Optoelectronics

Basics

- Optoelectronics includes all semiconductor devices which emit light through recombination of electrons and holes. Prime materials are **GaAs**, **GaAlAs**, **GaP**, **InSb** and generally all **III - V** semiconductors, but also **GaN** or **SiC**. More about optoelectronics can be found in an other Hyperscript.
  - Again, in making optoelectronic devices, *defect engineering* is needed. Diffusion plays a major role; the precise atomic mechanisms are not too well understood at present.
  - Moreover, defects in interfaces (= phase boundaries between different optoelectronic materials) play a major role; they essentially limit or prohibit applications in many cases.
- In contrast to **Si** microelectronics, defects may also play a role in the *finished device* while it is in operation. Dislocations, not wholly unavoidable in most **III - V** materials, may start to climb and degrade the function.
  - Early Lasers diodes, e.g., stopped working after few hours of operation because defects evolved that served as recombination centers impeding radiant recombination.