

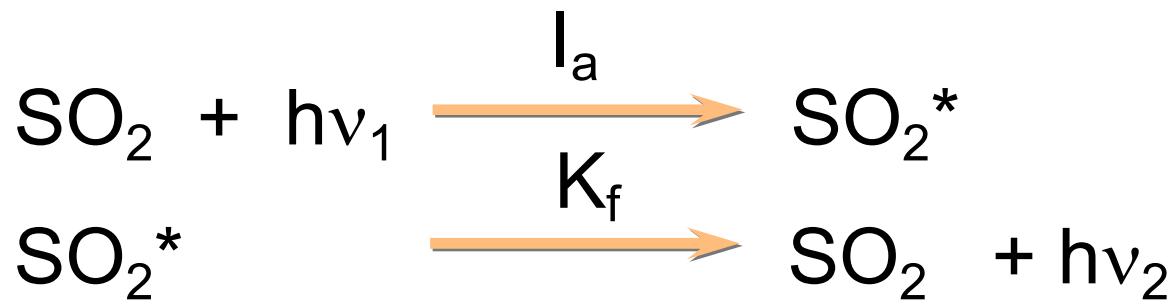
# Enhanced Methods for Trace Level Monitoring

# Trace SO<sub>2</sub> Monitoring by Pulsed UV Fluorescence

## Trace Level Analyzer Common Characteristics

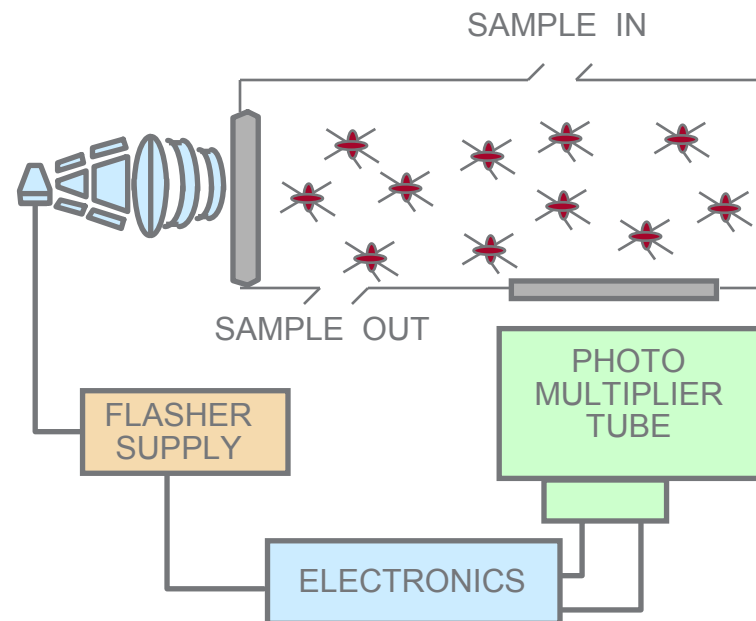
- Sensitivity – Low Noise
  - *High S/N*
  - *LDL*
- Stability
  - *Good Thermal Performance*
  - *Low Drift*
  - *Dynamic Zeroing*
- Specificity
  - *Interferent Rejection*
- Accuracy
  - *Is the instrument measuring what it should?*
  - *Standards*

## MODEL 43iTL



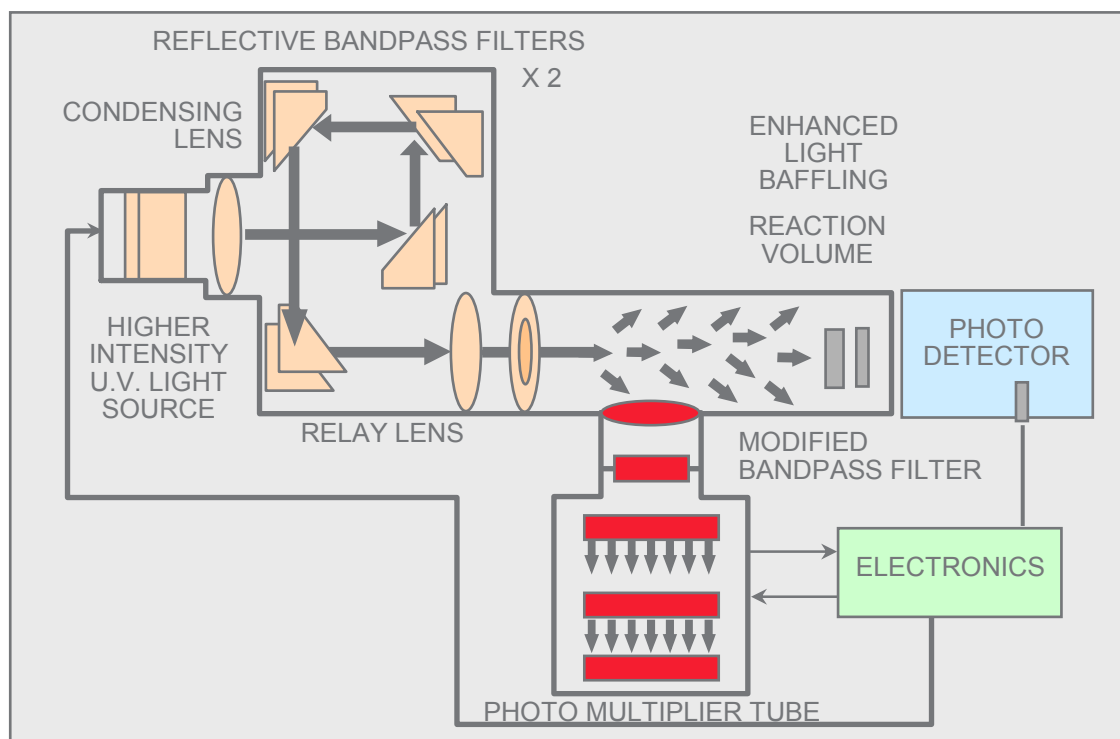
$$I_a = I_0[1 - e^{-ax(\text{SO}_2)}]$$

$$I_f ; I_0ax(\text{SO}_2) \text{ or } K(\text{SO}_2)$$



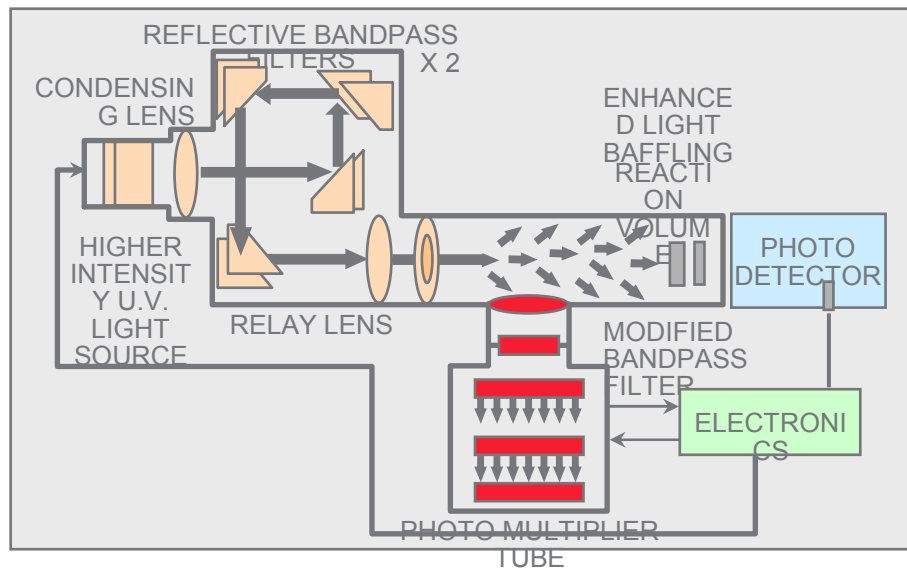
## MODEL 43i TLE OPTICAL SCHEME

- Higher Intensity Pulsed Source Lamp
  - Dual Reflective Filtering
  - Enhanced Light Baffling
  - Modified Bandpass Filter
- Filter

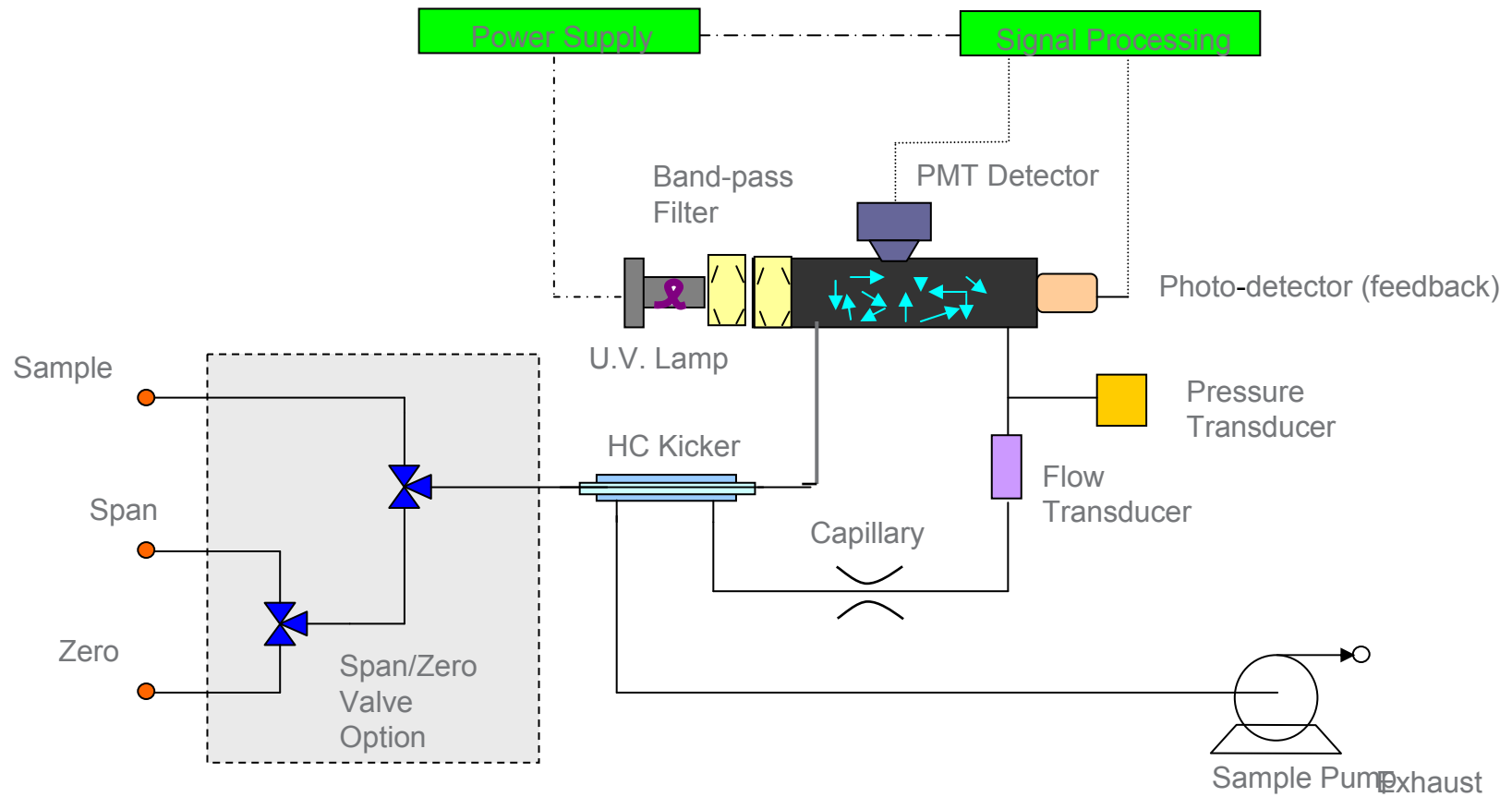


# MODEL 43i TLE OPTICAL SCHEME

- Lower detection limits = Lower back-round or zero noise
- Low Back-round
  - Minimize PMT Dark Current
  - Minimize Electronic Noise
  - Chop Signal
  - Reduce Scattered Light



# MODEL 43iTITLE FLOW SCHEME



## MODEL 43i TLE ANALYZER SPECIFICATIONS

- Units - ppb,  $\mu\text{g}/\text{m}^3$
- Standard Ranges:
  - 10, 20, 50, 100, 200, 500, 1000 ppb
  - 20, 50, 100, 200, 500, 1000, 2000  $\mu\text{g}/\text{m}^3$
- Zero Noise
  - 0.14 ppb RMS (10 sec avg time)
  - 0.06 ppb RMS (60 sec avg time)
  - 0.025 ppb RMS (300 sec avg time)
- LDL
  - 0.28 ppb RMS (10 sec avg time)
  - 0.12 ppb RMS (60 sec avg time)
  - 0.05 ppb RMS (300 sec avg time)



## MODEL 43i TLE ANALYZER INTERFERENCE

- **Interference – NO < 2.5 ppb per EPA levels (~400 PPB)**  
*~160:1 rejection ratio*

## Trace Level Analyzer Common Characteristics

- **Sensitivity – Low Noise**
  - *High S/N*
  - *LDL*
- **Stability**
  - *Good Thermal Performance*
  - *Low Drift*
  - *Dynamic Zeroing*
- **Specificity**
  - *Interferent Rejection*
- **Accuracy**
  - *Is the instrument measuring what it should?*
  - *Standards*