

$$\mathcal{L}[\psi_{\pm}, \phi] =$$

$$\psi_+^\dagger \left(\partial_\tau - i\partial_x - \partial_y^2 \right) \psi_+ + \psi_-^\dagger \left(\partial_\tau + i\partial_x - \partial_y^2 \right) \psi_-$$

$$- \phi \left(\psi_+^\dagger \psi_+ + \psi_-^\dagger \psi_- \right) + \frac{1}{2g^2} (\partial_y \phi)^2$$