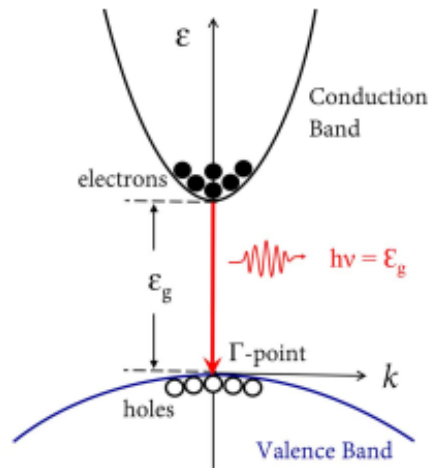
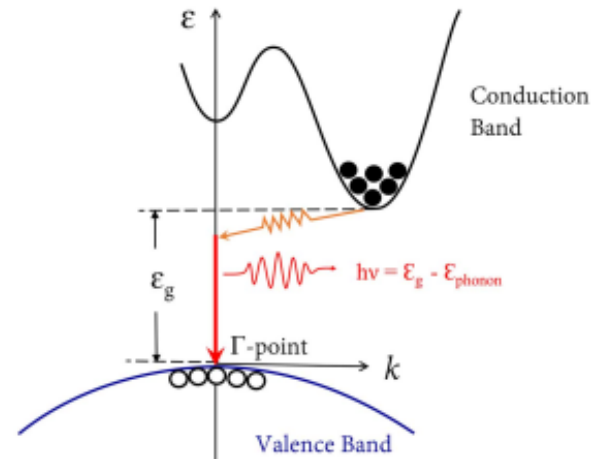


E-k band dispersion:



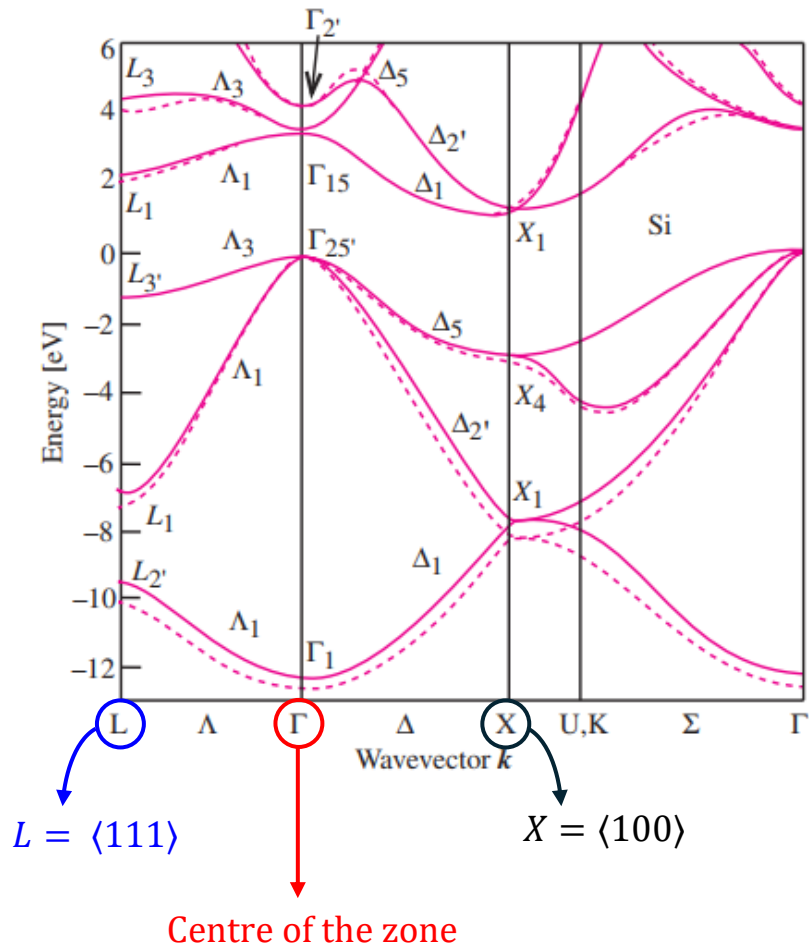
Direct Bandgap Semiconductor
GaAs, InAs, GaN



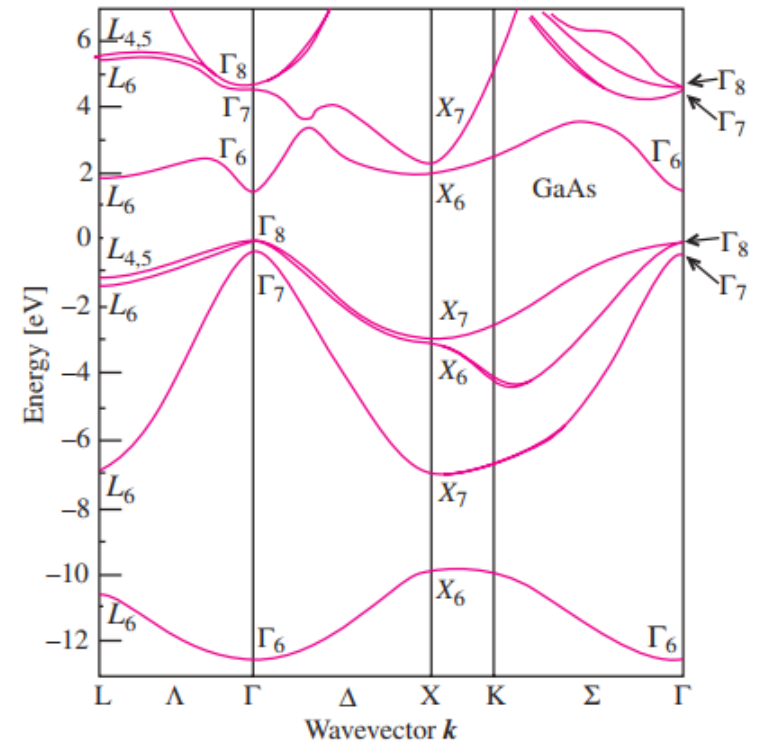
Indirect Bandgap Semiconductor
Si, Ge, AlAs

Examples:

Silicon

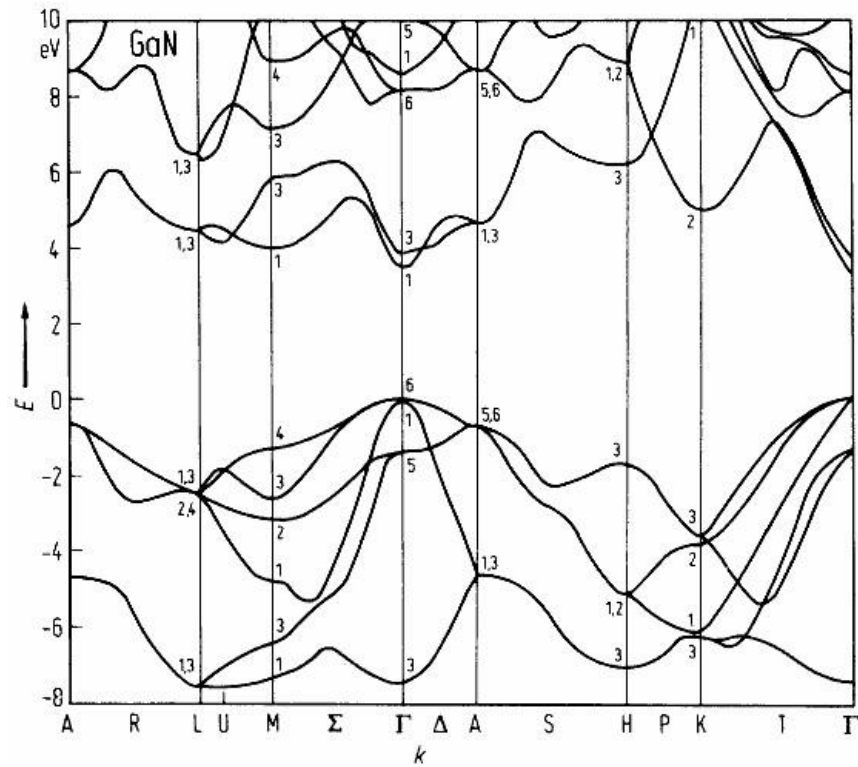


GaAs

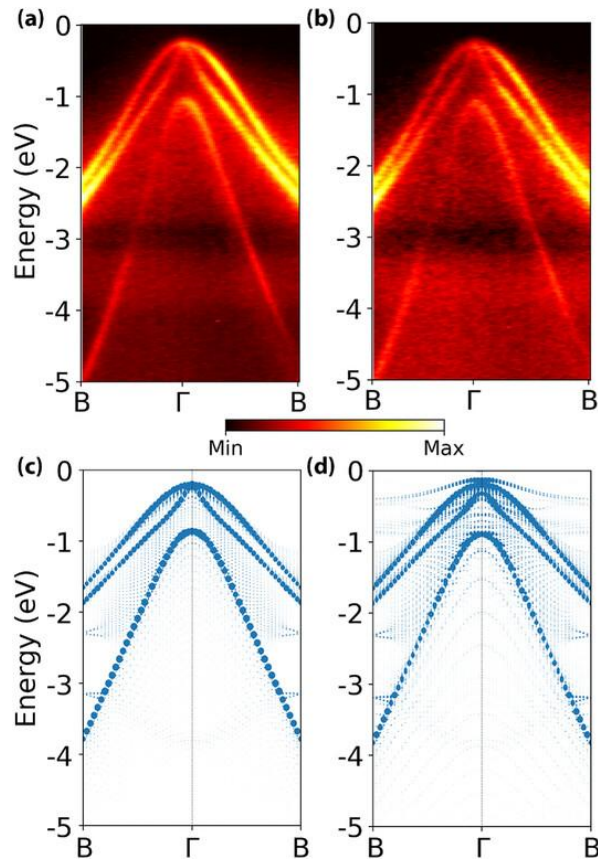


Examples (cont.):

Gallium Nitride

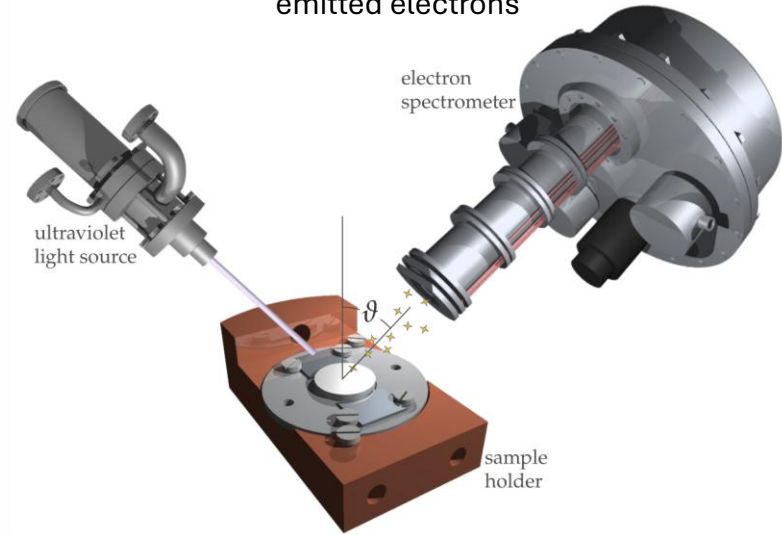


Angle-Resolved Photoemission Spectroscopy



InAs valence band structure:

Shining UV light and measuring energy/momentum of the emitted electrons



Energy of the electron: $E_e = h\nu - \phi$

Parallel wave vector: $k_{\parallel} = \frac{1}{\hbar} \sqrt{2m_e E_e} \sin \theta$

Perpendicular wave vector: $k_{\perp} = \frac{1}{\hbar} \sqrt{2m_e (E_e \cos^2 \theta)}$

[where, $E = \frac{\hbar^2}{2m_e} (k_{\parallel}^2 + k_{\perp}^2)$]

Effective mass estimation:

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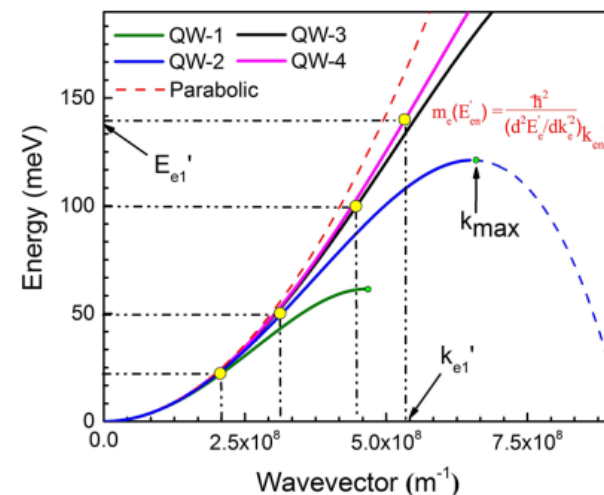
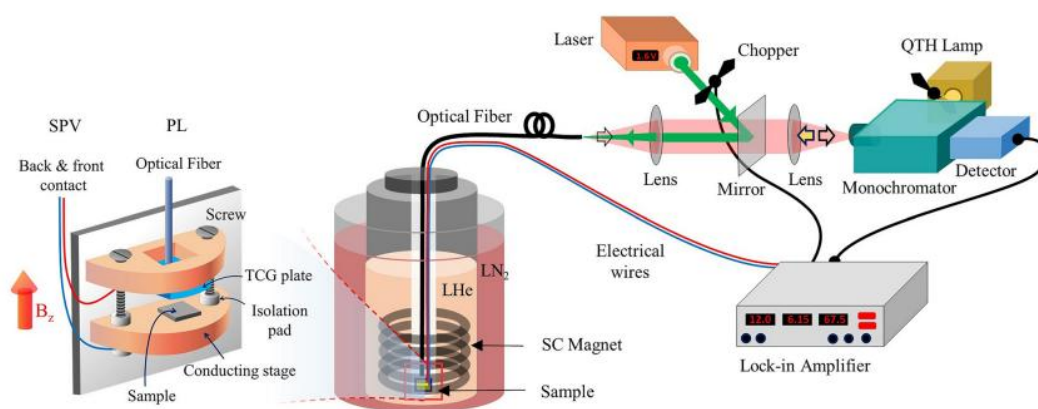
Effect of carrier confinement on effective mass of excitons and estimation of ultralow disorder in $\text{Al}_x\text{Ga}_{1-x}\text{As}/\text{GaAs}$ quantum wells by magneto-photoluminescence

Received: 7 September 2016

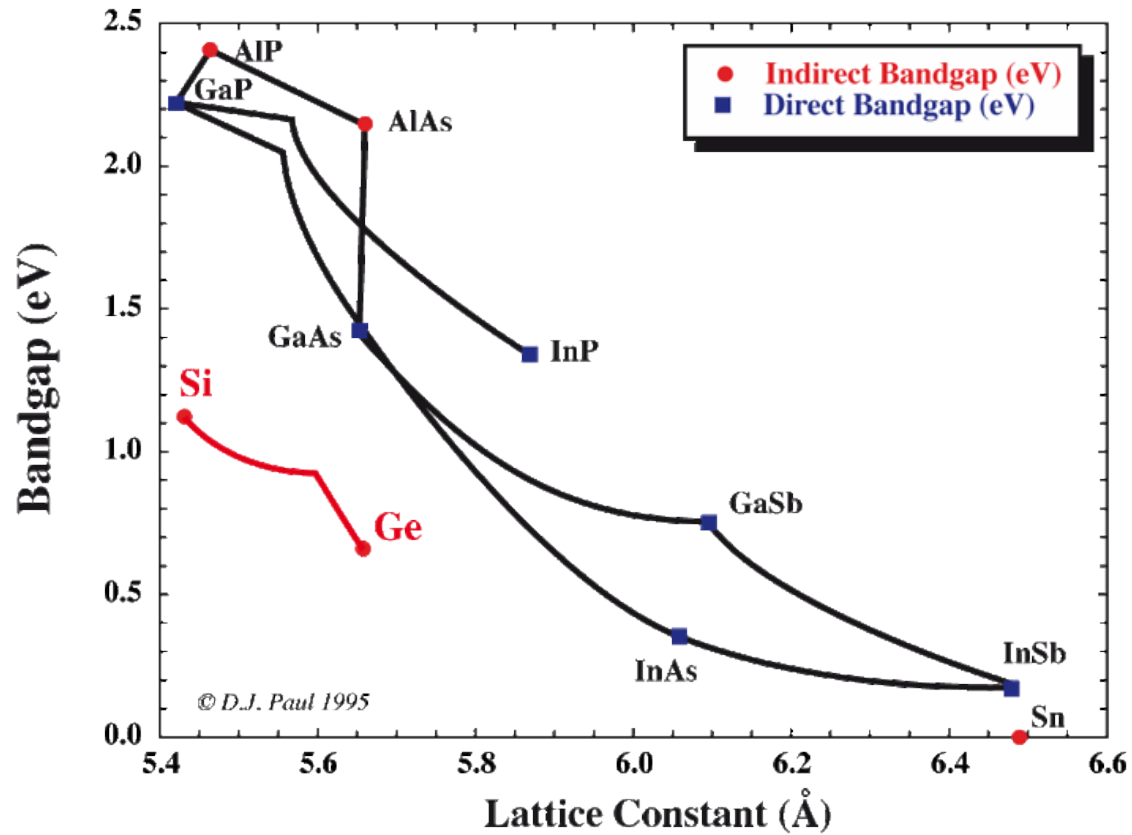
Accepted: 30 May 2017

Published online: 07 July 2017

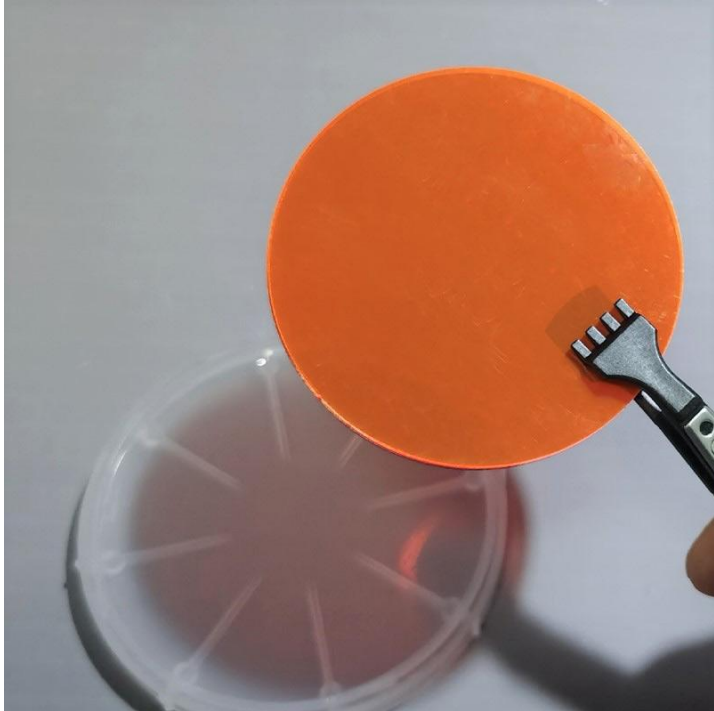
S. Haldar^{1,2}, V. K. Dixit^{1,2}, Geetanjali Vashisht¹, Shailesh Kumar Khamari^{1,2}, S. Porwal¹, T. K. Sharma^{1,2} & S. M. Oak^{1,2}



Bandgap for different semiconductors:



Semiconductor Wafers



GaP



GaN