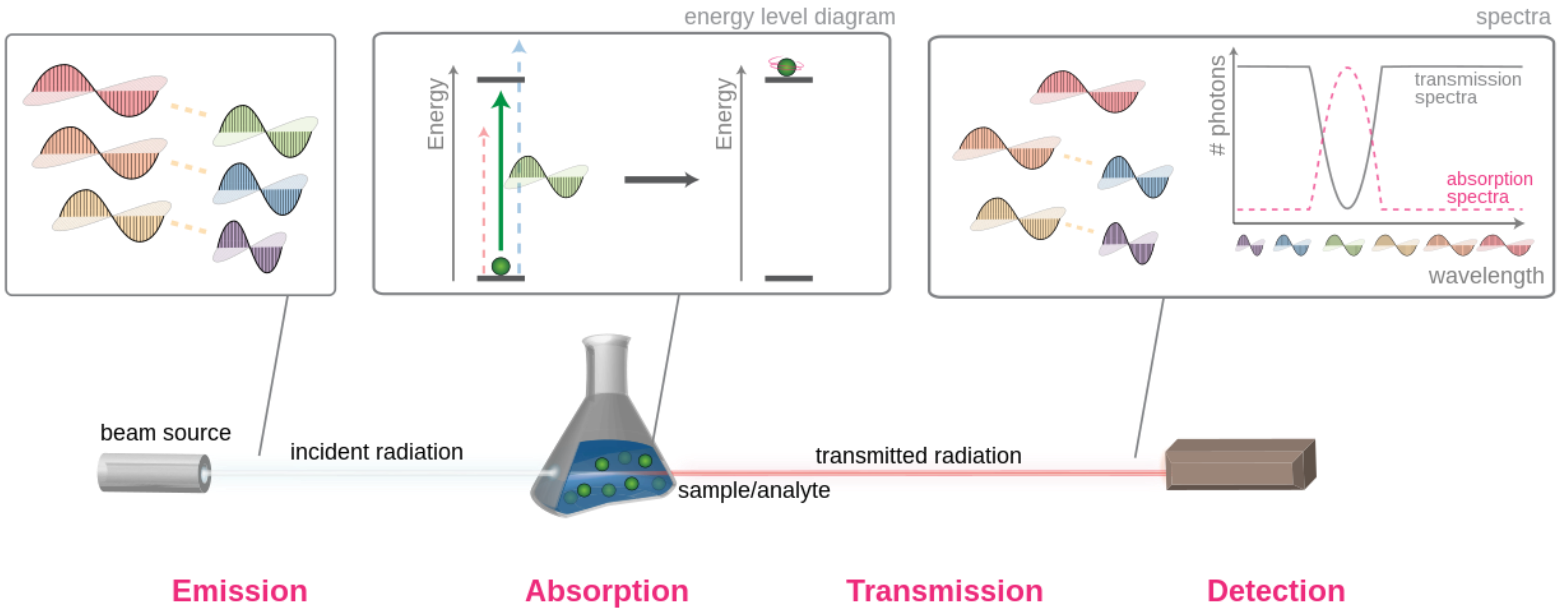
Class 2-9: Absorption spectroscopy

Any questions from the last class or things you've googled?

What's absorption spectroscopy?

- Spectroscopic method that looks at either transmission or absorption features of materials
- Can be used qualitatively to identify materials
- Can be used quantitatively to identify materials and their concentrations.
- Very flexible based on available light sources and detectors.



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Beer's Law

- Absorption of light is proportional to the concentration of the analyte, and the path that the light goes through
- Depends on the wavelength
- Usually holds up well for linear materials and things at low to moderate concentrations

$$A(\lambda) = \epsilon(\lambda)bc$$

Light transmitted

Extinction coefficient

Path length

concentration

Linear regression

- One of the easiest **Inversion methods**
  - How we go from some measured quantity to the information we want
  - We'll revisit this later….
- We assume our data can be represented by a linear function

$$y = X\mathrm{B} + \epsilon$$

- y is a vector of data or your information, X is matrix of the independent variables or measurements, Beta and epsilon are how they are related
- Sometimes you need to find B, sometimes you're using B to find y

Activity

- Build an apparatus to measure the absorption spectrum of blue dye
- Pick what wavelength you will use to probe the concentration