

ASTRO 1020 Lab

L2: Identifying Atomic Spectra

Grading

- All labs are scaled to be graded out of **10 points***

Points per question	Description
1.0	A correct answer <u>with</u> units <u>and</u> work shown. Answers that don't require work will be <u>graded on completion</u>
0.8	A correct answer <u>without</u> units or work shown
0.6	An incorrect answer <u>with</u> units <u>and</u> work shown
0.4	An incorrect answer <u>without</u> units or work shown
0.2	Some work shown <u>without</u> an answer
0.0	Not Attempted

Lab Schedule

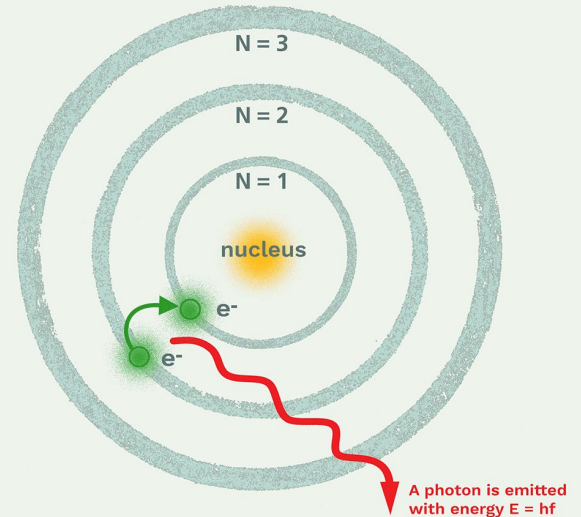
Lab	Dates	Topic
LAB 1	Sept 9 – 13	Sun
LAB 2	Sept 16 – 20	Spectra
LAB 3	Sept 23 – 27	Binary Stars
LAB 4	Sept 30 – Oct 4	Period-Luminosity
LAB 5	Oct 7 – 11	Hubble's Law
LAB 6	Oct 14 – 18	Galaxy Classification
LAB 7	Oct 21 – 25	Tully-Fisher Relation
LAB 8	Oct 28 – Nov 1	Star Clusters & Supernovae
LAB 9	Nov 4 – 8	Black Holes
Semester Project	Nov 18 – 22	

Things you need to know for Lab 2

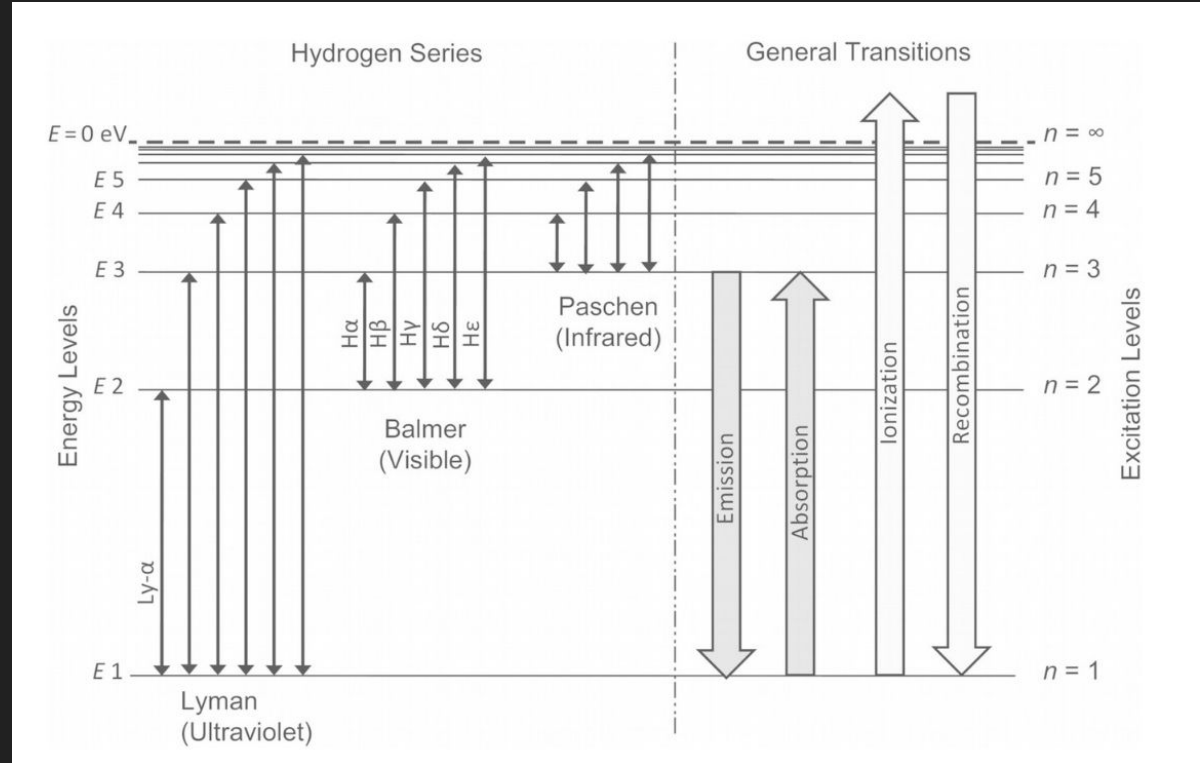
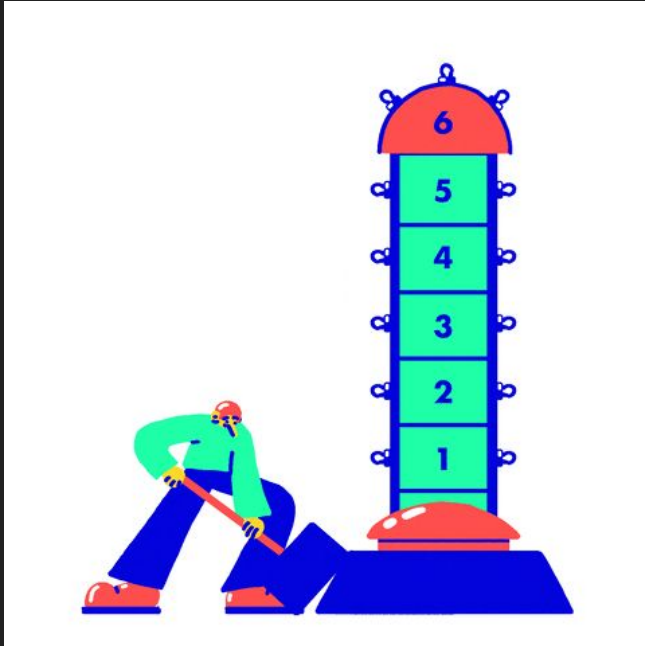
- Looking through diffraction lenses
- Absorption vs emission spectra
- Electron energy levels
- The Bohr Model

Bohr Model of the Atom

The Bohr model is a planetary model in which negatively-charged electrons orbit a positively-charged nucleus.



The Hydrogen Atom



The Rydberg Equation

$$\frac{1}{\lambda} = R_H \left(\frac{1}{n_1^2} - \frac{1}{n_2^2} \right)$$

Desmos

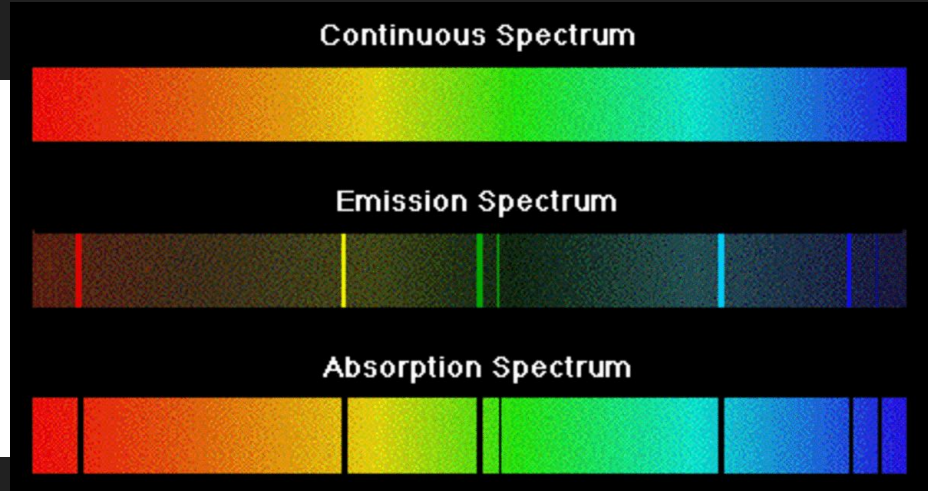
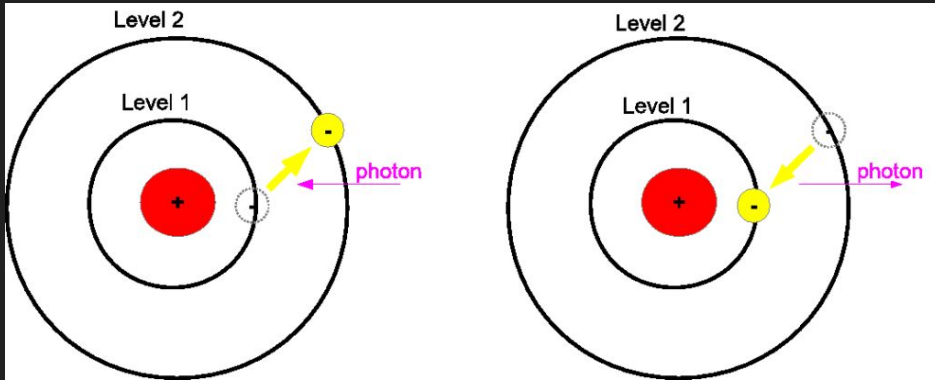
- <https://cutt.ly/RydbergCalculator>



Desmos calculator interface showing the Rydberg equation and its components:

- Equation: $a = R_H \left(\frac{1}{n_f^2} - \frac{1}{n_i^2} \right)$
Result: $a = 2303700$
- Constant: $R_H = 1.097 \cdot 10^7$
Result: $R_H = 10970000$
- Initial state: $n_i = 5$ (slider from -10 to 10)
- Final state: $n_f = 2$ (slider from -10 to 10)
- Result: $\frac{1}{a} \cdot 10^{10}$
Result: $= 4340.84299171$

Absorption vs Emission



Questions?