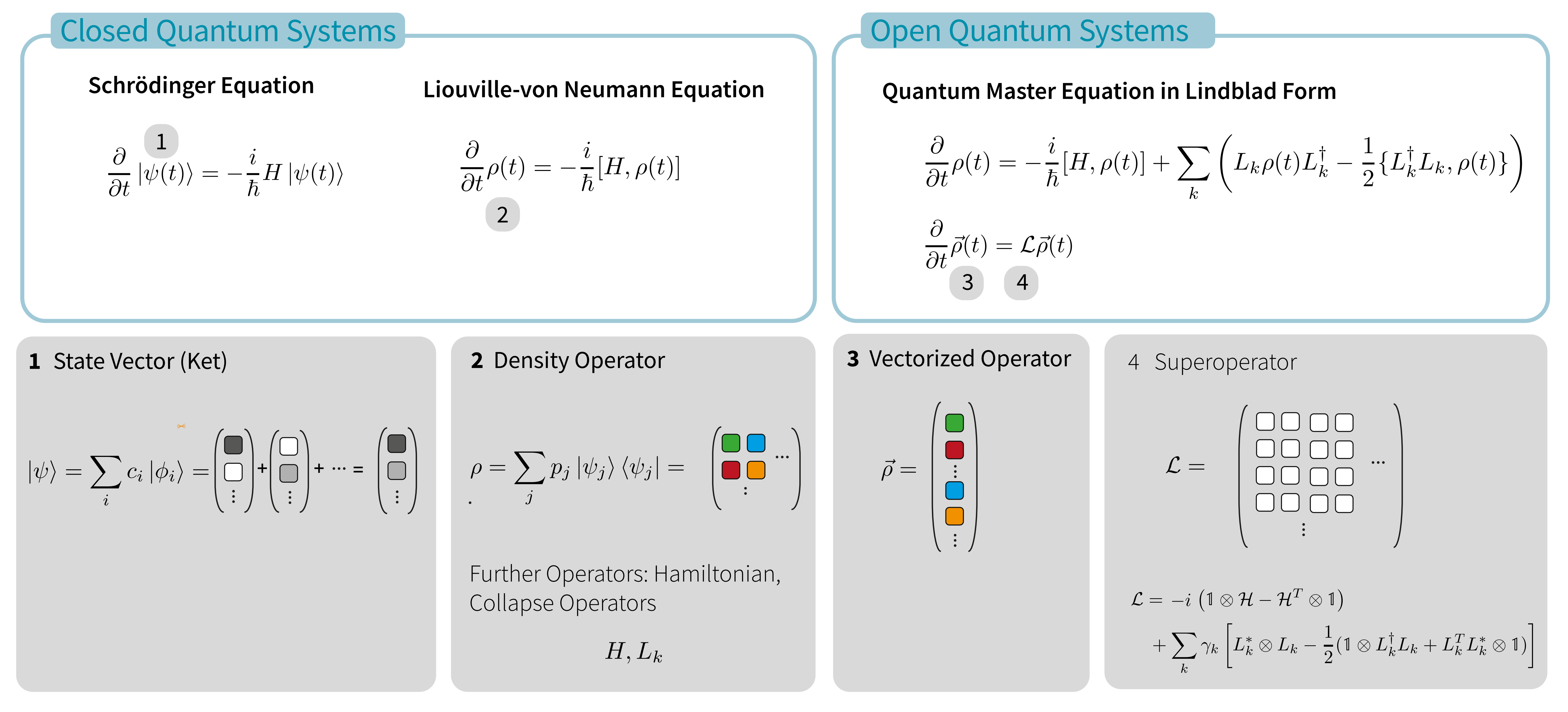
Closed Quantum Systems
Schrödinger Equation
$\frac{\partial}{\partial t}|\psi(t)\rangle = -\frac{i}{\hbar}H|\psi(t)\rangle$
1
Liouville-von Neumann Equation
$\frac{\partial}{\partial t}\rho(t) = -\frac{i}{\hbar}[H, \rho(t)]$
2
Open Quantum Systems
Quantum Master Equation in Lindblad Form
$\frac{\partial}{\partial t}\rho(t) = -\frac{i}{\hbar}[H, \rho(t)] + \sum_k \left(L_k \rho(t) L_k^\dagger - \frac{1}{2}\{L_k^\dagger L_k, \rho(t)\} \right)$
$\frac{\partial}{\partial t}\vec{\rho}(t) = \mathcal{L}\vec{\rho}(t)$
3
4
1 State Vector (Ket)
$|\psi\rangle = \sum_i c_i |\phi_i\rangle =$
+ + ··· =
2 Density Operator
$\rho = \sum_j p_j |\psi_j\rangle\langle\psi_j| =$
Further Operators: Hamiltonian, Collapse Operators
H, L_k
3 Vectorized Operator
$\vec{\rho} =$
4 Superoperator
$\mathcal{L} =$
$\mathcal{L} = -i\left(\mathbb{1}\otimes\mathcal{H} - \mathcal{H}^T\otimes\mathbb{1}\right)$
$+ \sum_k \gamma_k \left[L_k^* \otimes L_k - \frac{1}{2}\left(\mathbb{1}\otimes L_k^\dagger L_k + L_k^T L_k^* \otimes \mathbb{1}\right)\right]$