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When states can create gates, quantum process tomography becomes quantum state tomography[1] SHELBY KIMMEL, University of Maryland, CHRISTOPHER GRANADE, University of Sydney, NATHAN WIEBE, Microsoft Research — Lloyd, Mohseni, and Rebenstrost devised a way to simulate Hamiltonian evolution when the Hamiltonian is given by the density matrix of a state, and the experimenter is given access to copies of the state [Nat. Phys., 10(9):631633, 2014]. When the state is unknown, this produces an unknown evolution. Existing quantum process tomography techniques can characterize this evolution, which in turn can characterize properties of the unknown state. Thus we can use quantum process tomography to perform state tomography. We examine advantages and disadvantages of applying Hamiltonian learning [PRL, 112.19 (2014): 190501] to the task of state tomography using this approach.

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