Subband

\[ E(\vec{R}) = \pm \alpha t \sqrt{K_x^2 + K_y^2} \leq K_y \leq \frac{2\pi}{3L} \]

\[ D(E) = \sum_{K_y} \sum_{K_x} f(E - \varepsilon(K)) \]

How am I going from the \( E-K \) relationship to the DOS?

\[ D(E) = \iint \frac{dK_x}{2\pi/L_x} \frac{dK_y}{2\pi/L_y} \]

[Graph of \( E \) vs. \( K_x \) and \( K_y \)]

\[ \varepsilon_{j\nu}(K_y) = \pm \alpha t \sqrt{K_{j\nu}^2 + K_y^2} \]

\[ K_{j\nu} \cdot 2\alpha \cdot m = 2\pi \cdot 2^r \text{ Integer} \]
\[ K_{\nu} = \frac{2\pi}{2\alpha m} \nu \]

If the solid is big, then this term is big and then all the subbands are moved close to zero.

\[
\sum_{K} \delta(E(k) - E) \rightarrow \int \frac{d\nu}{2\pi/L} \delta(E(k) - E)
\]

\[
\frac{L}{2\pi} \int dE \frac{d\nu}{dE} \delta(E - E) \Rightarrow \left. \frac{L/2\pi}{dE/d\nu} \right|_{E=E}
\]

Wrapping along \( y \)

\[ E_{\nu}(k_x) = \pm \alpha t \sqrt{k_x^2 + b_y^2} \left( k_y - \frac{2\pi}{3b} \right)^2 \]

\[ k_y \cdot (2b, n) = 2\pi \nu \]

but \[ k_y = \frac{2\pi \nu}{2\nu n} = \frac{2\pi}{3b} \Rightarrow \nu = \frac{2\pi \text{ integer}}{3} \]

Wrapping along other directions \( (m, n) \)

\[ \begin{array}{l|ll}
(m, n) & E(k_x, k_y) & \text{Quantum Well} \\
(0, n) & E(k_x, k_y) & \text{Quantum Wire} \\
(m, 0) & \text{Quantum Well} & \text{Quantum Wire} \\
\end{array} \]