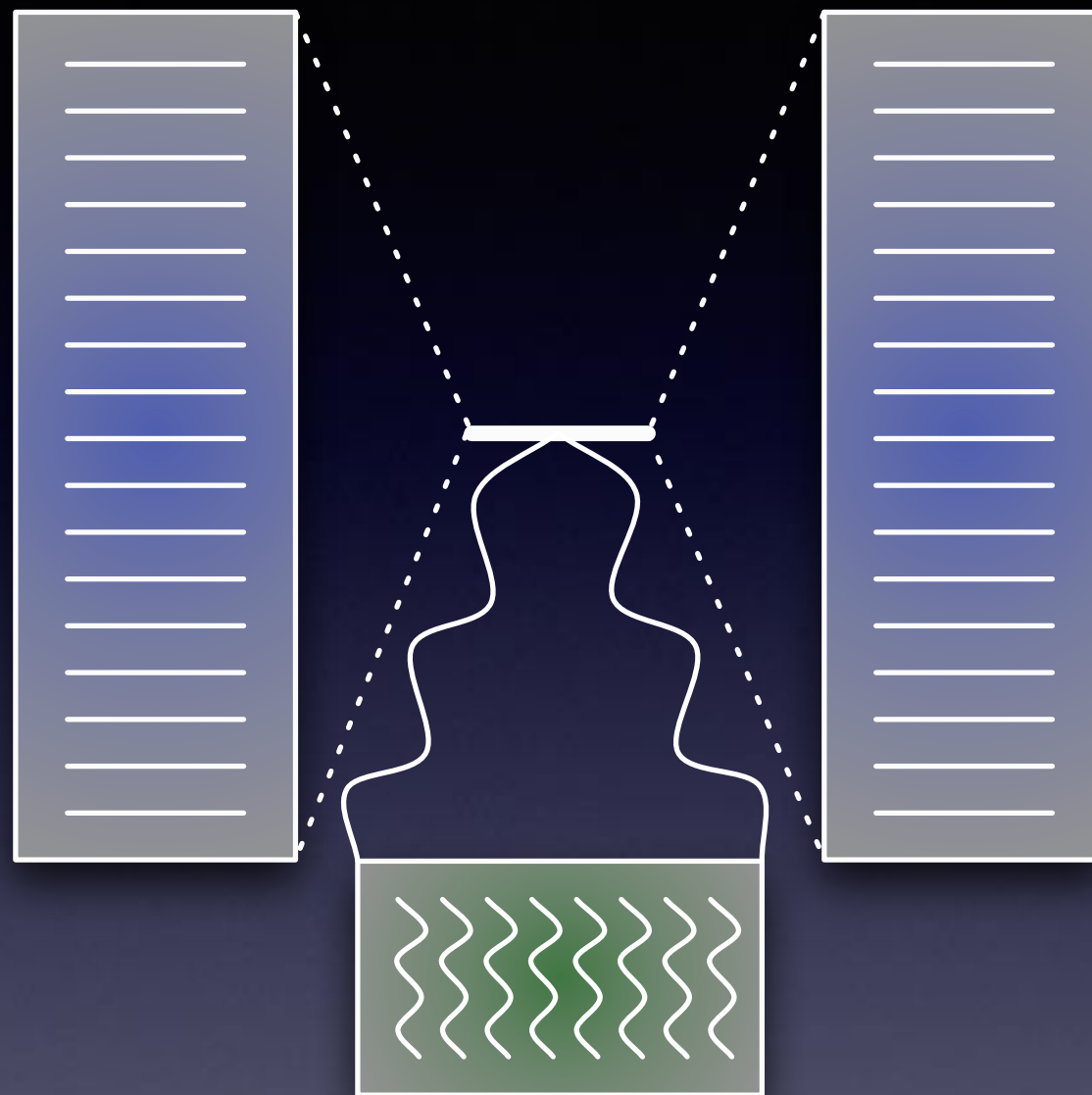


Including Vibrational Effects



$$\hat{H} = \hat{H}^{\text{Landauer}} + \hat{a}_0^\dagger \hat{a}_0 \sum_{\alpha} M_{\alpha} \left(\hat{b}_{\alpha}^\dagger + \hat{b}_{\alpha} \right) + \sum_{\alpha} \omega_{\alpha} \left(\hat{b}_{\alpha}^\dagger \hat{b}_{\alpha} + \frac{1}{2} \right)$$

$$H_{\text{SC}} = H_{\text{SC}}^{\text{Landauer}} + n_0 \sum_{\alpha} \Gamma_{\alpha} x_{\alpha} + \sum_{\alpha} \frac{\omega_{\alpha}}{2} (x_{\alpha}^2 + p_{\alpha}^2)$$

Time Dependent Current

