

Name:

# Atomic structure Lab Report

LibreTexts page: [6: Atomic Structure](https://chem.libretexts.org/214683)

(<https://chem.libretexts.org/link?214683>)

You will be given keywords to answer some questions. You must use all of the given keywords in your answer to receive full credit. Note: DO NOT provide definitions of the keywords in your answers, unless asked to do so.

To start go to [6.5: The Modern View of Electronic Structure](https://chem.libretexts.org/52800) (<https://chem.libretexts.org/link?52800>) and scroll down to PhET Simulation. Follow instructions in this document to complete the assignment.

## Part I

1. Turn on the gun.
2. Make sure you selected **White light**.
3. Select **Show spectrometer**.

1. Explain why when white light is chosen the light photons passing through the box have different colors. [*Keywords: spectrum, nm*]

2. What type of light are represented by the  particle?  
**Hint:** Shift the light control to **monochromatic**.

1. Turn the light control back to **white light** and move the **speed controller to fast**.
2. Pay attention to the **spectrometer** (bottom right). It shows which colored photons are emitted (released by) the atom represented in the box.
3. Let the simulation run for **1 minute** before answering questions 3 and 4.

3. List the wavelengths of the colors that have come from the atom. Be sure to include wavelengths beyond the visible.

4. Take a snapshot of the spectrometer and paste below. Adjust the size if needed.



## Part II

1. Switch from Experiment to Prediction in the upper left hand corner of the simulation.
2. Switch to the Bohr model and turn on the Show electron energy level diagram in the upper right hand corner.
3. Convert the speed control to slow and watch to see what happens in the simulation, the electron energy level diagram and the spectrometer.

1. Bohr model. How is the electron represented in this model and which electron level is the lowest energy? [Keywords: ground state,  $n=$ ]

2. What happens when a photon interacts with the electron in the ground state? Do photons of all colors interact with the ground state electron and if not, why? Be sure to look at the electron energy level diagram when answering this question. [Keywords: energy gap, electron, photon, absorb, ground state, excited state]

3. Explain how this simulation produces the line spectra and indicate which transitions are ultraviolet, visible and infrared. [Keywords: excited state, ground state, emission, Lyman, Balmer, Paschen, series]

Hint: go to <https://chem.libretexts.org/link?52785>

4. Compare the Bohr model with the Schrödinger model in the simulation. Explain how they are similar and different. [Keywords: orbit, orbital, s, p, d, f, wavefunction, spectrum, energy gap]