

# Principle of Work of Lasers.

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## **Abstract.**

In given article is opened the principle of work of lasers.

## **1 Principle of Work of Lasers**

The left-hand part of Fig. 1 shows the simplest laser, and the right-hand part, an electronic amplifier of lasers with an indicator of the laser beam's strength.

Inside of a glass tube or quartz tube there is a gas, which is irradiated by light. If photons have suitable energy they at collision with nucleuses of atoms of gas are absorbed by a ethereal sphere of nucleus, due to that the ethereal sphere of nucleus is increasing. If the nucleuses of the atoms have tangential collision with orbital electrons of next atoms, then the nucleuses radiate an photons. This radiation of photons occurs in different sides. Photons, radiated from nucleuses, can be absorbed by other nucleuses at their collision, and then the these other nucleuses at collision with orbital electrons can radiate again the photons.

Most of the emitted photons hit the wall of the tube where they are either absorbed or go outside. But, if the most part of a tube is covered with material and to leave only a window for irradiation by the light, then almost all photons will be reflected from the tube inside and again to be absorbed and radiated by atoms.

A part of the photons move along the tube in two directions and hit the mirrors from which they are reflected into the opposite direction. A low-density ether path is formed along the tube due to the multiple passages of photons. This path is compressed by the more condensed ether which enters through the wall of the tube from outside.

Since the ether pressure across the tube is higher than that along the tube, then the ethereal sphere of nuclei of atoms is being elongated in di-

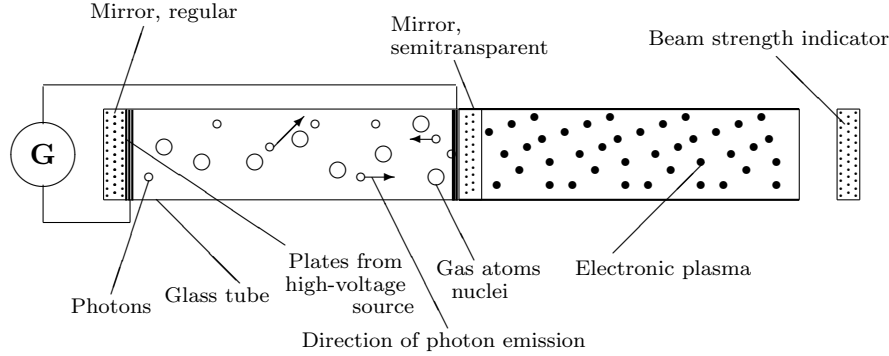


Figure 1: Diagram of a simple laser.

rection in parallel to the axis of the tube. Upon the colliding of these nuclei with orbital electrons, from the nuclei occurs emission of photons in the direction in parallel to the axis of the tube. Thus the avalanche-like excitation of the nuclei of atoms is formed as well as the emission of photons from them, which move in the direction of either of the mirrors. Part of the emitted photons leave outside through the semitransparent mirror. Thus the unidirectional emission of photons from the laser is formed.

But gas lasers are usually made of long round tubes which contain gases through which runs independent electric current from a high-frequency generator. When electric current passes through a gas, the tangential (non-elastic) collisions of electrons with the nuclei of the gas atoms occur. Upon these collisions the ethereal spheres of nuclei emit photons.

Not only gases can be taken as working bodies of lasers, but also solids and liquids. Herewith the atoms of the active elements must be excited due to the action of extraneous photons used for the excitation of atoms. The density of a photon beam characterizes its force, but the force and the value of cross-section of the beam characterizes the power of the beam. The force of a laser beam also depends on frequency of radiated photons, the more frequency the more force.

Solid lasers could be more powerful than the gas and liquid lasers, since in solids photons have low velocities of motion; only when they leave the laser, photons increase their velocity to the limit velocity. Due to that, the photon beam inside the laser and upon leaving it, may have high density

wihch will not destroy the laser. As to the gas lasers, the photons there move at the limit speed; due to that, the formation of dense emission of photons is inadmissible, since the beam will destroy the mirrors reflecting the photons.

## **Conclusions**

In the laser is formed a ray with small divergence, because, if increase the frequency of passage of photons from a mirror to a mirror, then the pressure of the ether is decreasing longitudinally of the tube, and across a tube remains former, due to that the ethereal sphere of the nucleuses is extended in direction of the axis of the tube and the radiation of photons occurs also mainly in the axis of the tube.