University of Mosul
College of science
Department of Physics
Third Stage
Lecture 11

Laser

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Lecture 11: Kinds of Pumping

Preparation
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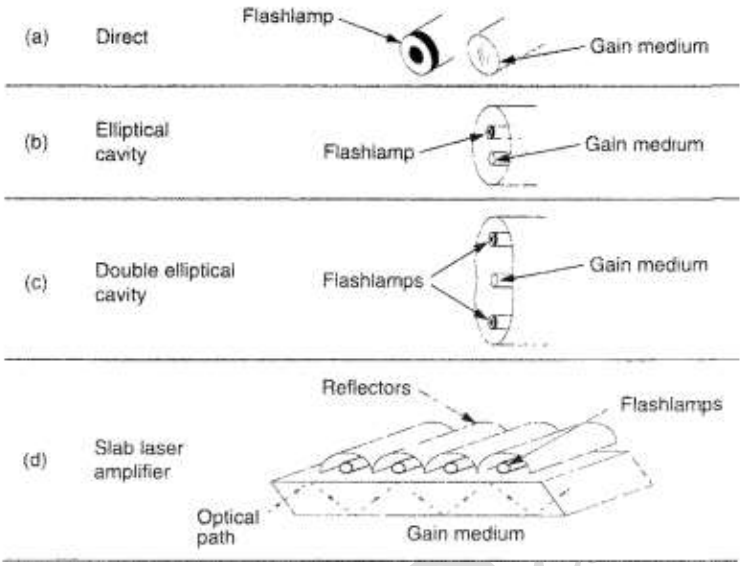
Optical Pumping Geometries

In order for pumping to occur, the light from the pumping source must be absorbed by the gain medium. This can be accomplished by a number of techniques, summarized in Figure. The first example (a), shows a lamp located next to a cylindrical gain medium, a small portion of the flux from the lamp is directly intercepted by the gain medium.

To increase the amount of flux intercepted by the laser rod from the flashlamp, an elliptically shaped pumping cavity is used as shown in Figure (b). An elliptical shape is used because any optical ray emitted from one focus of the ellipse is refocused at the other focus of the ellipse. This elliptical arrangement is configured to take advantage of the common linear type of flashlamp that is available as a reliable, long-lasing pumping lamp. This pumping configuration can be improved further by

using a double elliptical cavity as in Figure (c), where two flashlamps are used to increase the total pumping flux to the rod.



(e) Spiral pumping

Figure (1): optical pumping geometries

As alternative geometry for a solid-state laser is the slab geometry shown in (d), where the laser beam undergoes a zigzag path through the slab. Pumping is accomplished by flashlamp partially enclosed by reflectors located adjacent to the slab, this geometry is used for high-power laser. Figure (e) shows the spiral light pumping for He-Ne laser to expose all the volume of gain medium with light of pumping.

https://www.google.com/search?q=%3A+Kinds+of+Pumping+in+laser%2C+vedio&sca_esv=7319a1d5414ff2b8&ei=Ng2tZ_qwAeONxc8P-pnZ0A8&ved=0ahUKEwj6o9b2hL-LAxXjRvEDHfpMFvoQ4dUDCBA&uact=5&oq=%3A+Kinds+of+Pumping+in+laser%2C+vedio&gs_lp=Egxnd3Mtd2l6LXNlcnAiIjogS2luZHMgb2YgUHVtcGluZyBpbiBsYXNlciwgdmVkaW8yBxAhGKABGAoyBxAhGKABGApI8khQ1QtYmTFwAXgAkAEAmAGkAqABpg-qAQUwLjIuN7gBA8gBAPgBAvgBAZgCCqAC2g_CAg4QABiABBiwAxiGAxiKBcICCxAAGIAEGLADGKIEwgIEECEYCsICCBAAGIAEGKIEmAMAiAYBkAYFkgcHMS4xLjcuMaAHtB8&sclient=gws-wiz-serp#fpstate=ive&vld=cid:9c80450a,vid:b34WBdp9S-E,st:0