

Another 3D System: The Atom

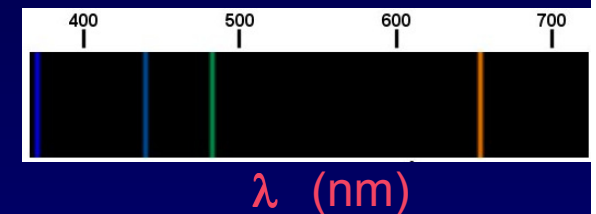
-electrons confined in Coulomb field of a nucleus

Early hints of the quantum nature of atoms:

Discrete Emission and Absorption spectra

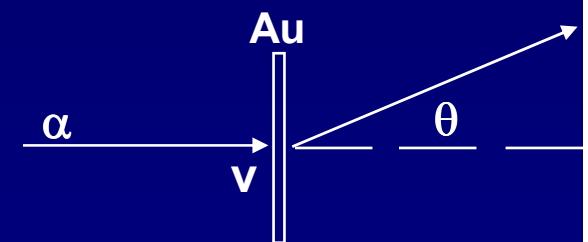
- When excited in an electrical discharge, atoms emit radiation only at discrete wavelengths
- Different emission spectra for different atoms

Atomic hydrogen



Geiger-Marsden (Rutherford) Experiment (1911):

- Measured angular dependence of particles (He ions) scattered from gold foil.
- Mostly scattering at small angles \rightarrow supported the "plum pudding" model. But...
- Occasional scatterings at large angles \rightarrow Something massive in there!



- **Conclusion:** Most of atomic mass is concentrated in a small region of the atom

\rightarrow a nucleus!