Презентация ЛАЗЕРЫ

1. Медицина:

Medical Lasers:
Medical lasers can be used as a scalpel. Since the laser can be controlled and can have such a small contact area it is ideal for fine cutting and depth control. Medical lasers can also be used to reattach retinas and can be used in conjunction with fiber optics to place the laser beem where it needs to be. Medical lasers can also be used to stitch up incisions after surgery, by fusing together skin. (LFI)

2. Промышленность

Metal working:
Lasers very accurate point and solid state construction make it ideal or industrial production. Lasers allow better cuts on metals and the welding of dissimilar metals with out the use of a flux. Also lasers can be mounted on robotic arms. This is safer then oxygen and acetylene, or arc welding. (Impulse).

Lasers in the Garment Industry

Computer controlled laser garment cutters can be programmed to cut out 400 size 6 and then 700 size 9 garments - and that might involve just a few cuts. The programmed cutter can cut dozens to hundreds of thicknesses of cloth, and can cut out every piece of the garment in a single run.

The usefulness of the laser for such cutting operations comes from the fact that the beam is highly collimated and can be further focused to a microscopic dot of extremely high energy density for cutting.

3. Военная

Military Applications

There are a variety of military laser applications. In relatively few cases, lasers are used as weapons. Some high-power lasers are currently developed for potential use as *directed energy weapons* on the battle field, or for destroying missiles, projectiles and mines.

In other cases, lasers function as target designators or laser sights (essentially laser pointers emitting visible or invisible laser beams), or as irritating or blinding (normally not directly destroying) countermeasures e.g. against heat-seeking anti-aircraft missiles. It is also possible to blind soldiers temporarily or permanently with laser beams, although the latter is forbidden by rules of war.

4. СМИ и развлечения:

Entertainment:

Laser shows are quite popular and the special effects are amazing. These use lasers that are in the visible spectrum along with vibrating mirrors to paint images in the air. Here is an example of a dance with lasers in the background: 

Another example of laser entertainment is the use of laser signs at trade shows. Here is an example of a laser Microsoft sign: 

5. Банковские системы

6. Связь

Lasers in Communication

Fiber optic cables are a major mode of communication partly because multiple signals can be sent with high quality and low loss by light propagating along the fibers. The light signals can be modulated with the information to be sent by either light emitting diodes or lasers. The lasers have significant advantages because they are more nearly monochromatic and this allows the pulse shape to be maintained better over long distances. If a better pulse shape can be maintained, then the communication can be sent at higher rates without overlap of the pulses.

7. Безопасность

Lasers and laser technologies are widely used in defense and security fields. Applications include perimeter security, range-finding, target designation, monitoring of hazardous gases, and illumination. Having to pass the critical qualification criteria required for deployment in defense applications has helped make diode laser technology one of the most reliable photonics technologies available today.

8. Наука

Various Scientific Applications

Laser cooling makes it possible to bring clouds of atoms or ions to extremely low temperatures. This has applications in fundamental research and also for industrial purposes.

Particularly in biological and medical research, optical tweezers can be used for trapping and manipulating small particles, such as bacteria or parts of living cells.

Laser guide stars are used in astronomical observatories in combination with adaptive optics for atmospheric correction. They allow substantially increased image resolution even in cases where a sufficiently close-by natural guide star is not available.

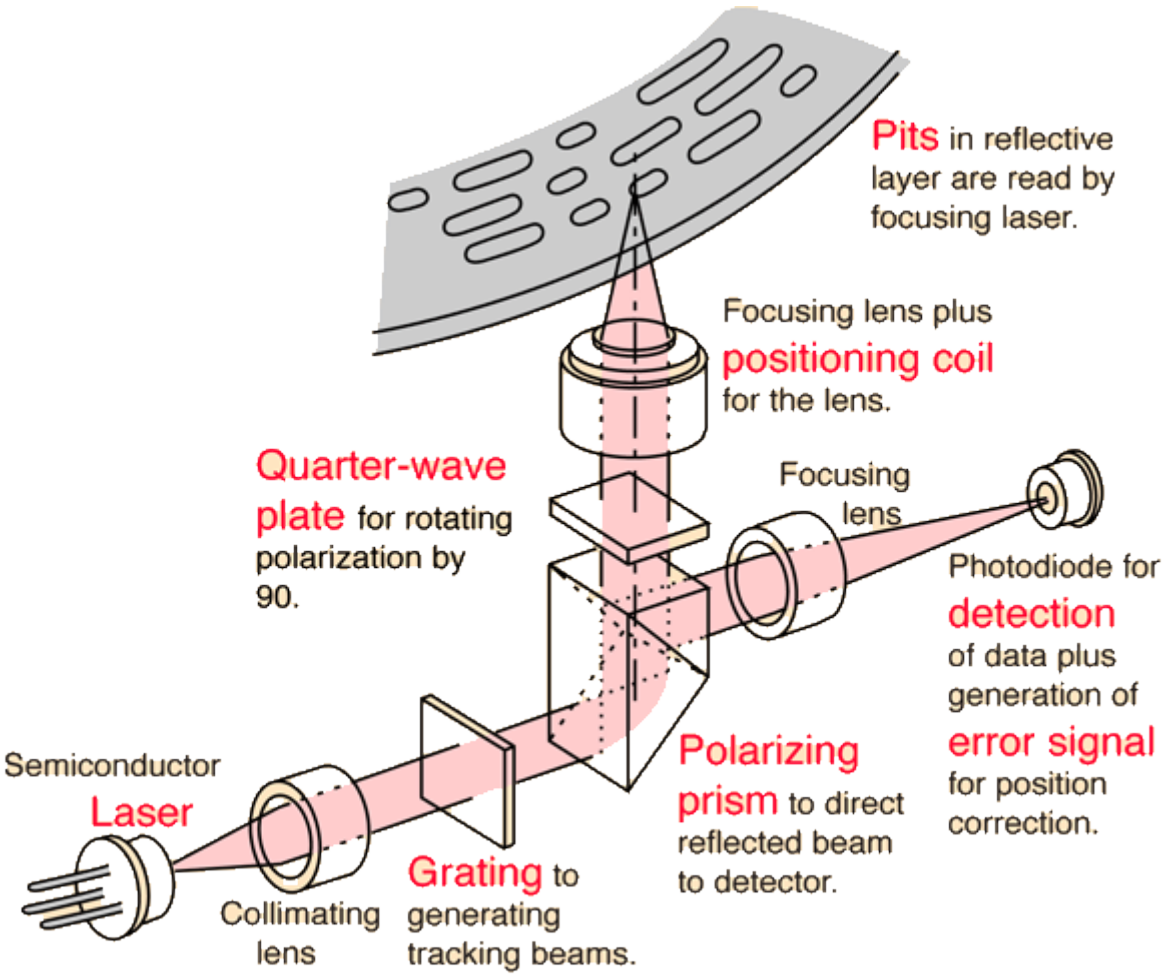
Barcode Scanners

Supermarket scanners typically use helium-neon lasers to scan the universal barcodes to identify products. The laser beam bounces off a rotating mirror and scans the code, sending a modulated beam to a light detector and then to a computer which has the product information stored. Semiconductor lasers can also be used for this purpose.

Laser for Compact Discs

The detection of the binary data stored in the form of pits on the compact disc is done with the use of a semiconductor laser. The laser is focused to a diameter of about 0.8 mm at the bottom of the disc, but is further focused to about 1.7 micrometers as it passes through the clear plastic substrate to strike the reflective layer..

Also do magnetic strips on cash cards.


Pits in reflective layer are read by focusing laser.
Focusing lens plus positioning coil for the lens.
Quarter-wave plate for rotating polarization by 90.
Focusing lens
Photodiode for detection of data plus generation of error signal for position correction.
Polarizing prism to direct reflected beam to detector.
Semiconductor Laser
Collimating lens
Grating to generating tracking beams.