Homojunction Laser (Laser Diode):

Homojunction laser are made of p-n junctions of either the same material or of material having similar bandwidth. Population inversion can be achieved by heavily doping a p-type material with electrons or n-type materials with holes.

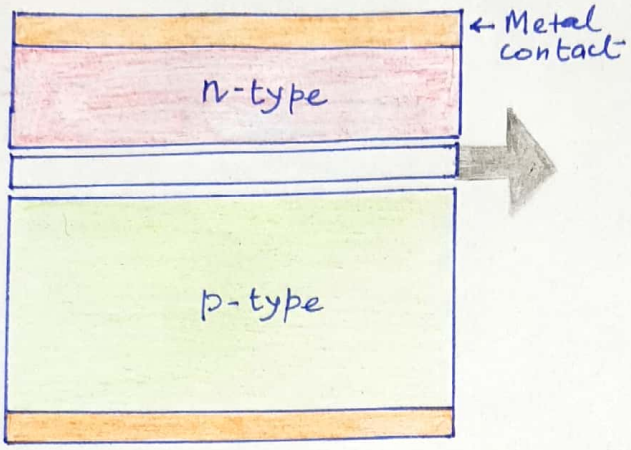

Fig: Homojunction Laser

It is called a homojunction laser because it has the same semiconductor material (eg. GaAs) on both side of the junction. A pair of parallel planes are polished perpendicular to the axis. Under appropriate biasing condition laser light will be emitted from these planes

The two remaining sides of the diode are roughened to eliminate lasing in the directions other than the main ones. This structure is called a Fabry-perot cavity, it is used extensively for modern semiconductor Lasers.

Heterojunction Laser.:

A heterojunction is an interface between two adjoining single crystal semiconductor with different bandgap energies. devices which are fabricated with heterojunction are said to have heterostructure. Heterojunctions are classified into either an isotype (n-n or p-p) or an anisotype (p-n).

The isotype heterojunction provides a potential barrier within the structure which is useful for the confinement of minority carrier to a small active region. It effectively reduces the carrier diffusion length and thus the volume within the structure where radiative recombination may take place.

Anisotype heterojunctions with sufficiently large bandgap differences improve the injection efficiency of either electrons or holes. Both type of heterojunction provide a dielectric step due to the different refractive indices at either side of the junction. This may be used to provide radiation confinement to the active region.

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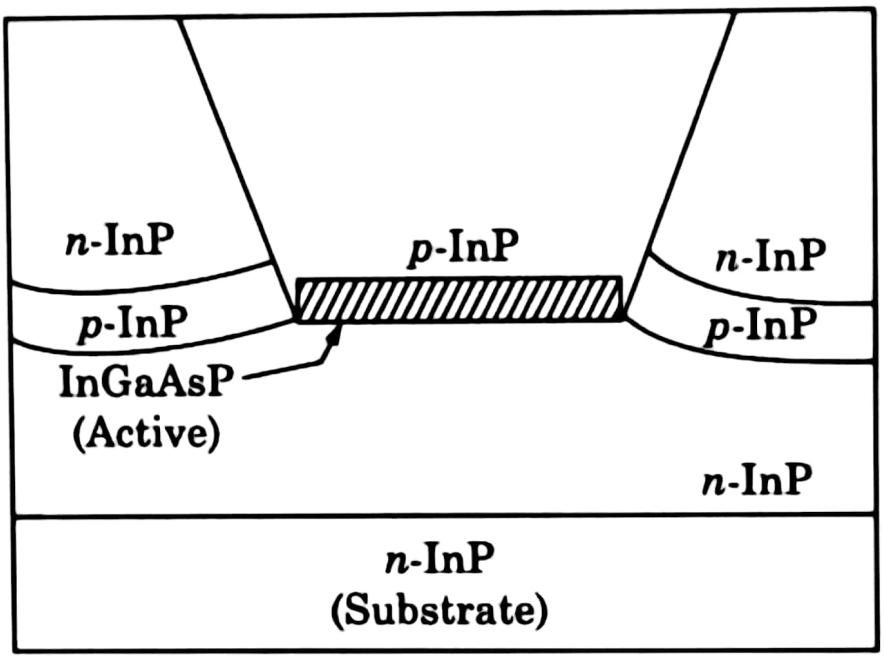

Cross-section of a buried heterostructure semiconductor laser (schematic).

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