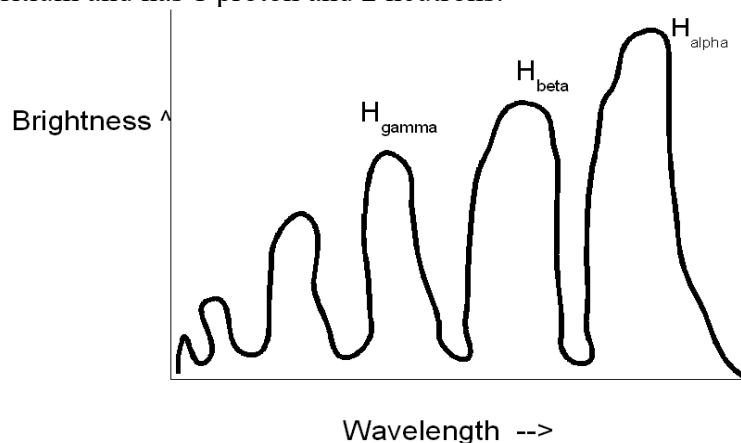


Isotopes

1. The number of protons in an atom determines its chemical element.
2. Two atoms with the same number of protons but different number of neutrons are called isotopes.
3. For carbon, 6 protons and 6 neutrons – called Carbon-12 or ^{12}C
4. Spectra of two isotopes are slightly different because of the difference of atomic mass.
5. An ion also has a different spectrum of a neutral atom
6. Ionized atom – C^+ - carbon that has lost 1 electron
7. C^{++} - double ionized
8. In astronomy, $\text{C}^0 = \text{CI}$, $\text{C}^+ = \text{CII}$, $\text{C}^{2+} = \text{CIII}$, $\text{C}^{3+} = \text{CIV}$, etc.

Hydrogen

1. Hydrogen ions exist in either H^0 or H^+ (HI or HII)
2. Hot stars emit UV rays and ionize hydrogen.
3. The hydrogen emits a red light when the electron comes back to the atom
4. This type of cloud is called an HII cloud, because it is made up of ionized hydrogen.
5. Common hydrogen is HI.
6. HII has 1 proton and 1 neutron and is called deuterium, or heavy hydrogen.
7. HII has twice the mass of HI.
8. HIII is called tritium and has 1 proton and 2 neutrons.



Emission Line Spectrum of Hydrogen

9. Red line is H_{α} , blue line is H_{β} , violet line is H_{γ}
10. H_{α} is $3 \rightarrow 2$, H_{β} is $4 \rightarrow 2$, H_{γ} is $5 \rightarrow 2$, H_{δ} is $6 \rightarrow 2$.
11. This is called Balmer Series.
12. From $2 \rightarrow 1$, you get UV photon, from $3 \rightarrow 1$, you get UV with more energy, any level to 1 is UV.
13. $100 \rightarrow 99$, radio wave is emitted.