Excited electrons \( \rightarrow \) thermal
Electrons move up energy levels and when they drop to ground state, photons are produced.

The different frequencies produced can be recorded on line spectra.
Hydrogen:

- Low E
- High E

Emission spectrum is made up of separate lines, discontinuous.
Lines converge as frequency or energy increases.

Energy levels:
\[
\begin{align*}
\text{Emission:} & \quad E_2 - E_1 \\
\text{Frequency:} & \quad f = \frac{E_2 - E_1}{h} \\
\end{align*}
\]

Energy absorbed
\[
\begin{align*}
\text{Frequency:} & \quad f = \frac{E_2 - E_1}{h} \\
\end{align*}
\]

Distance between energy levels means higher energy differences.

- The difference between energy levels converges as you move further from nucleus. The convergence limit is the energy for ionization \( N = 1 \rightarrow n = \infty \)