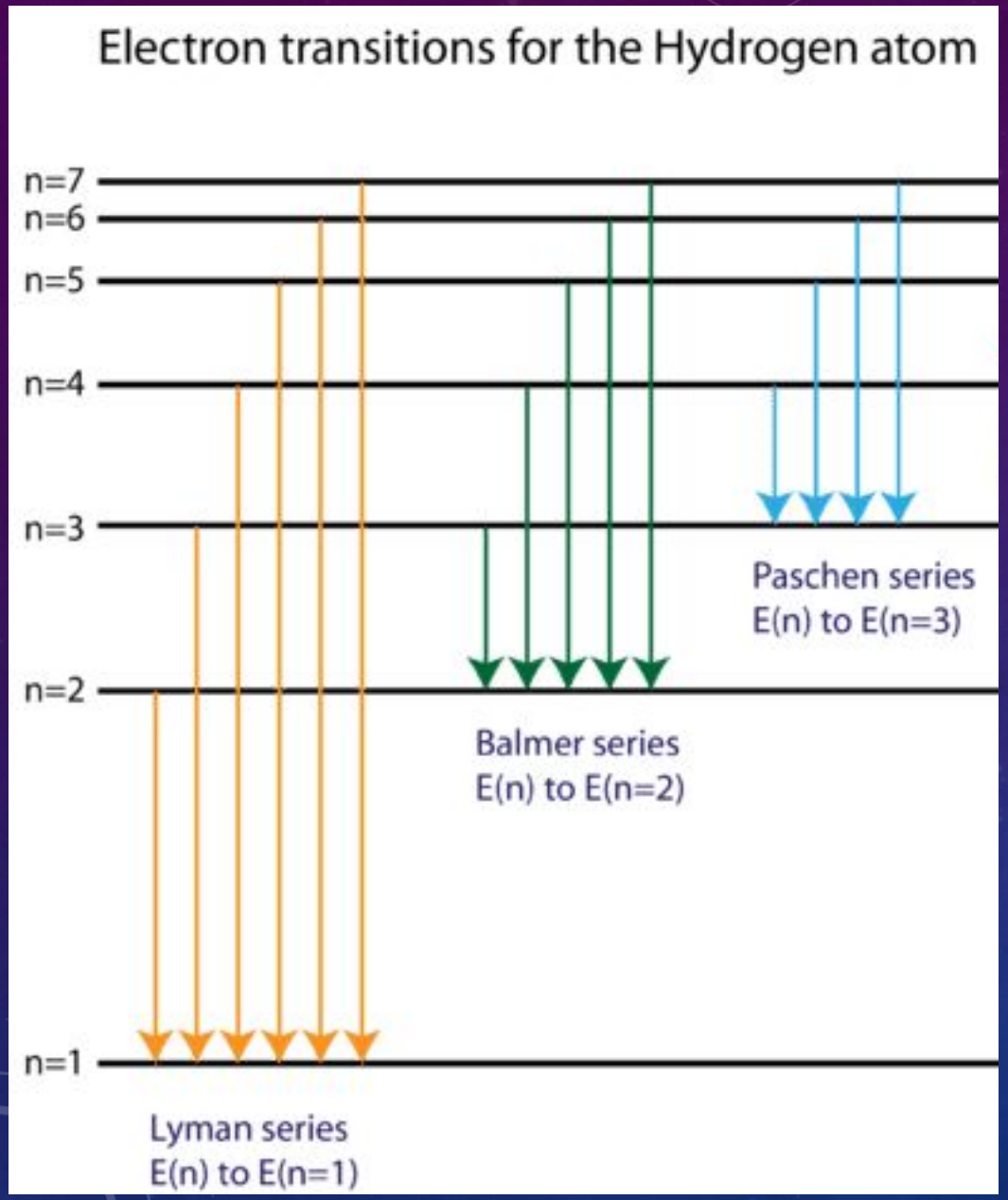


Only shows certain frequencies of visible light
A line spectrum is formed by light emitted from atoms that have electrons falling back down to lower energy levels (orbitals). Since electron transitions can only exist at specific energy values (electrons are quantized) , you don't get light emitted at all wavelengths.
The emission spectrum is the result of electrons within an atom absorbing energy and moving to higher energy levels. When the source of energy decreases/stops, the electrons fall back to the a lower or the bottom energy level, releasing energy equivalent to how much it had absorbed.
(it can only drop quantum levels)

2.3.3 HOW HYDROGEN EMISSION WORKS

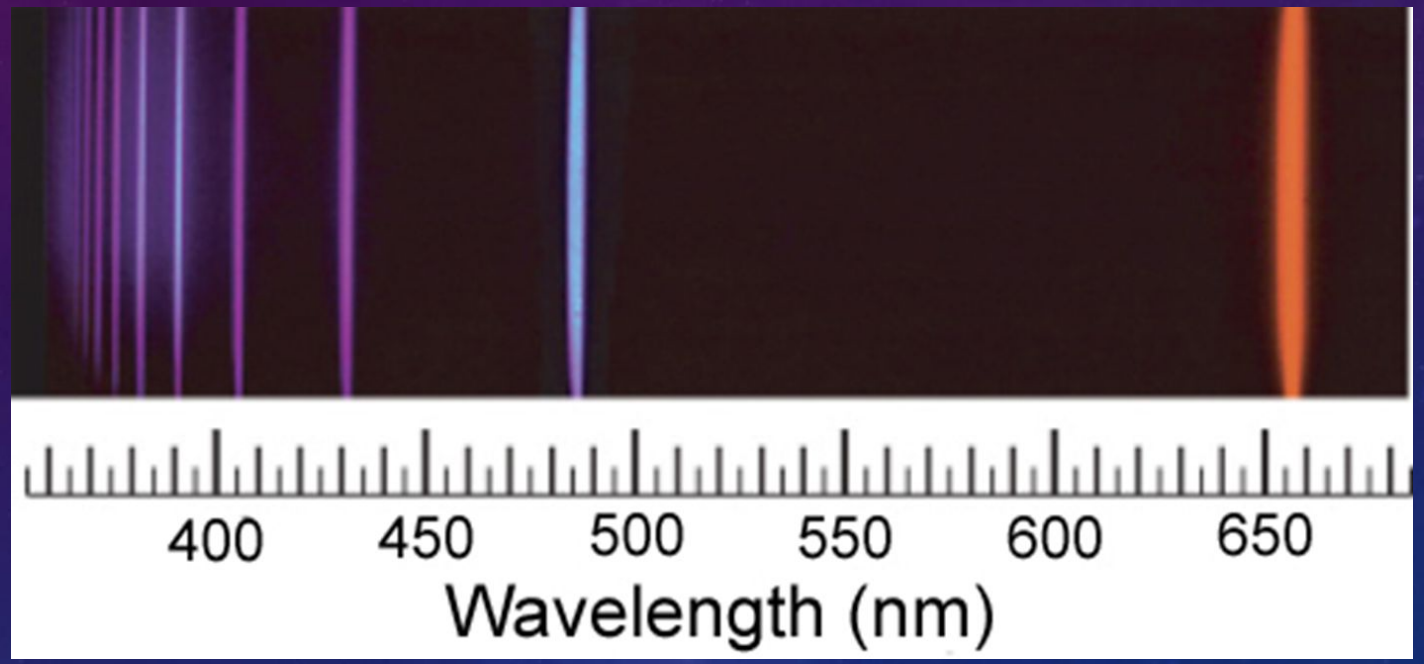
- Is when we apply an electrical current is put across a tube, containing low pressure gas, light is emitted. In particular if the gas is hydrogen, a characteristic “line spectrum” is seen.





The different colours from the hydrogen emission spectrum depends on these electron transitions. If they fall to n=1 the series is called the lyman series. If they fall to n=2 the series would be called the balmer series. If the fall to n=3 the series would be called the paschen series.

These transitions give out different amounts of energy. The further they fall the more energy is emitted so they have different frequencies and wavelength which produce different colours.


400
450
500
550
600
650
Wavelength (nm)