

Optical Components: Lasers

What is a laser?

Why use a laser?

How does a laser work? 1)

2)

3)

Optical Components: Lasers

1. Pumping Mechanism (produces AM)

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-

2. Active Medium

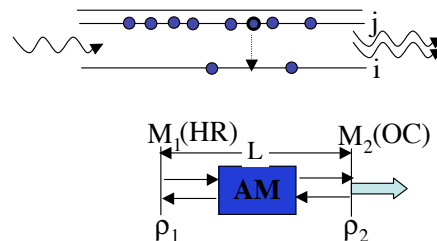
- **gas:**
-
-

liquid:

solid:

3. Resonant Cavity (Optical Feedback)

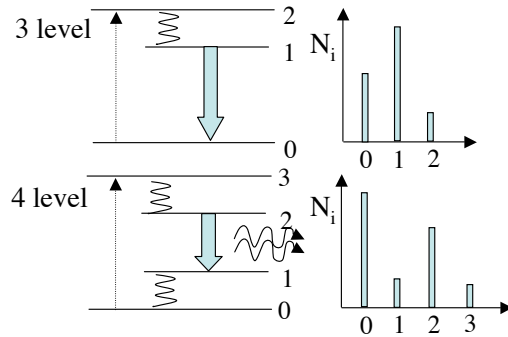
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Optical Components: Lasers

In order to observe lasing,

- 1)
- 2)



- 3)

Optical Components: Lasers

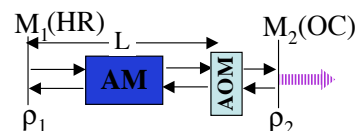
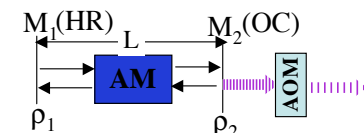
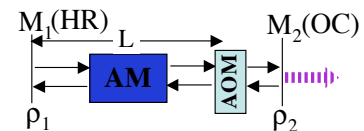
What are the characteristics of a laser beam?

- a) temporal profile (pulse duration)

Q-switching -

Cavity dumping -

Mode Locking -



Optical Components: Lasers

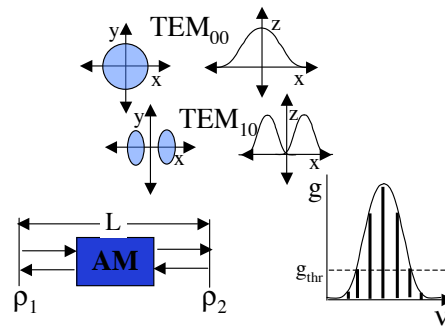
What are the characteristics of a laser beam?

b) beam power

c) spatial distribution

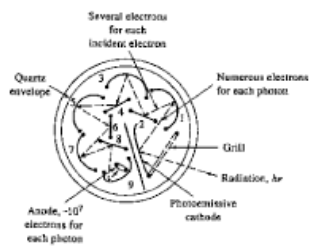
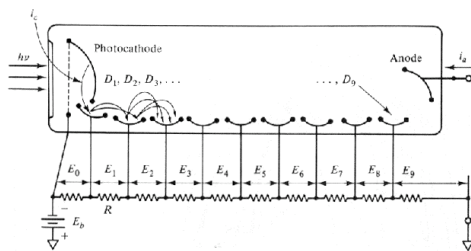
d) bandwidth

e) polarization



Photon Transducers

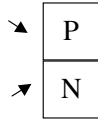
Photomultiplier tube (PMT)



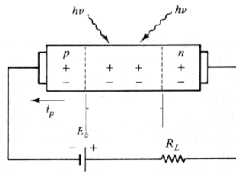
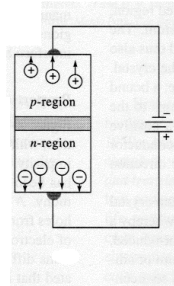
I&C: 7-29a

Photon Transducers

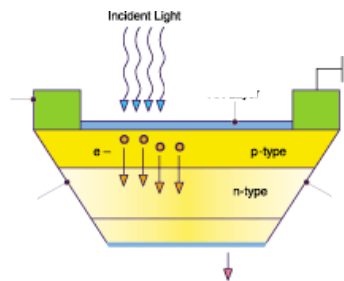
Diodes are semiconductor devices that limit current to one direction



Reverse bias

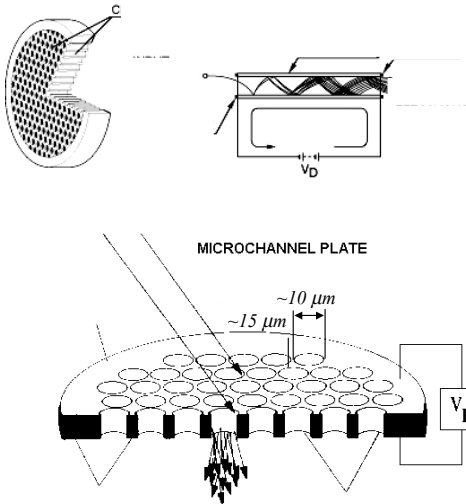


Avalanche Photodiodes



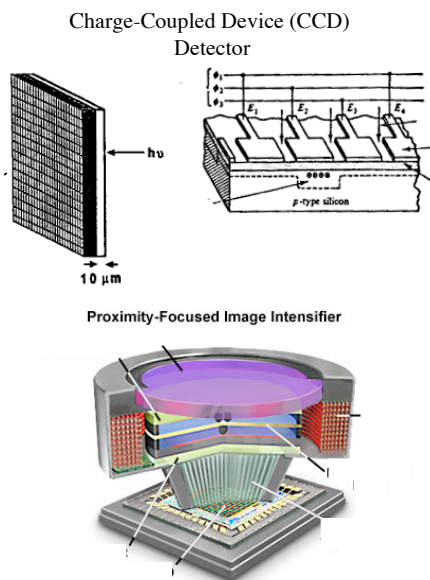
<http://oemagazine.com/fromTheMagazine/aug01/images/tutorialfig3.gif>

Microchannel Plate



http://www.dmphotonics.com/MCP_MCPIImageIntensifiers/microchannel_plates.htm
<http://hea-www.harvard.edu/HRC/mcp/mcp.html>

Multichannel Detectors



<http://micro.magnet.fsu.edu/primer/digitalimaging/digitalimagingdetectors.html>