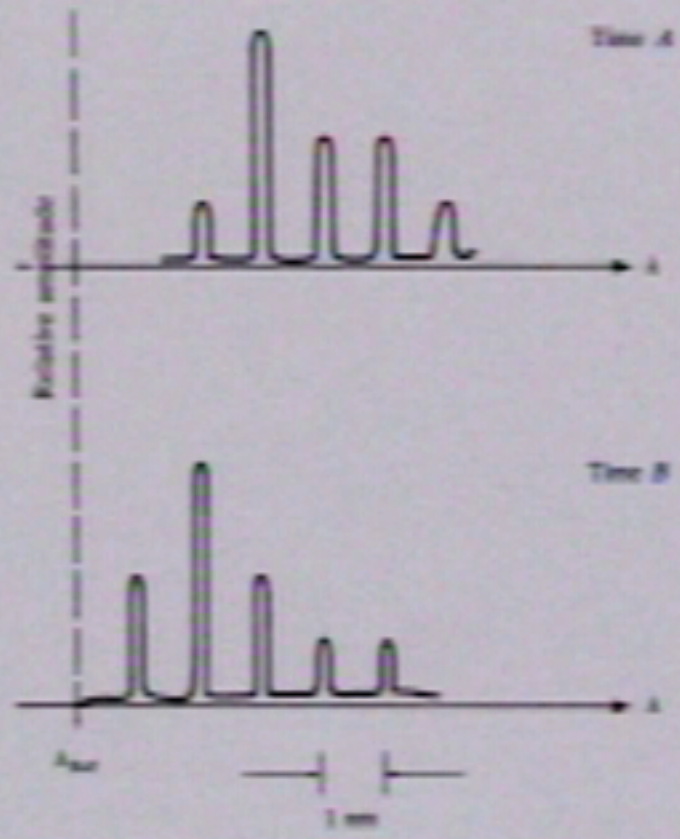
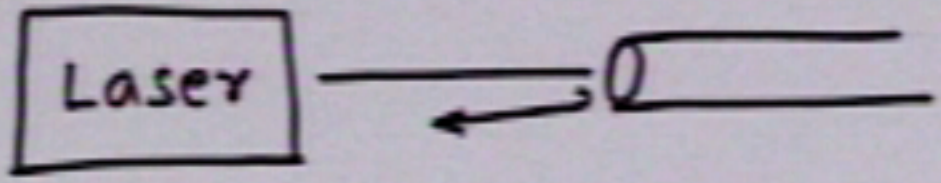
Time-resolved laser spectra



NOISE

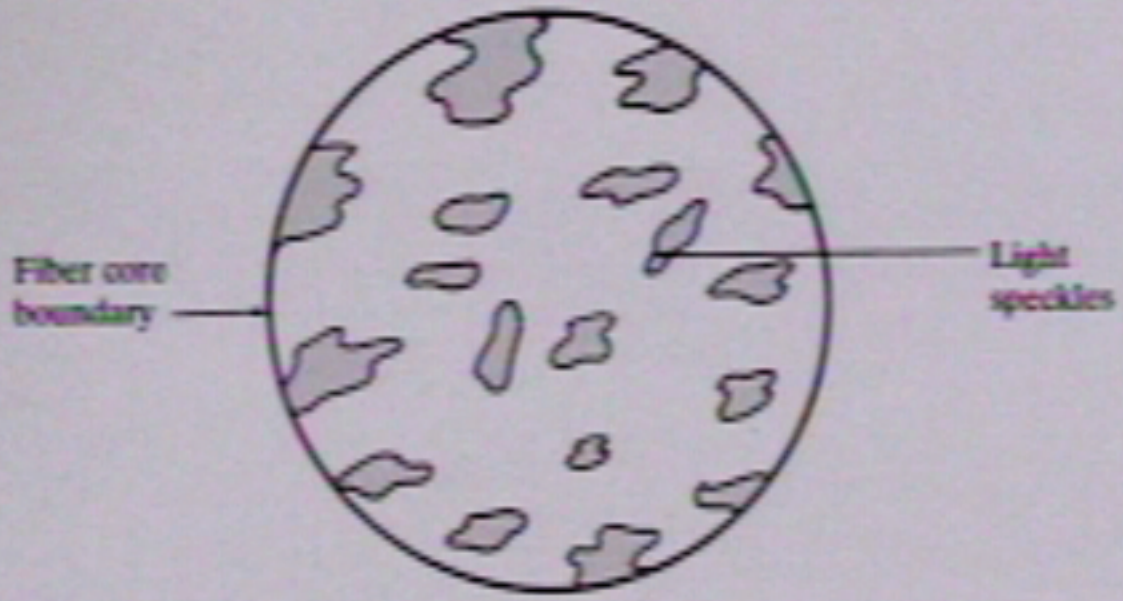
- Reflection Noise :



- Mode Partition :

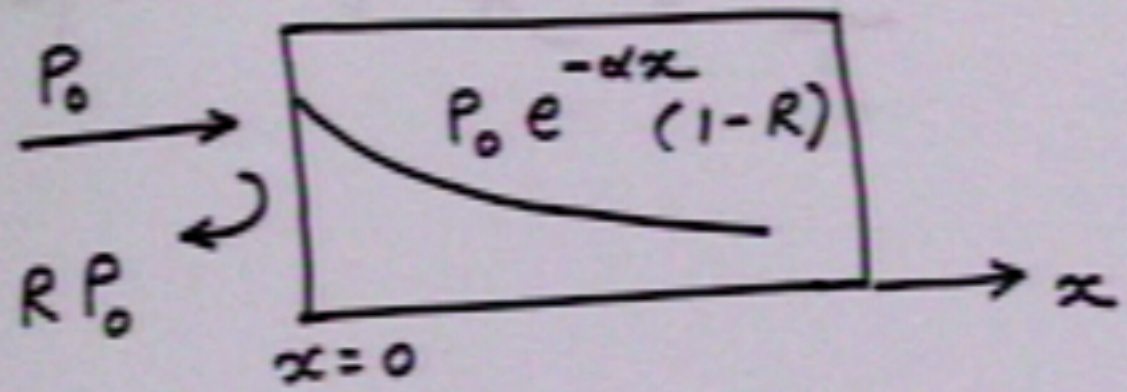
- Speckle Noise :

Speckle patterns



Fiber Optic Transmitter

- **LED**
  - Low cost
  - Low power
  - Poor power launching
  - Spectral width 30nm
  - Short distance
  - Intensity modulation
- **LASER**
  - More expensive
  - High power
  - Efficient launching
  - Spectral width 1-2 nm
  - Good for long haul communication
  - Coherent communication
  - ASK, FSK, PSK modulation
  - Non-linear applications



optical power absorbed

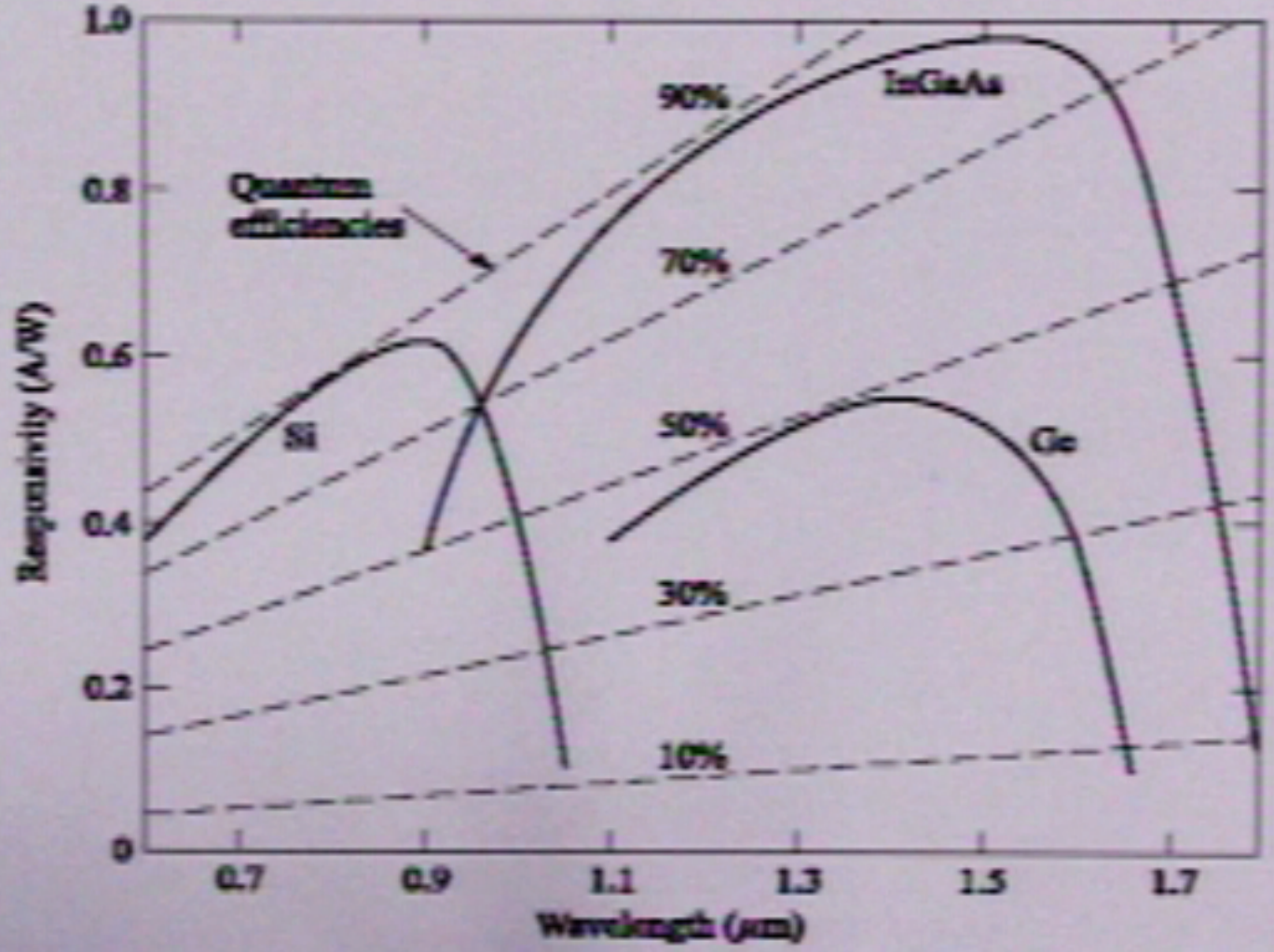
$$= P_0(1-R)(1-e^{-\alpha x})$$

Photo current

$$I_p = \frac{q}{hf}(1-R)(1-e^{-\alpha x})P_0$$

Responsivity $\mathcal{R} \equiv \frac{I_p}{P_o} = \frac{\mu A}{\mu W}$.

Photodiode Responsivities



pin photodiode circuit