Noise Induced Delocalization in Strongly Localized Quantum Systems

Ehsan Gholami 24/01/2022

Noise Induced Delocalization in Strongly Localized Quantum Systems

$$\phi_s(\phi_t(\rho)) = \phi_{t+s}(\rho), \qquad t, s \geq 0.$$

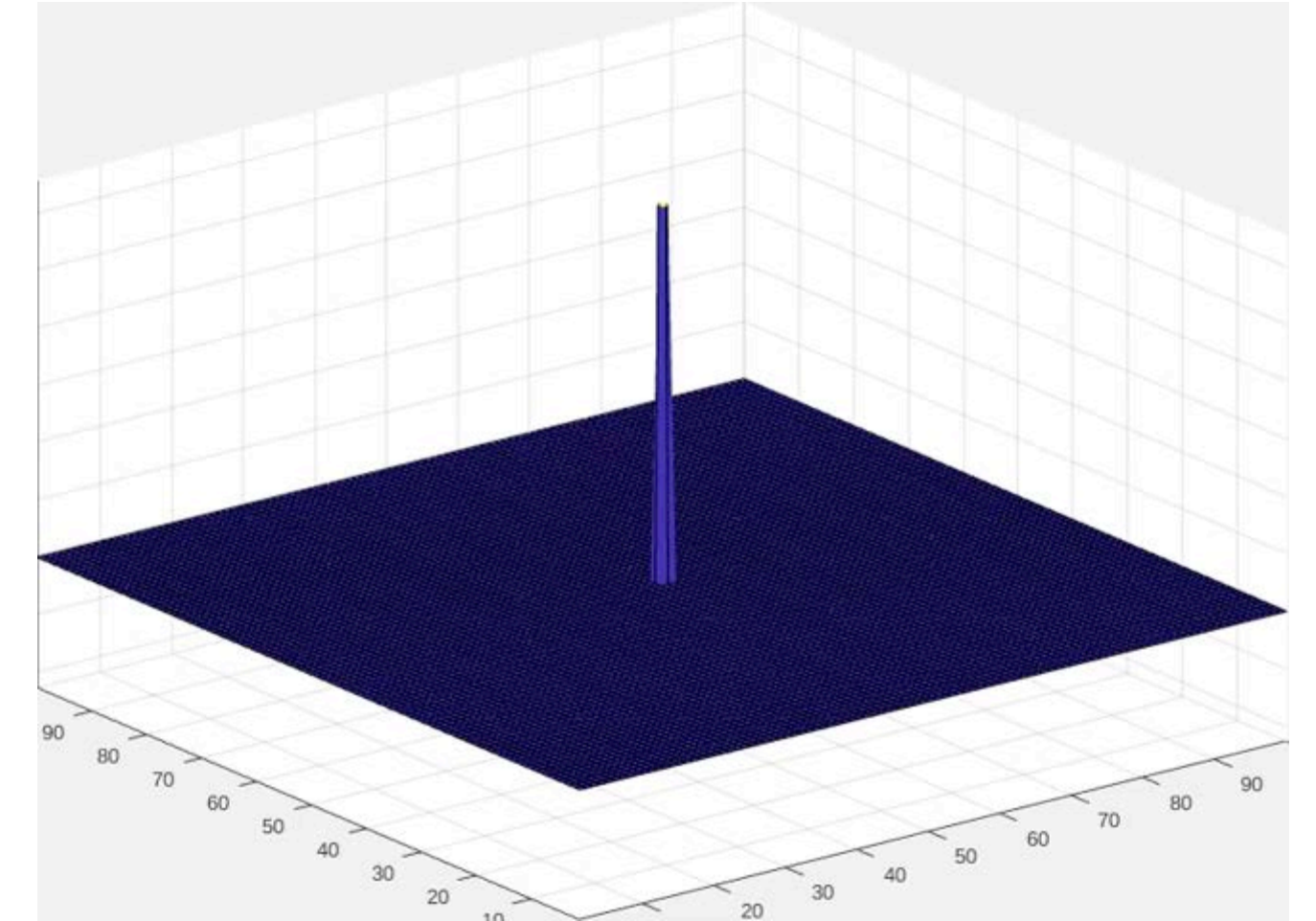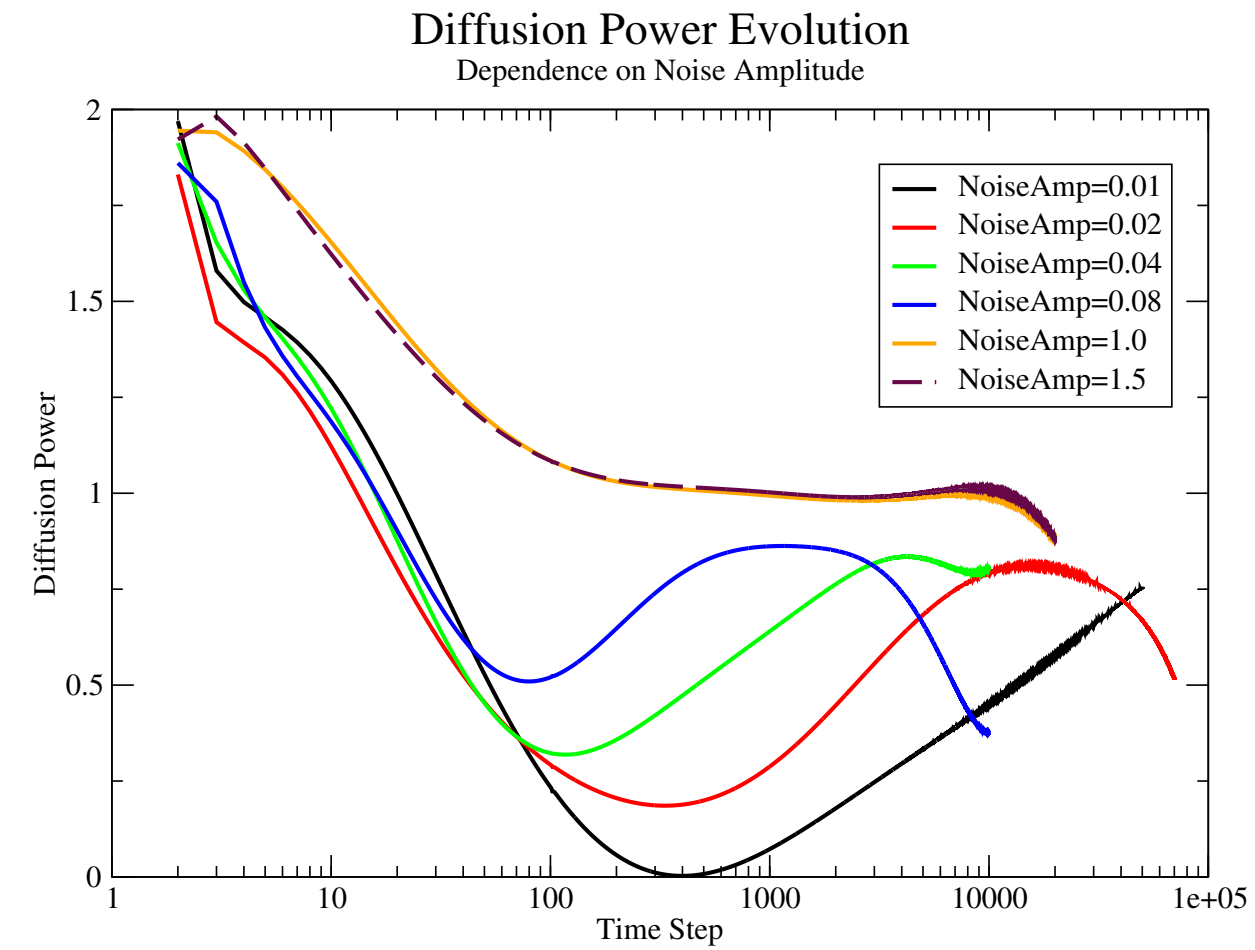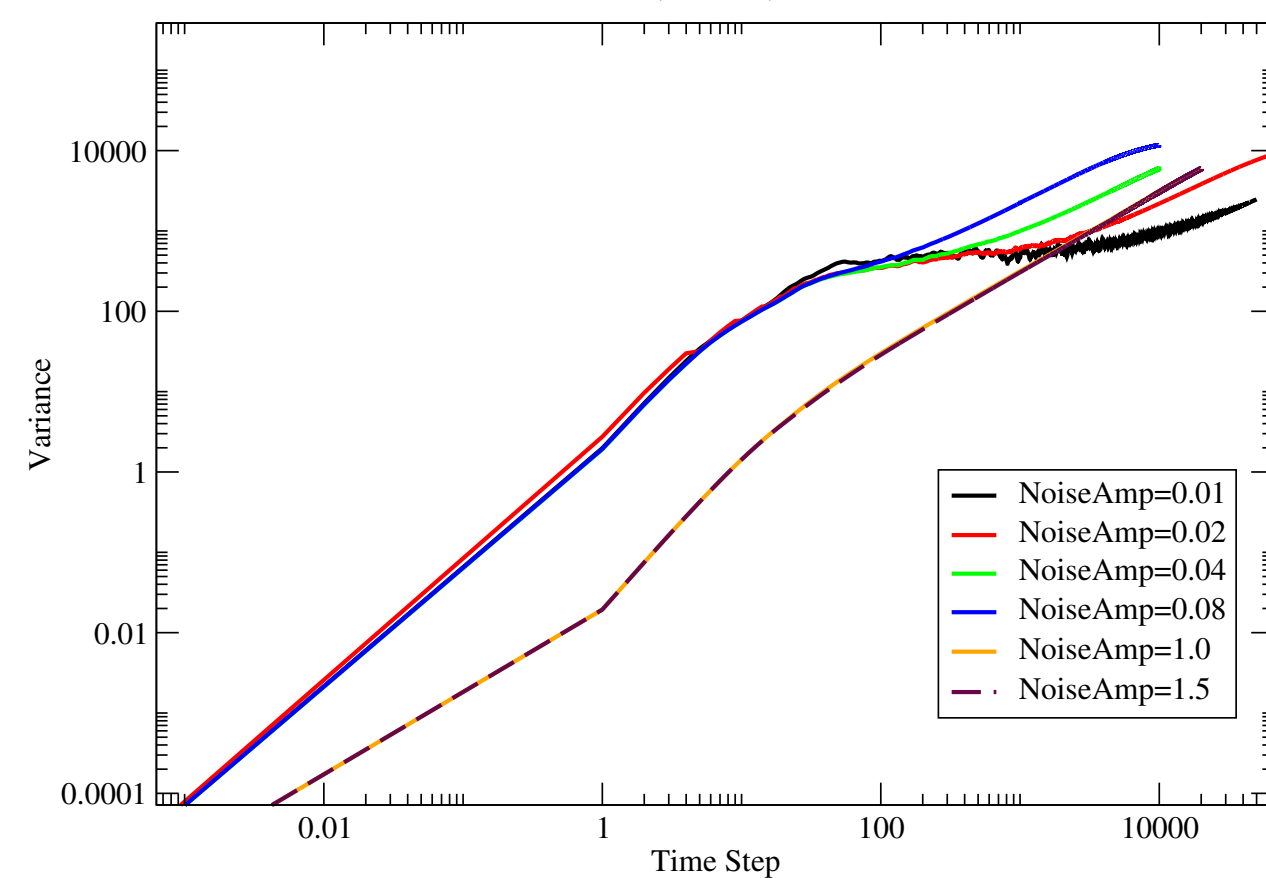$$\mathcal{L}(\rho) = \lim_{\Delta t \to 0} \frac{\phi_{\Delta t}(\rho) - \phi_0(\rho)}{\Delta t}$$

$$\phi_{t+s}(\rho) = e^{\mathcal{L}s}\phi_t(\rho).$$

$$L(\rho) = \frac{1}{2}\sum_j ([\Gamma_j \rho, \Gamma_j^\dagger] + [\Gamma_j, \rho\Gamma_j^\dagger]) - \frac{i}{\hbar}[H, \rho]$$
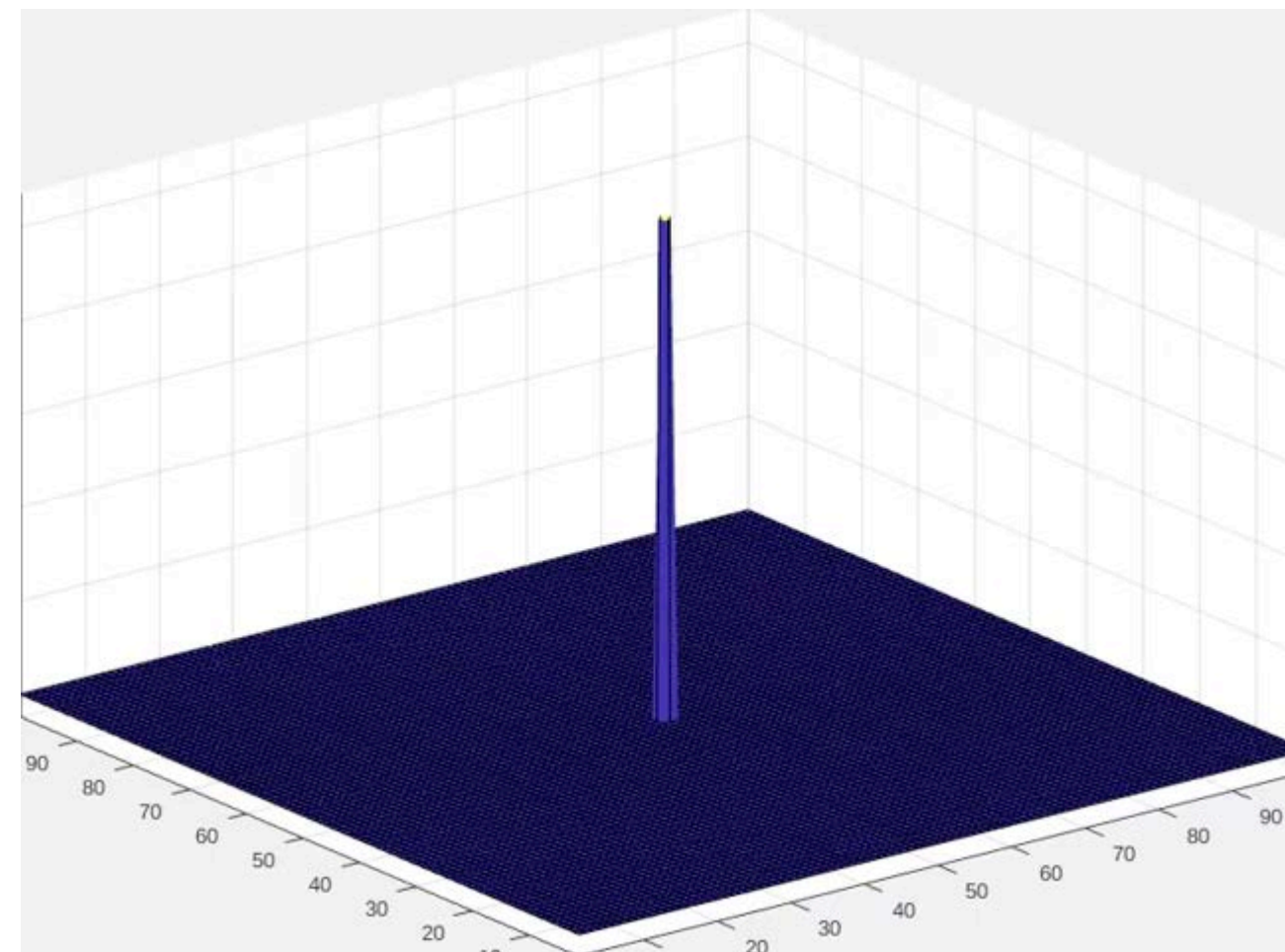
$$H = -J \sum_{<i,j>} c_i^\dagger c_j + \epsilon_i \sum_i c_i^\dagger c_i$$

$$\sigma^2 \equiv \sum_n n^2 |\psi_n|^2$$

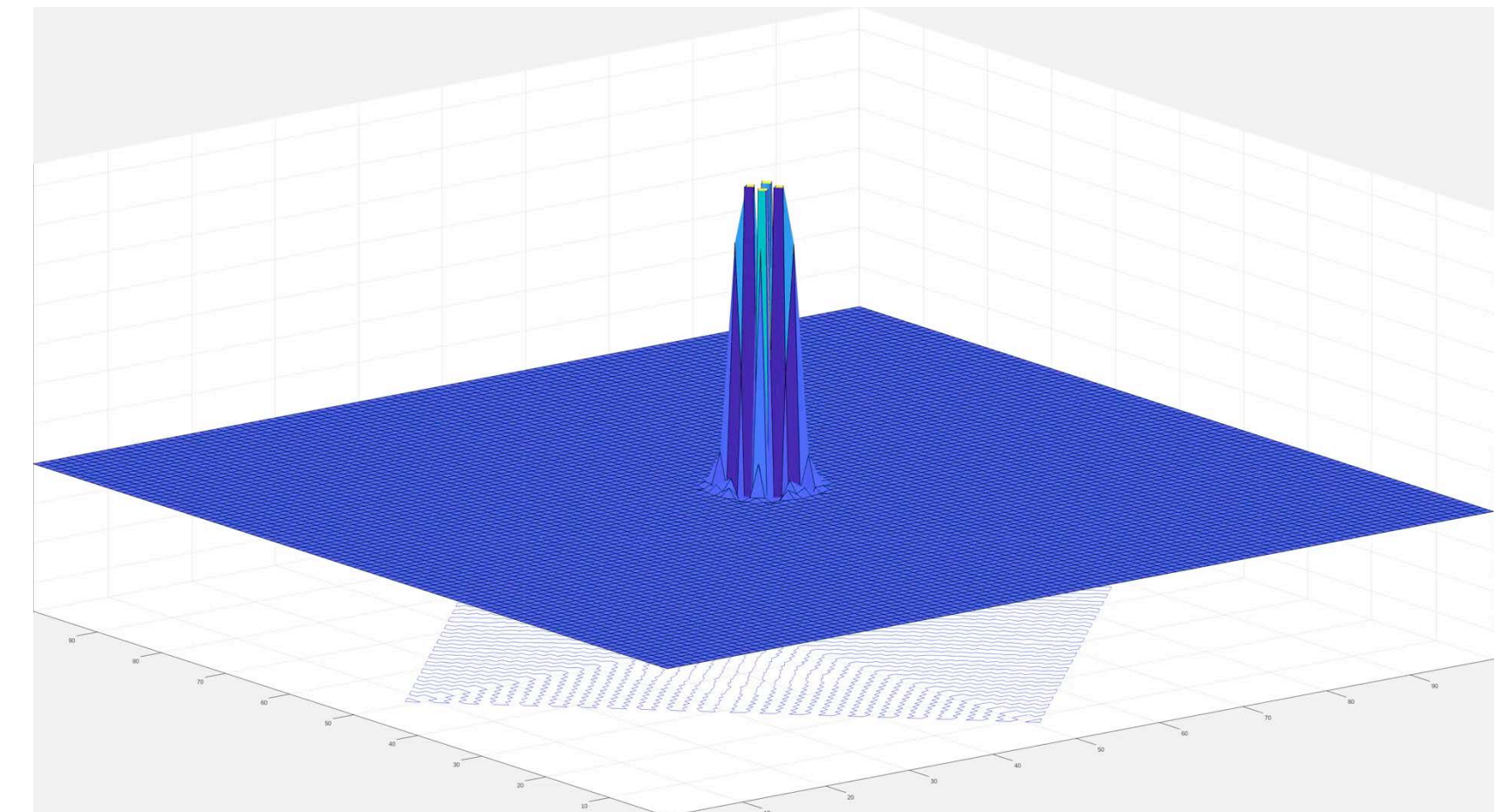Diffusion Power Evolution
Dependence on Noise Amplitude

Non-interacting Many Body Delocalized in Presence of Resonances

Spreading of the Wavepacket
(variance)

Non-interacting Many Body Delocalized from deeply localized regime

Non-interacting Many Body Delocalized in Presence of Strong Resonances