Abstracts

Heterostructure Injection Lasers

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The utilization of the nearly ideal heterojunction that can be achieved between GaAs and AL/sub x/ Ga/sub 1-x/As to confine both light and electrical carriers has lead to the evolution of several new classes as injection lasers with very low room-temperature current-density thresholds for lasing (/spl lsim/ 1000 A/cm²), and structures whose operation can be more readily understood than the earlier homostructure lasers. These are as follows: the single-heterostructure (SH) laser which utilizes one heterojunction to confine light and carriers on one side of the structure; the double-heterostructure (DH) laser in which both carriers and light are confined to the same region; and the separate-confinement-heterostructure (SCH) laser in which the carriers are separately confined to a narrow region within the optical cavity. A state-of-the-art description of these lasers and some of the mode structures encountered in their operation is presented. Recent work is described which permits the growth of low-strain heterostructures with heterojunctions between GaAs and Al/sub x/Ga/sub 1-x/As/sub1-y/P/sub y/ strain reduction from mismatch and bonding of contacts has resulted in lasers which, while maintaining very low room-temperature current thresholds, also have very long lifetimes (> 10/sup 5/ h) for continuous operation.

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