

$$\mathcal{H} = \mathcal{H}_0 + \hat{V}$$

$$\mathcal{H}_0 = U \cdot \sum_l \hat{n}_{l,\uparrow} \hat{n}_{l,\downarrow} + \sum_{l,\sigma} \underbrace{\left(\vec{E} \cdot \vec{r}_l \right)}_{\mathcal{E}_l} \hat{n}_{l,\sigma}$$

$$\hat{V} = -J \cdot \sum_{\langle l,m \rangle, \sigma} \left(\hat{c}_{l,\sigma}^\dagger \hat{c}_{m,\sigma} + \hat{c}_{m,\sigma}^\dagger \hat{c}_{l,\sigma} \right)$$