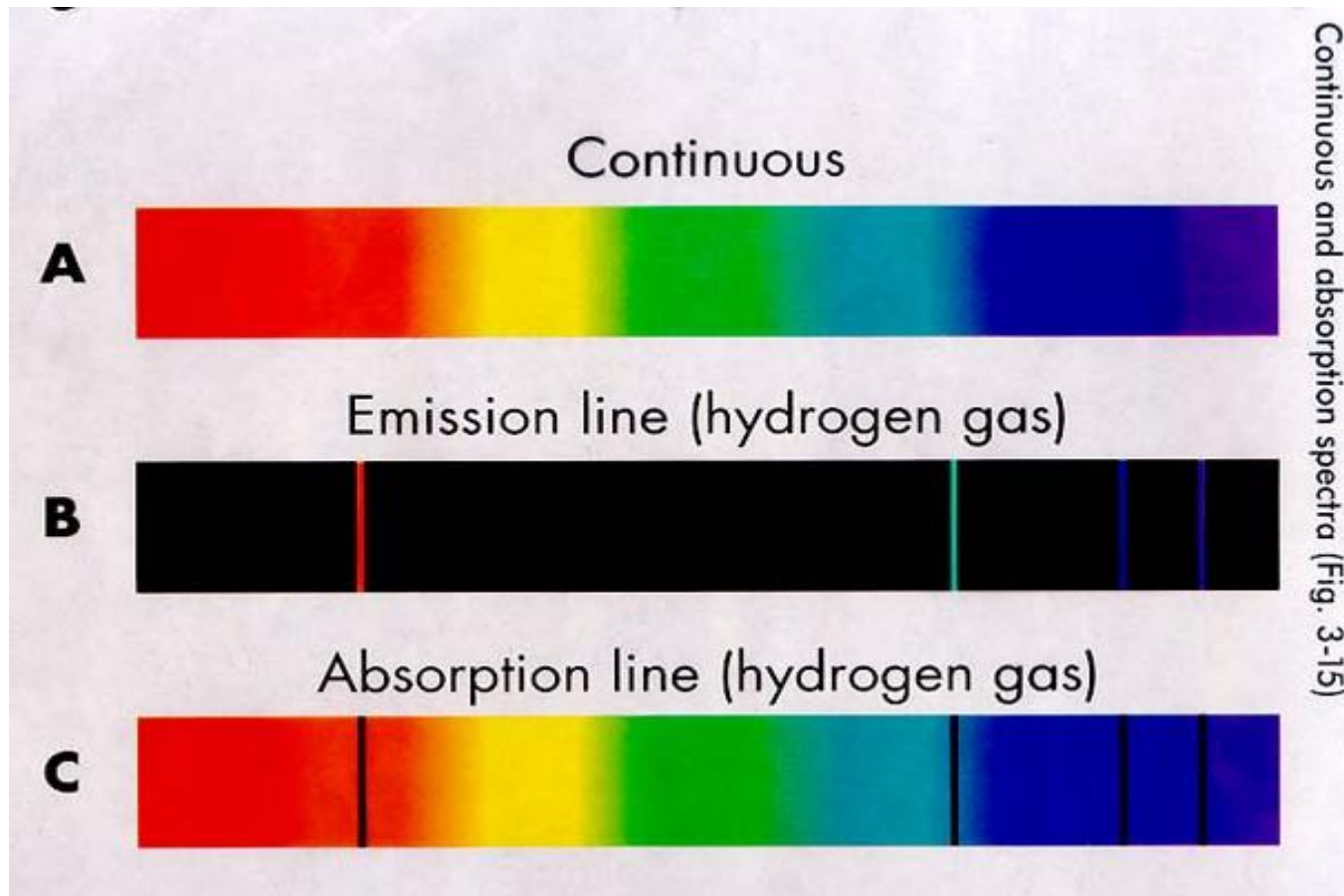


Emission Spectrum Animation



Introduction

- When metal ions are heated strongly in a non-luminous Bunsen flame or excited by high voltage electric currents characteristic colours are produced.
- These colours are so characteristic that they can be used to identify the ions present.
- How are these colours produced?

4000 Å 5000 6000 7000

1

H Ca H H Fe Na H

2

Na

H

Ca

Hg

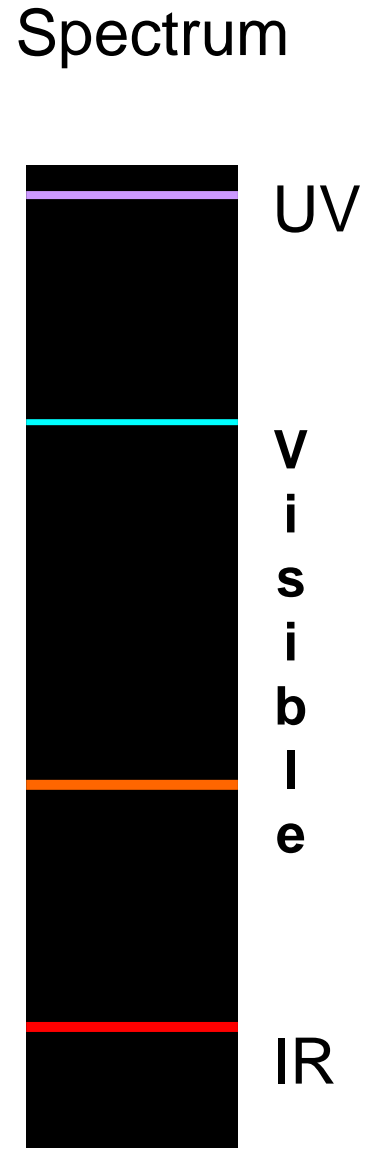
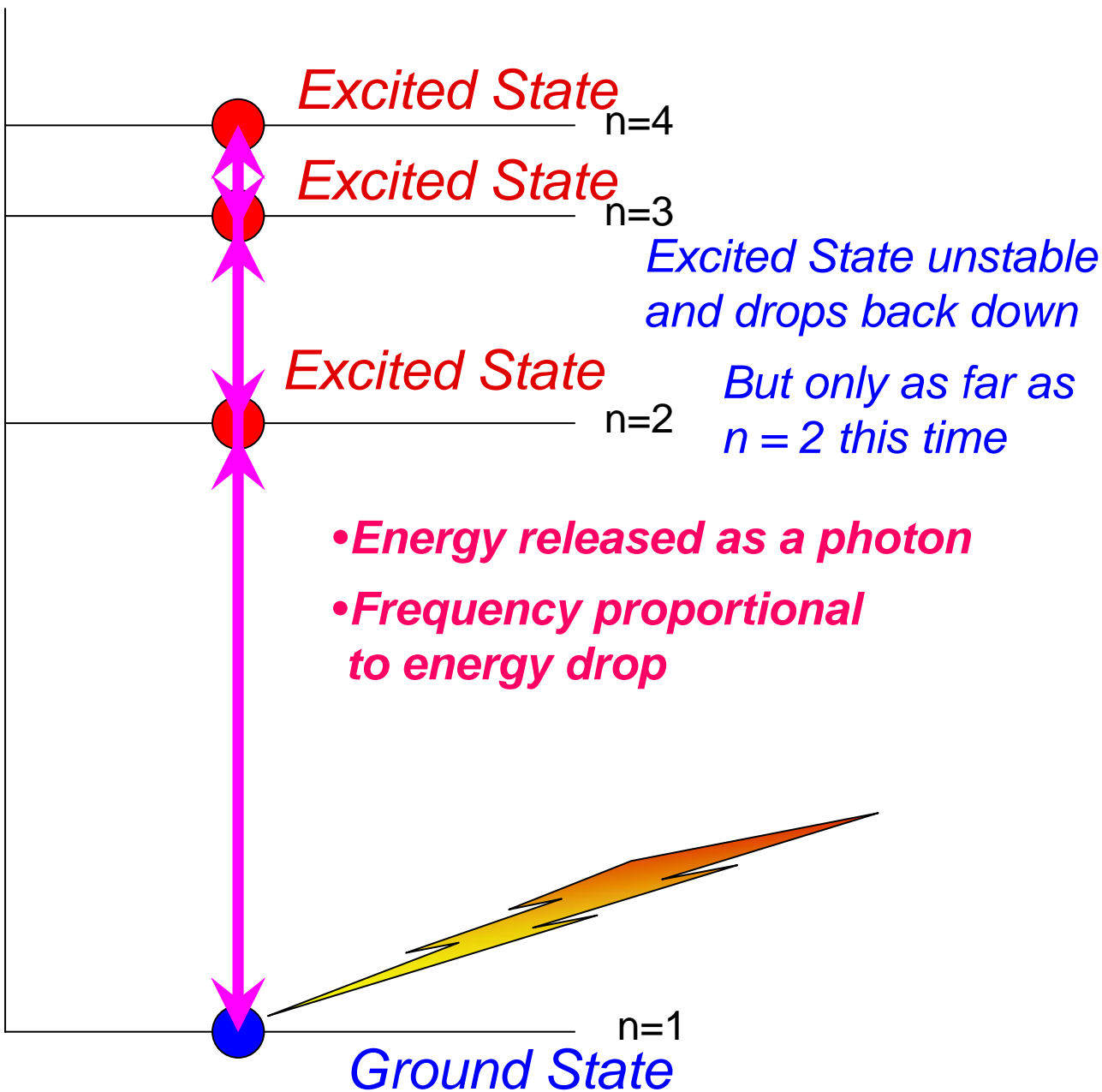
Ne

4000 Å 5000 6000 7000

- Emission spectra known for hundreds of years
- Niels Bohr unlocked their secret
- Electrons orbiting in shells around the nucleus
- Won the 1922 Nobel Prize for Physics



How are the lines of
the line spectrum
formed?



Summary

- Electron normally in **Ground State**
- **Energy supplied [as heat or electricity]**
- Electron jumps to higher energy level
- Now in **Excited State**
- Unstable
- Drops back to a lower level

- Energy that was absorbed to make the jump up is now released as a photon
- Frequency depends on difference in energy levels [$E_2 - E_1 = hf$]
h is Plank's Constant and f is frequency of light
- When electron falls to
 - n = 1 level gives UV Range
 - n = 2 level gives Visible Range
 - n = 3,4 or 5 levels gives IR Range