



光电子器件

Optoelectronic Devices

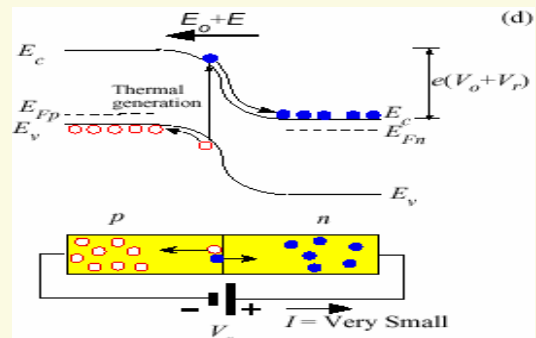
陈根祥

北京交通大学全光网与现代通信网教育部重点实验室
2007-4-23

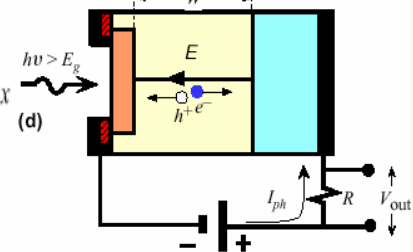
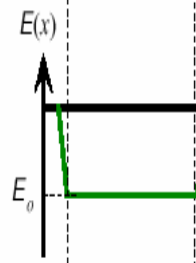
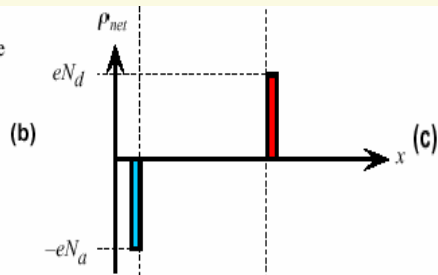
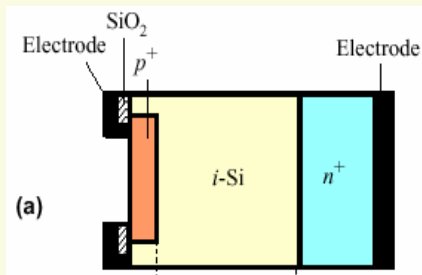
北京交通大学

PIN光电二极管

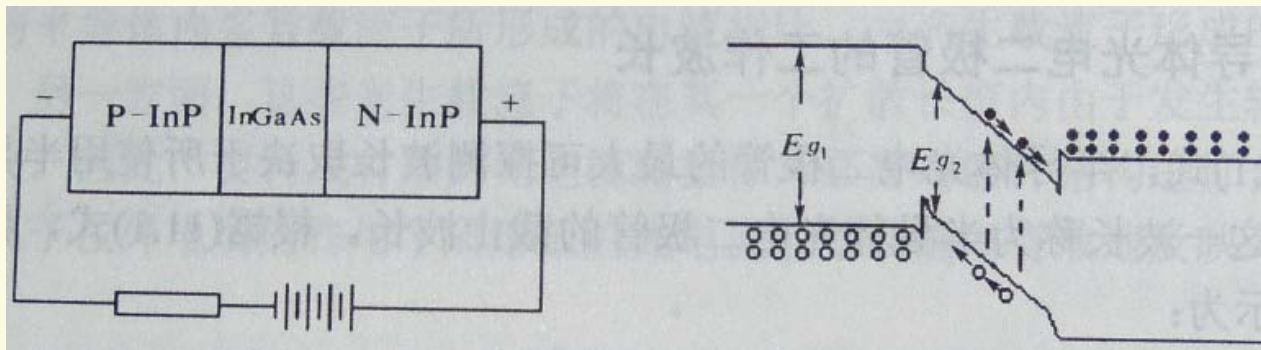
➤ PN结光电效应



➤ PIN光电检测器

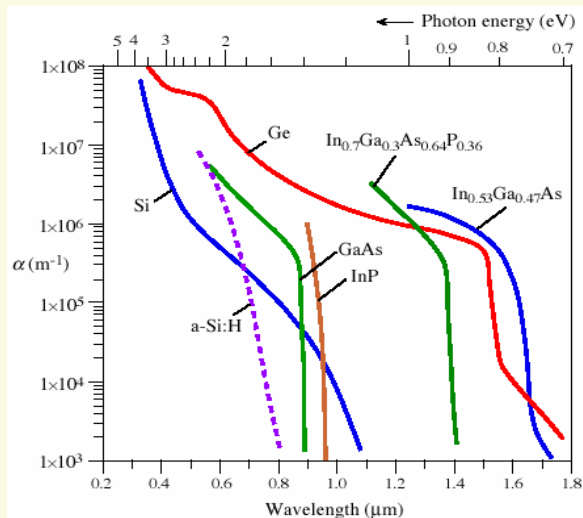


➤ 异质结PIN管



半导体光电检测器材料

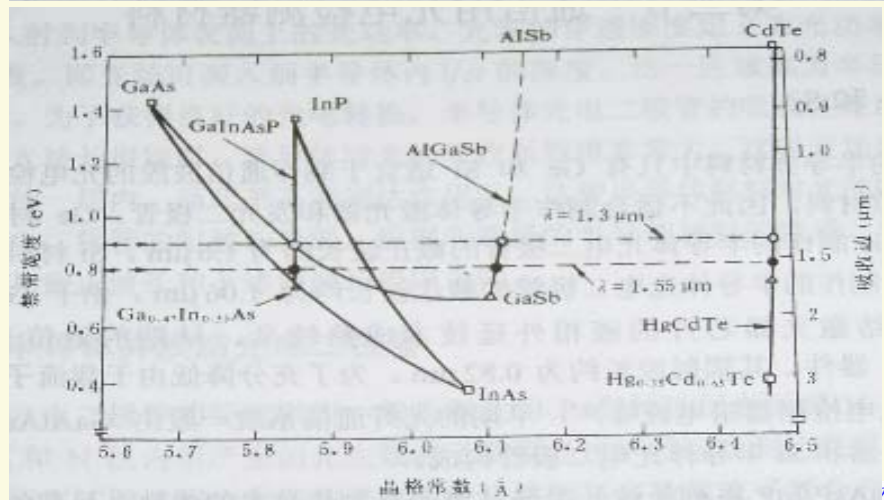
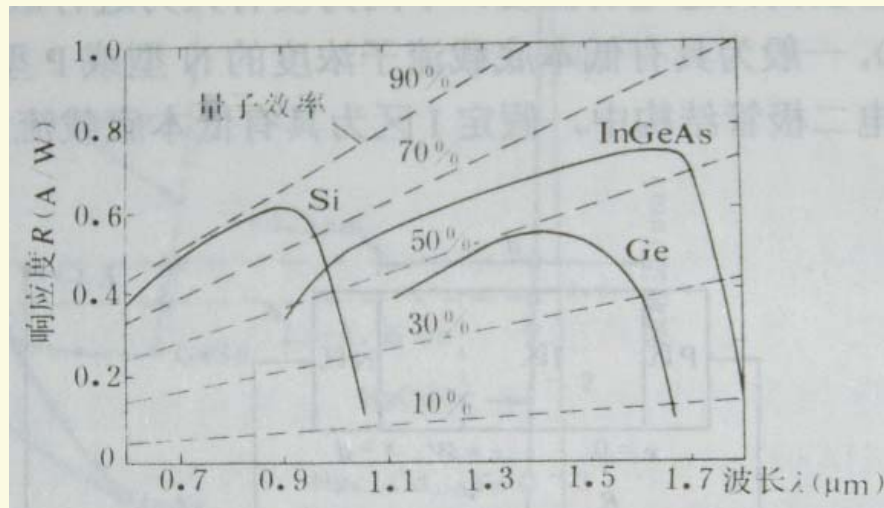
➤ 各种材料的吸收谱



$$\begin{aligned}
 R &= I_{ph} / P_{in} \\
 &= (e/h\nu)(I_{ph}/e)/(P_{in}/h\nu) \\
 &= (e/h\nu)\eta
 \end{aligned}$$

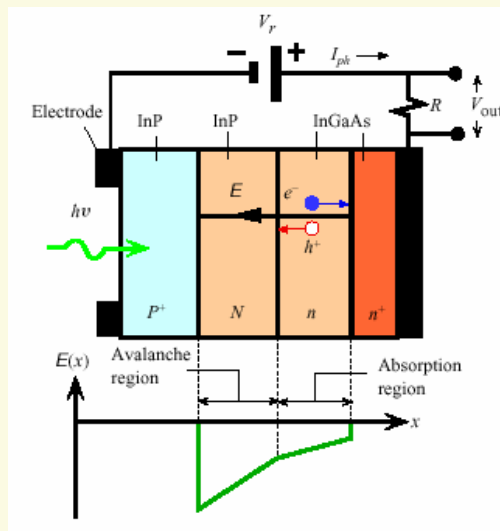
➤ 化合物光电检测器材料

➤ 响应度和量子效率

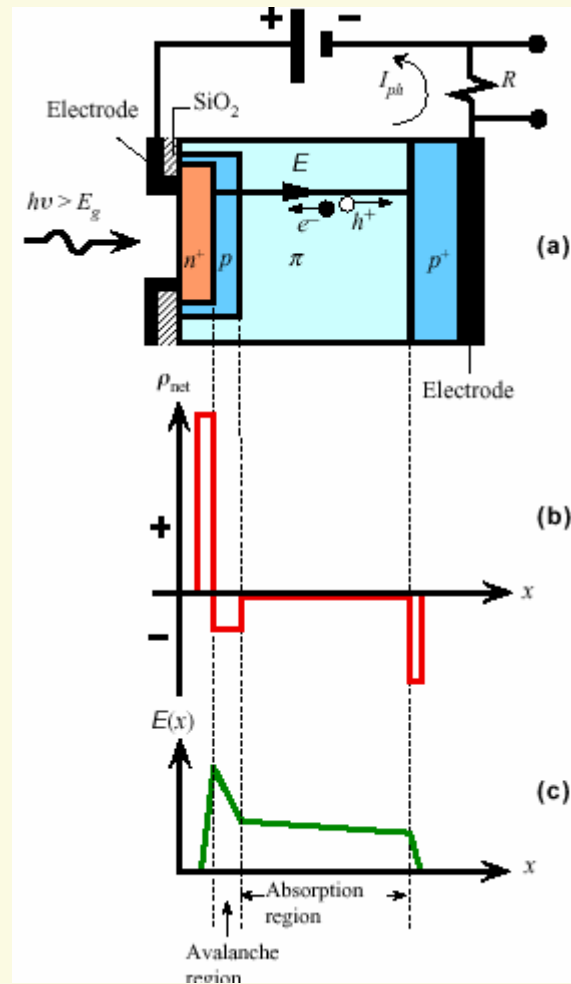
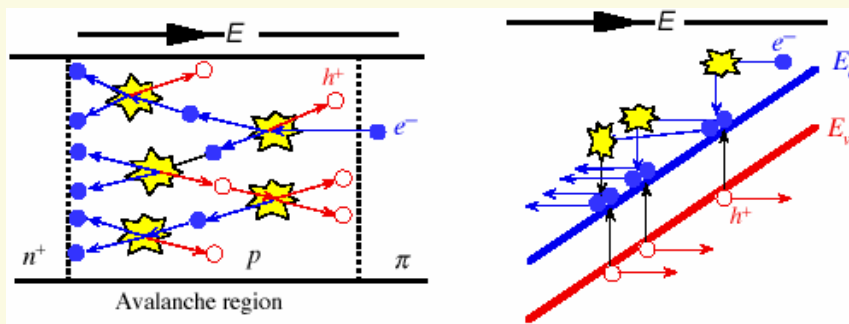


APD光电二极管

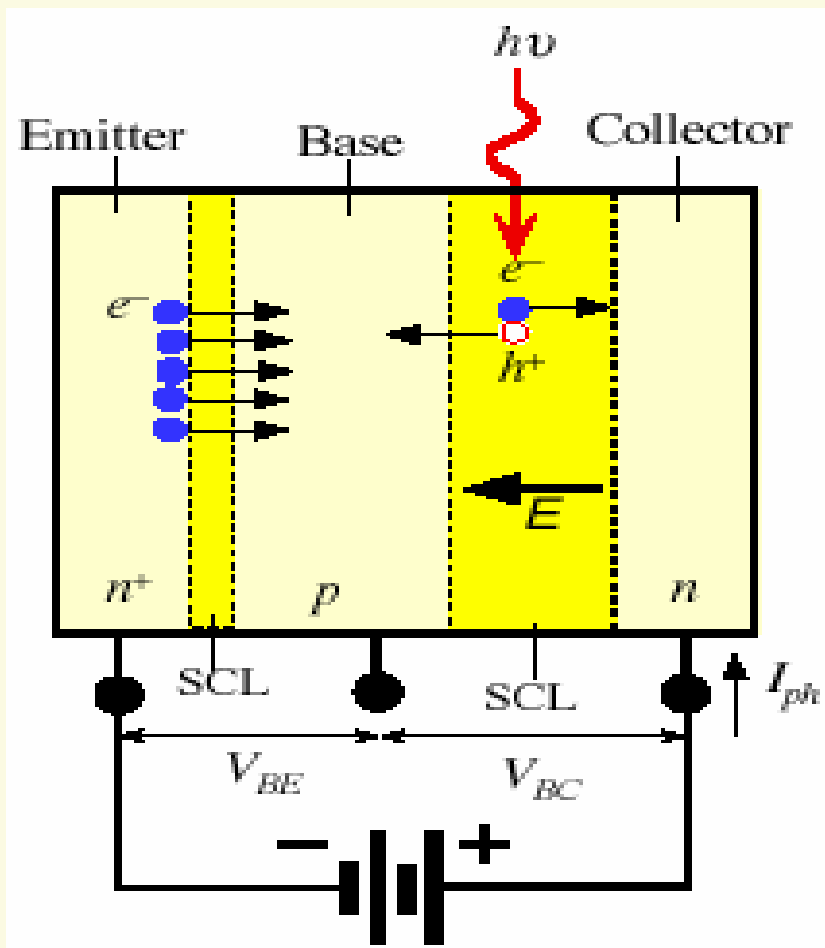
➤ 器件基本结构



➤ 基本原理

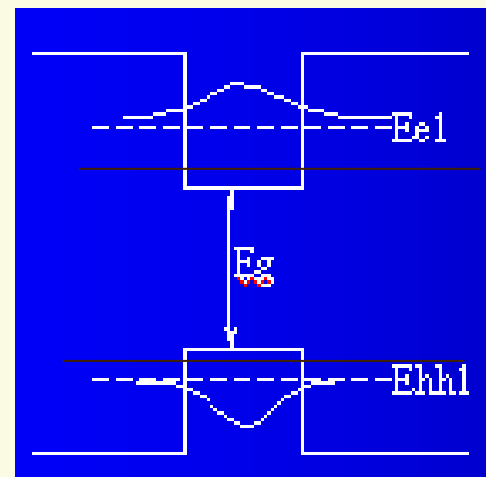


光晶体管

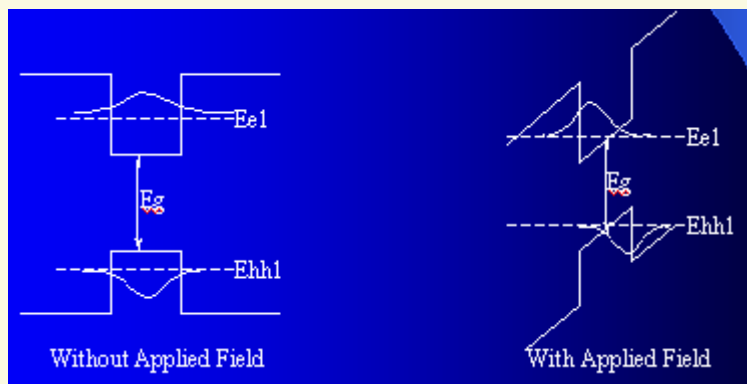


电吸收 (EA) 调制器

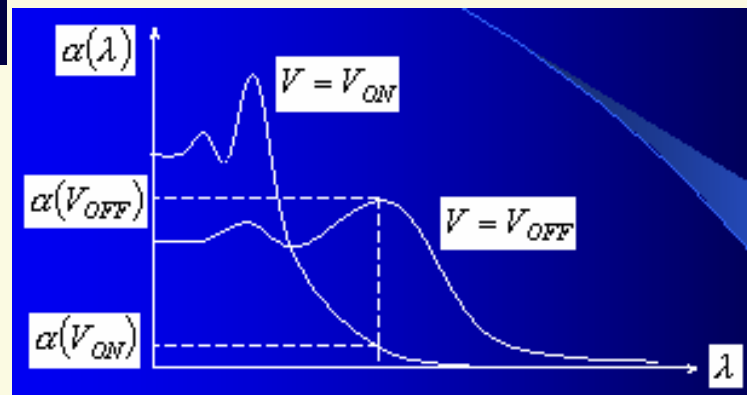
➤ 激子效应



➤ 量子限制Stark效应

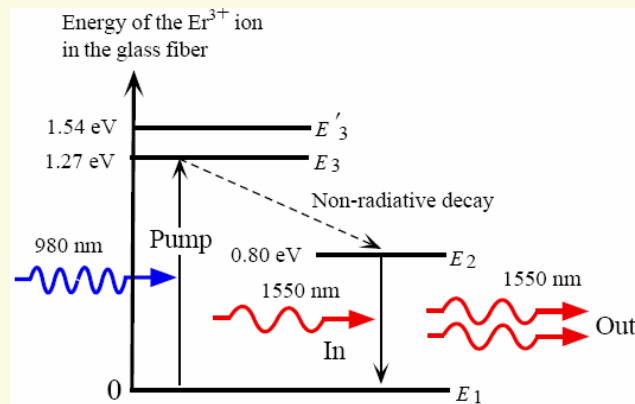


➤ 吸收谱



稀土掺杂光纤放大器

Er³⁺离子的能级图



EDFA的基本结构

