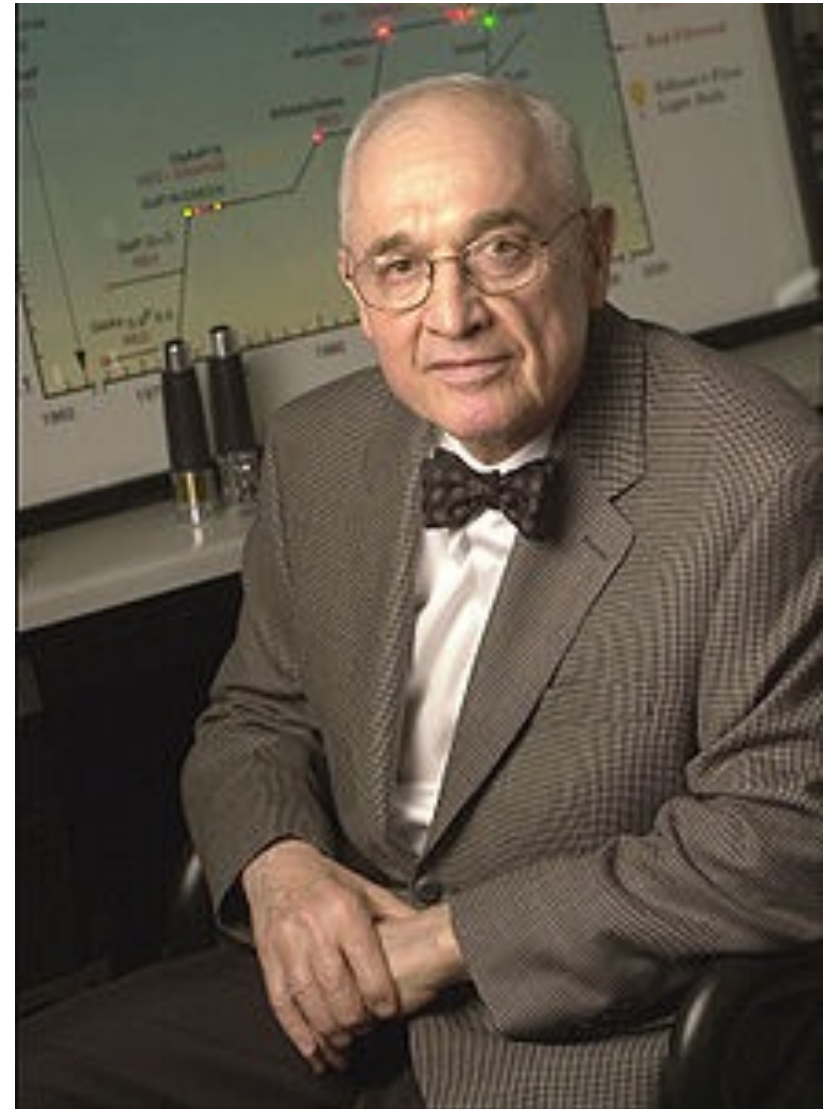
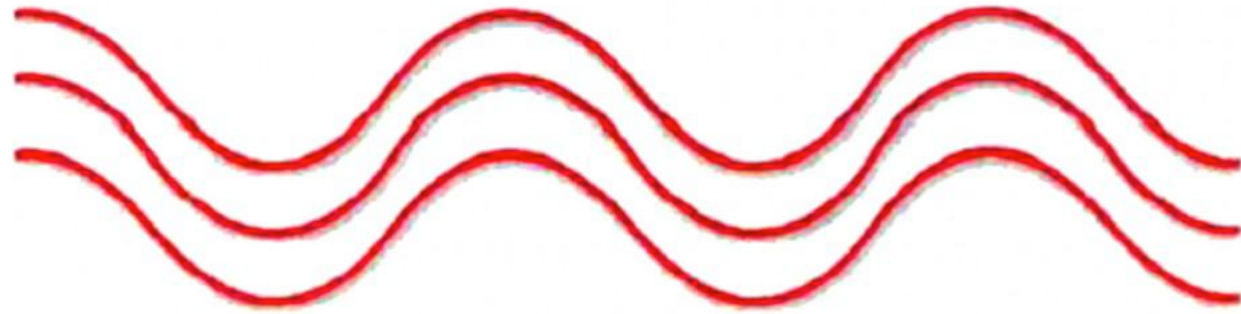


LASERs

Nick Holonyak
1928 (88)

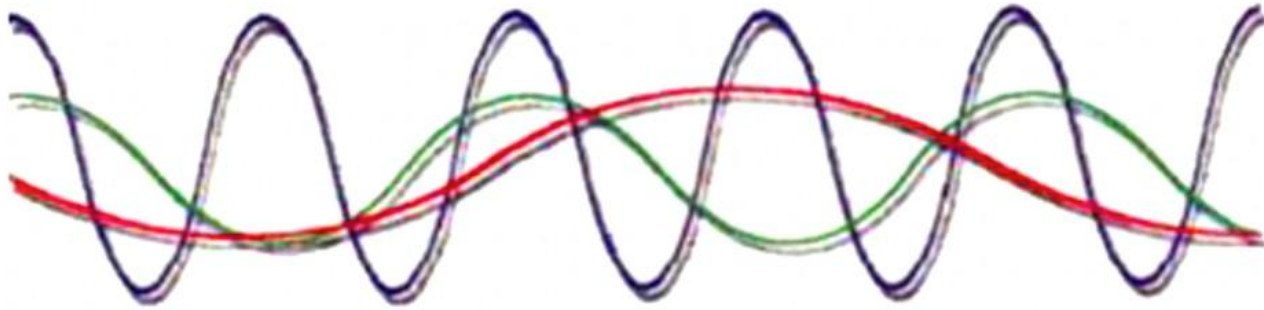


Coherent

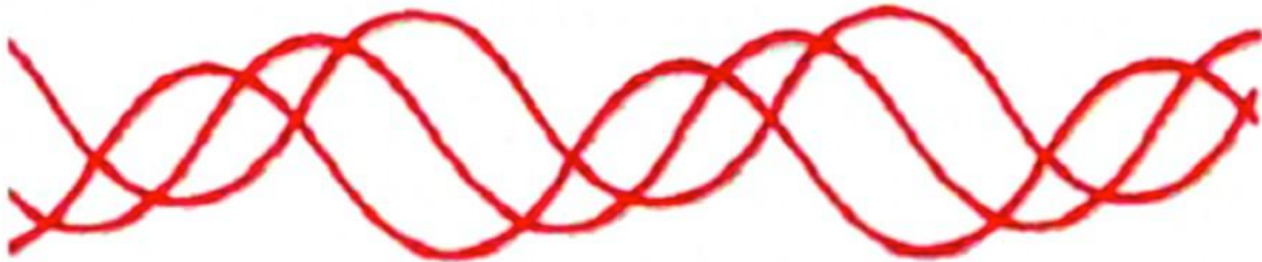


LASER

Incoherent



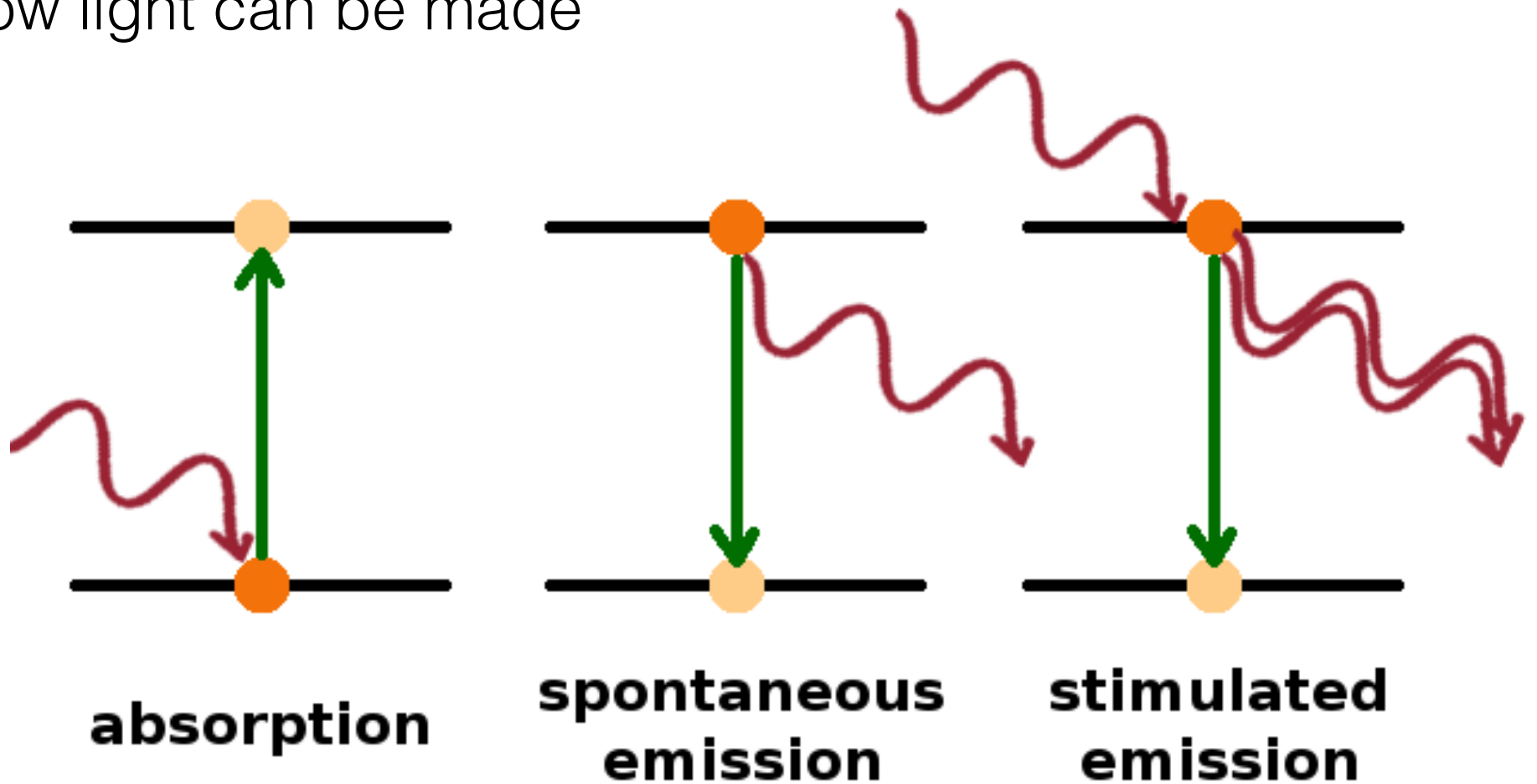
Lightbulb



LED



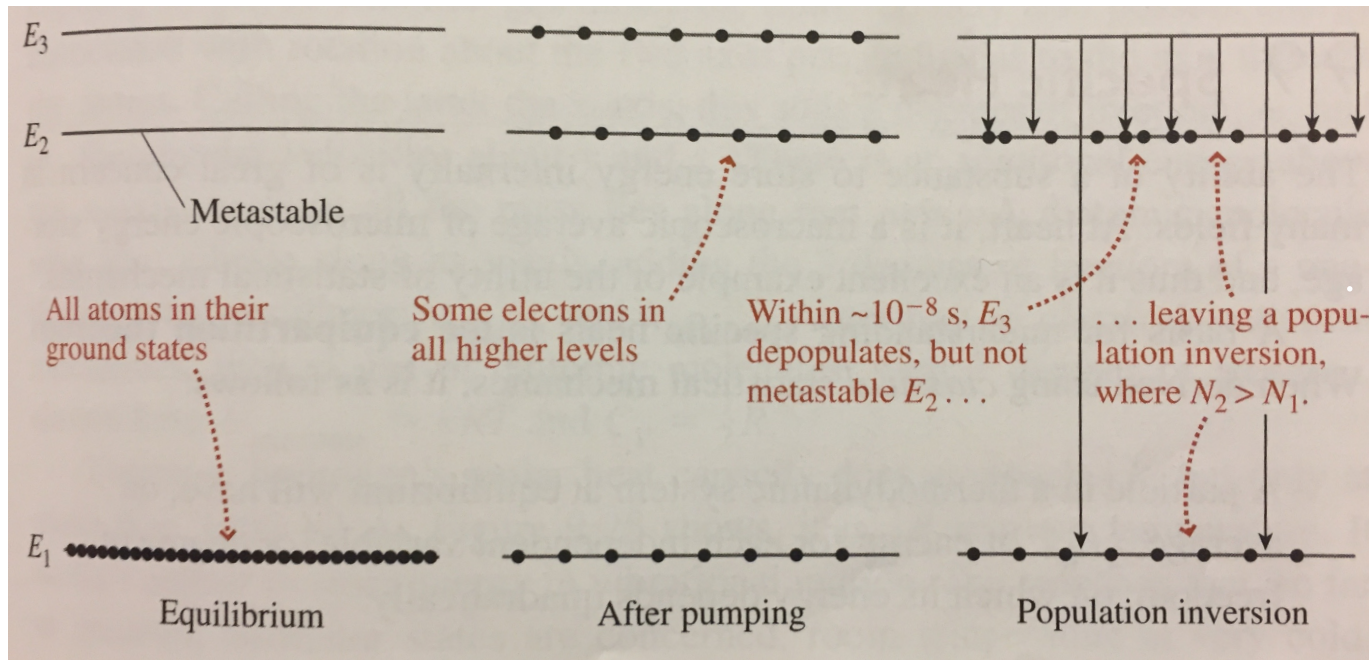
How light can be made



$$R_{\text{stim}} = B \cdot N_2 \cdot Y(\Delta E)$$

Basics of LASERs

- Gain Medium
- Pumping
 - Optical Pumping
 - Electrical Pumping



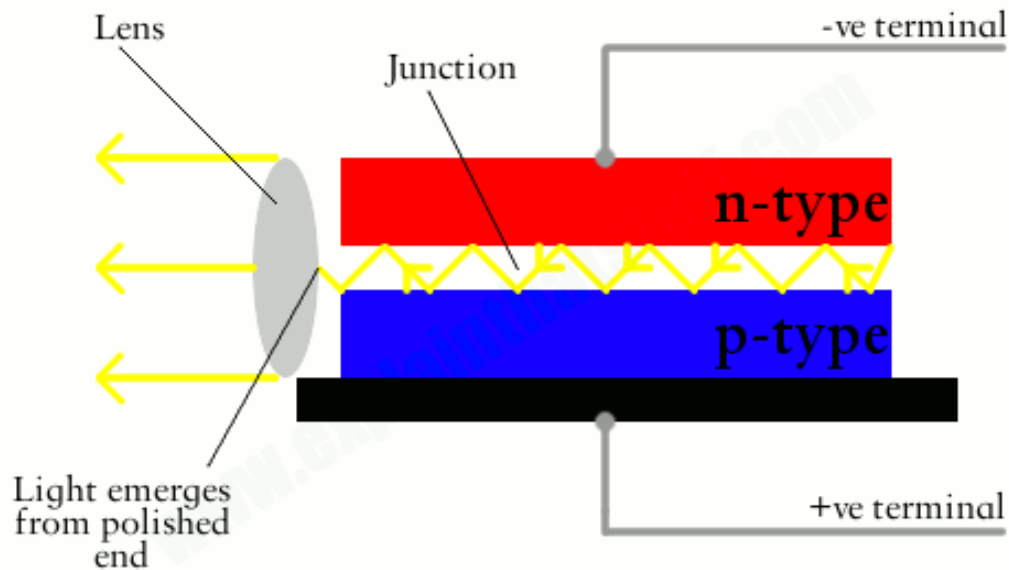
Basics of LASERs

- Optical Resonator
 - Linear and Ring Resonators
 - Feedback
 - Longitudinal Modes
 - $L = n\lambda/2$
- Mirrors
 - Coupling Mirror
 - Bragg Mirror
 - Snell's Law: $\frac{n_1}{n_2} = \frac{\sin \theta_2}{\sin \theta_1}$
 - Bragg Grating



Semiconductor Laser

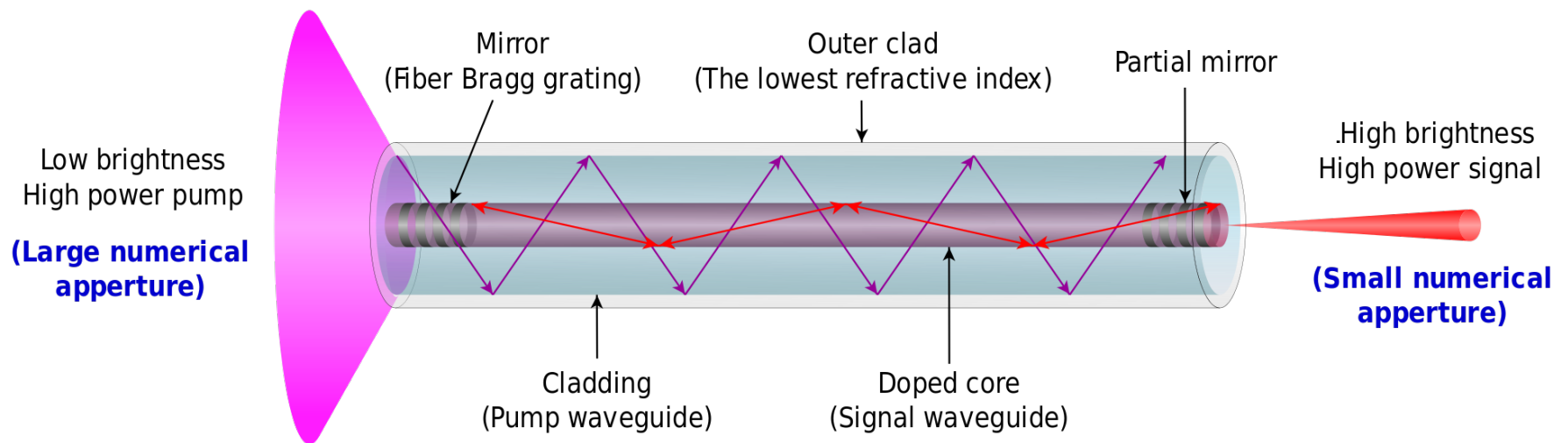
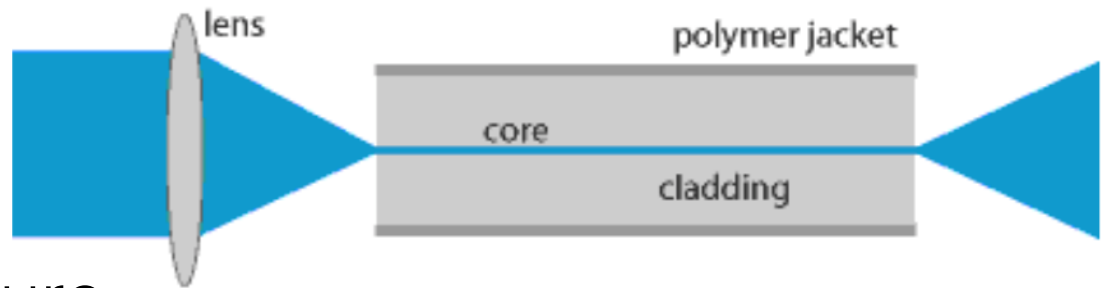
Laser Diode



Fiber Laser

Fiber Optics

- Numerical Aperture



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