

## \*Scattering Methods

### Elastic

Rayleigh (particle  $< \lambda$ , uniform distribution)

Debye (  $\approx \lambda$  not uniform)

Mie (  $> \lambda$ , clouds)

### Nonelastic

Brillouin Scattering (Thermal sound waves  $\rightarrow$  reflection)

Raman (Vibrational energy exchange)

#### 4. Selection of optical information

- $\lambda$  selection (Improvement of sensitivity ( of selectivity, interference elimination
- Time discrimination (Different time of desorption of metal from surface
- Position discrimination (in flame)
- Polarization discrimination
- MLR
- Chemical selection

# Devices

- Spectrometer

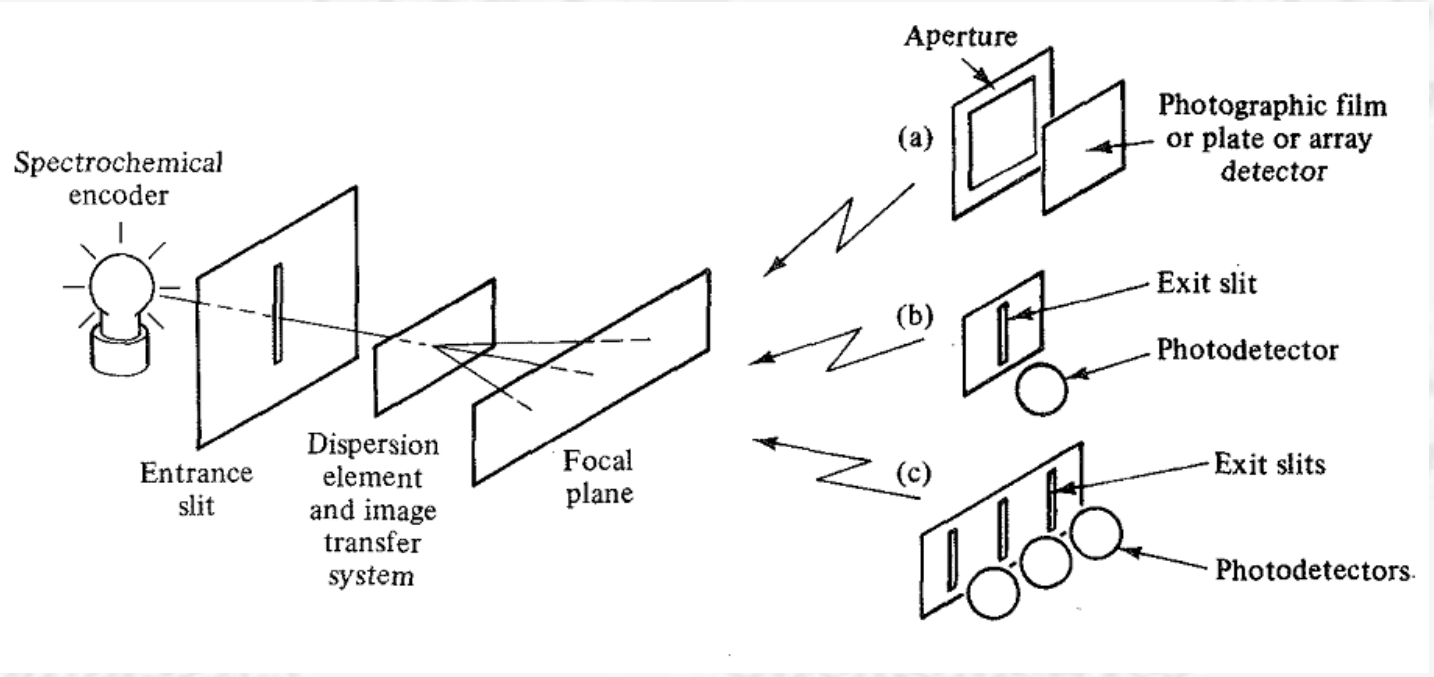
Dispersing elements, { Prism  
Grating

- Photometer

Filters { Absorbance filters  
Interference filters

- Spectrophotometer

Dispersing element + photonic detector



Monochromator

Polychromator

Spectrograph

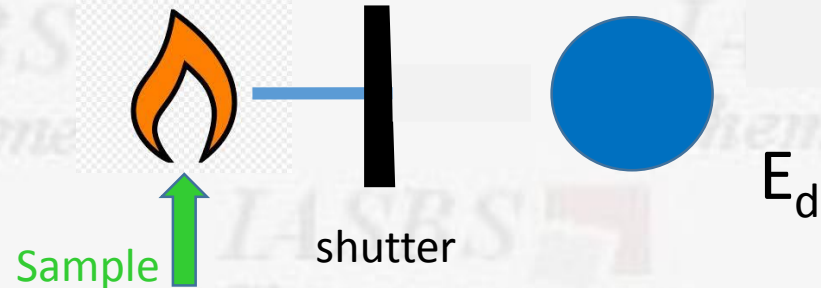
Photographic plate

Photodiode array

# 5. Signal measurements



Emission



$$E_{Et} = E_E + E_{bgE} + E_d$$

Analyte Background Dark

Chemiluminescence

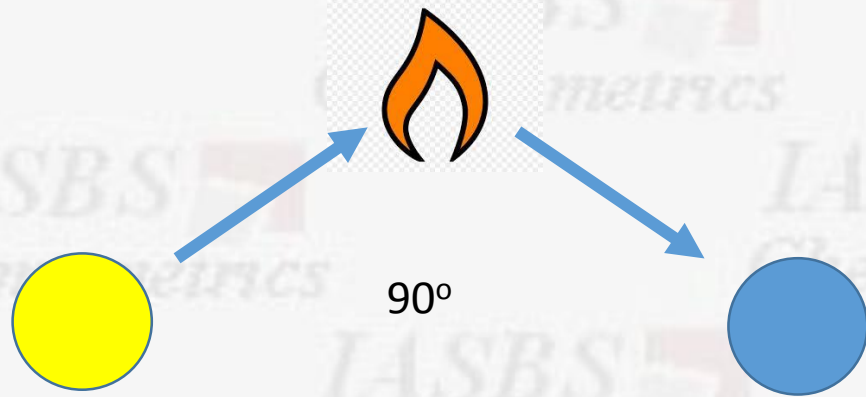


$$E_{CLt} = E_{CL} + E_d$$

## Photoluminescence

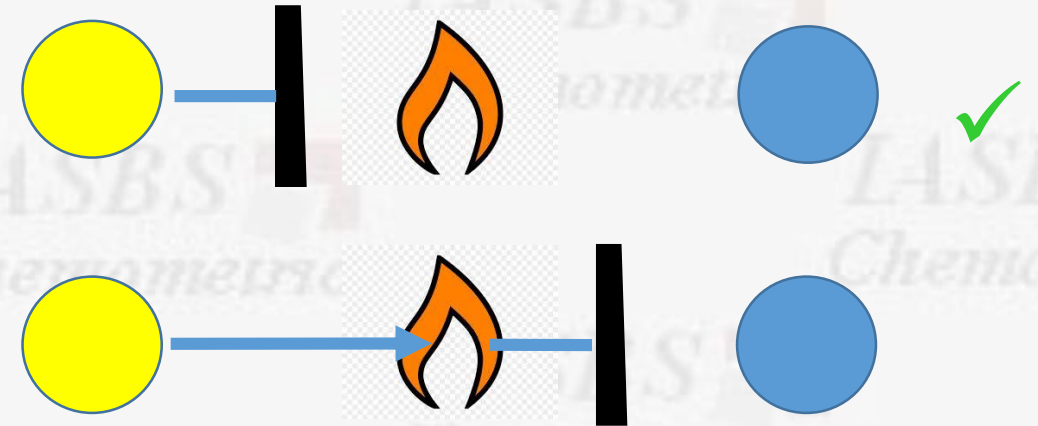
$$E_{Lt} = E_L + E_{bgL} + E_{sc} + E_E + E_{bgE} + E_d$$

Blank



## Absorbance

$$A = -\log T = -\log[(E_{st} - E_{ot}) / (E_{rt} - E_{ot})]$$



$$E_{St} = E_S + E_L + E_{bgL} + E_{sc} + E_E + E_{bgE} + E_d + E_r = E_{rt}$$

$E_{ot}$