

AQH-HO

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December 28, 2020

1 Chern insulator

1.1 Chern number

$$H_{CI}(\mathbf{k}) = \lambda_x \sin k_x \sigma_x + \lambda_y \sin k_y \sigma_y + (m_0 + t_x \cos k_x - t_y \cos k_y) \sigma_z \quad (1)$$

1.2 Cylinder geometry

$$\begin{aligned} H(k_y) = & \sum_{x,k_y} \Psi_{x,k_y}^\dagger [\lambda_y \sin k_y \sigma_y + (m_0 - t_y \cos k_y) \sigma_z] \Psi_{x,k_y} \\ & + \sum_{x,k_y} \Psi_{x,k_y}^\dagger \left[\frac{\lambda_x}{2i} \sigma_x + \frac{t_x}{2} \sigma_x \right] \Psi_{x+1,k_y} \end{aligned} \quad (2)$$

$$\begin{aligned} H(k_x) = & \sum_{y,k_x} \Psi_{y,k_x}^\dagger [\lambda_x \sin k_x \sigma_x + (m_0 + t_x \cos k_x) \sigma_z] \Psi_{y,k_x} \\ & + \sum_{y,k_x} \Psi_{y,k_x}^\dagger \left[\frac{\lambda_y}{2i} \sigma_y + \frac{t_y}{2} \sigma_z \right] \Psi_{y+1,k_x} \end{aligned} \quad (3)$$