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**Efficient Simulation of Dissipative Dynamics** KYUNGJOO NOH, VICTOR V. ALBERT, CHAO SHEN, LIANG JIANG, Yale University — Open quantum systems with engineered dissipations may have more than one steady states. These steady states may form a non-trivial decoherence free subspace (DFS) that can store quantum information against major decoherences. Besides unitary operations within DFS, it is also useful to have dissipative/cooling operations within the DFS. We investigate the possibility of using Hamiltonian perturbation to the engineered dissipation to induce an effective dissipative dynamics within the DFS in a controlled manner. The major challenge is to simulate all the Lindblad jump operators in the master equation. By designing the dissipation within the subspace complementary to the DFS, we can simply use the Hamiltonian perturbation to the designed dissipation with a *single* jump operator to produce an effective dissipation with *multiple* Lindblad jump operators.

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