Ultraviolet – Visible – Infrared Instrumentation

- Focus our attention on measurements in the UV-vis region of the EM spectrum
- Good instrumentation available
- Very widely used techniques
- Longstanding and proven methods
- IR instrumentation will be considered from time to time particularly when there are similarities to UV-vis

Absorption measurements require:

1) source of radiation

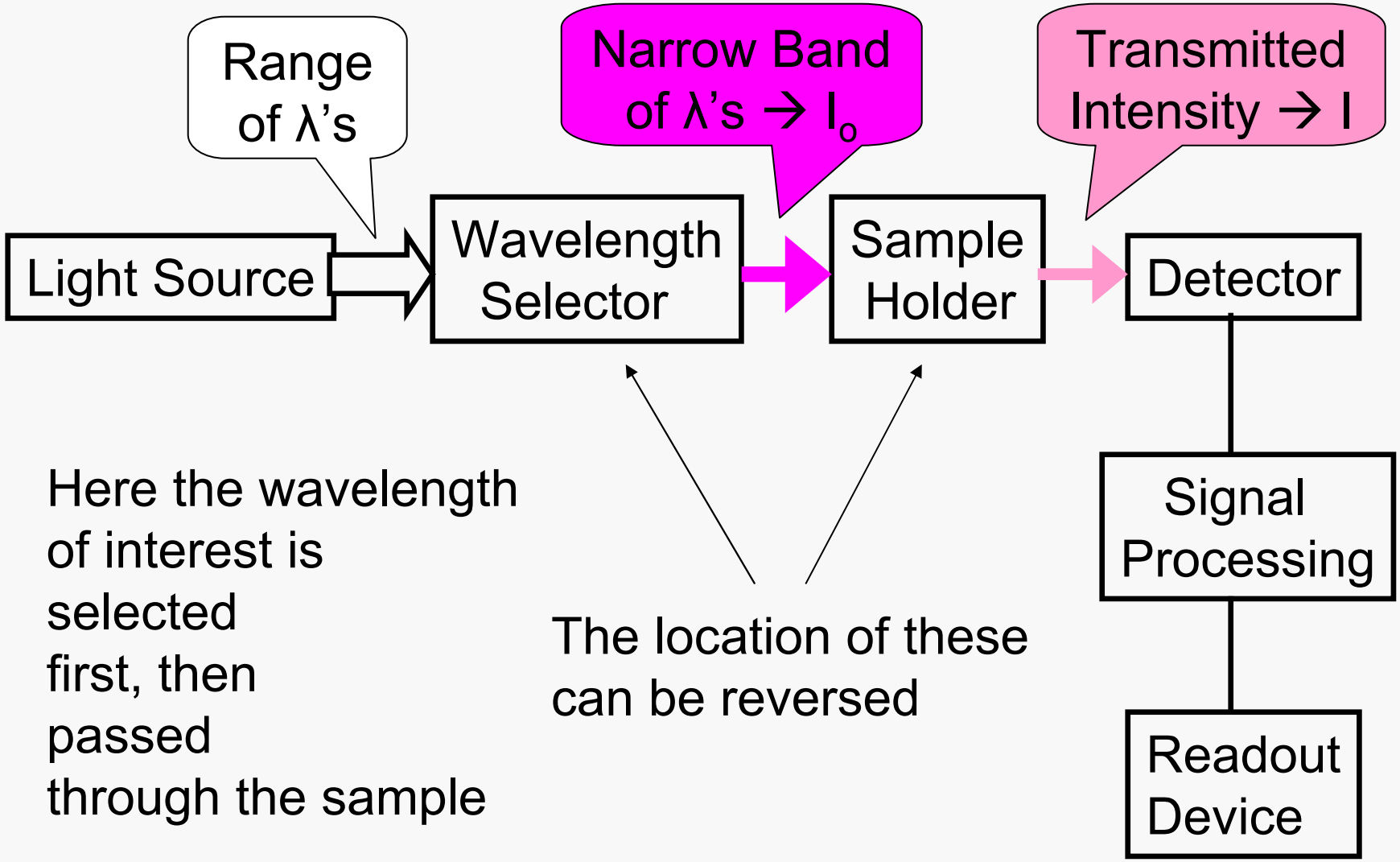
2) device for dispersing radiation into component wavelengths

3) a means of putting sample into the optical path, i.e., cell

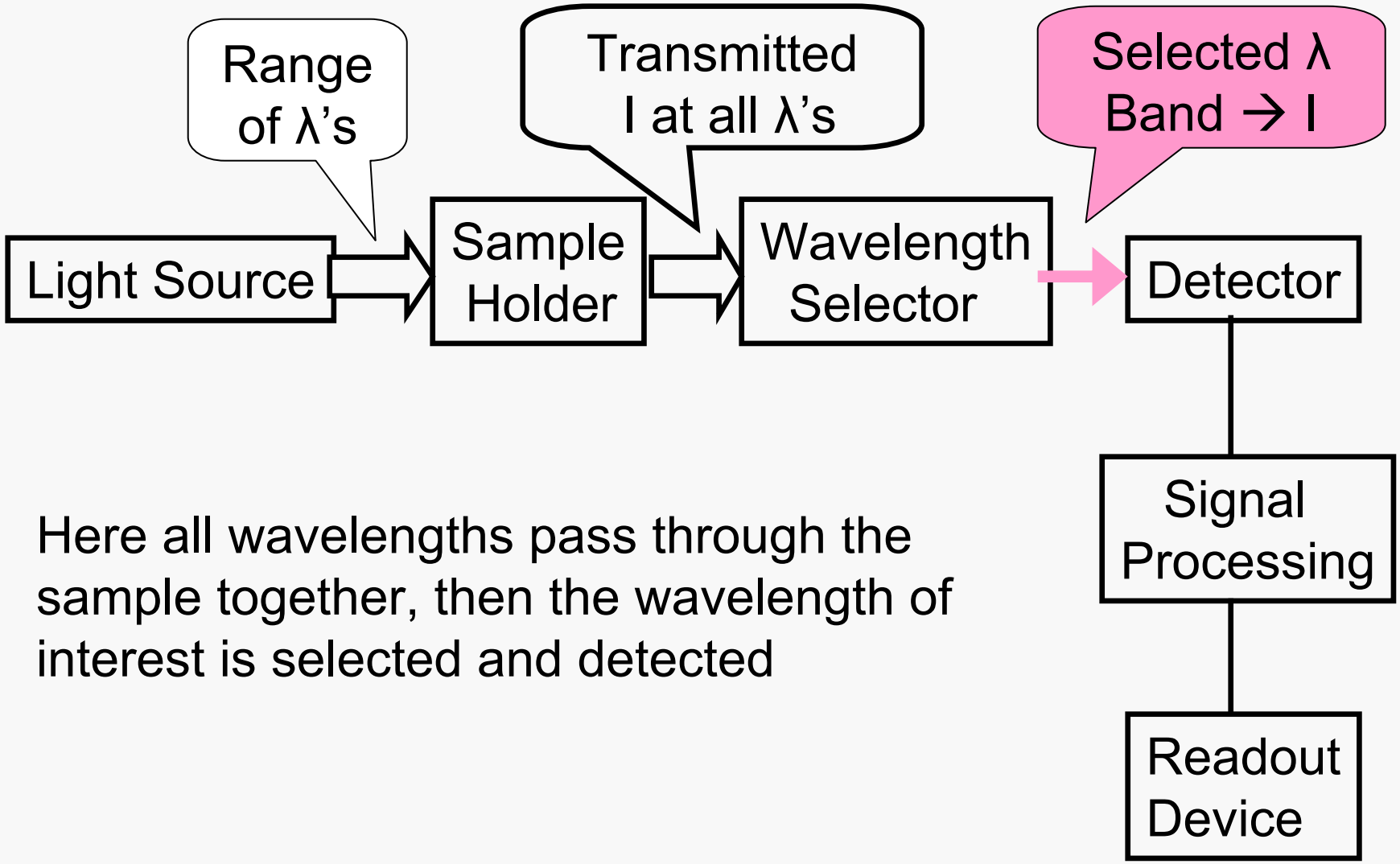
4) Detector to convert the EM to an electrical signal

5) readout device or circuitry, i.e., meter, computer, recorder, integrator, etc.

Block diagram of instrument for absorption



Block diagram of instrument for absorption



Here all wavelengths pass through the sample together, then the wavelength of interest is selected and detected

Emission measurements require:

1) means of exciting emission i.e., way of populating upper energy level which spontaneously emits

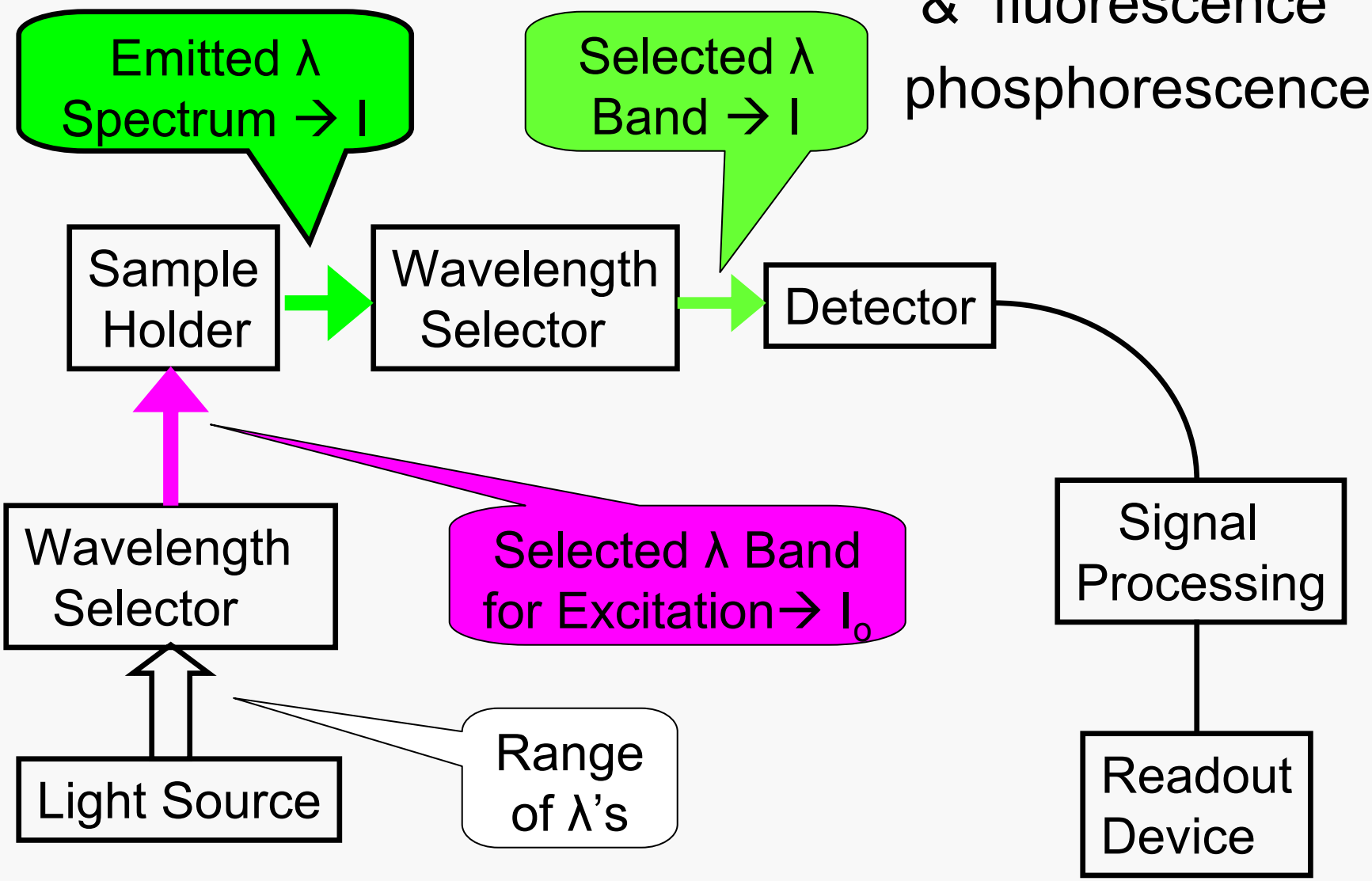
2) device for dispersing radiation into component wavelengths

3) a means of putting sample into the optical path, i.e., cell

4) Detector to convert the EM to an electrical signal

5) readout device or circuitry, i.e., meter, computer, recorder, integrator, etc.

Block diagram of instrument for emission i.e., & fluorescence phosphorescence



- The requirements for the various components used in different instruments change with the type of spectroscopy as well as for different kinds of measurements within a type of spectroscopy
- We will consider the components separately then combine them to make the overall instrument
- And finally look at the measurements with regard to theory and practice