

Abstract Submitted  
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**Measuring a qubit using stimulated wave of polarization in a 1D spin chain** JAE-SEUNG LEE, Department of Chemistry, Kent State University, Kent, OH 44242-0001, ANATOLY KHITRIN, Department of Chemistry, Kent State University, Kent, OH 44242-0001 — Measurement of a single qubit state is one of requirements for quantum information processors. A measuring device should show macroscopically distinguishable read out depending on the state of a single qubit. One logically simple way is applying a sequence of quantum controlled-NOT gates, globally conditioned on the state of the measured qubit, when a measuring device is initialized in a specific state. Recent NMR experiments have shown that an algorithm of quantum measurement can be realized using multiple-quantum dynamics of nuclear spins. However, this dynamics is slow and not very efficient. In this work, we propose a simple and realistic model of amplified quantum measurement which uses a stimulated wave of polarization in a 1D chain. An exact solution for the dynamics of this system is presented. It describes a process when a flip of the first qubit in the chain triggers a wave of flipped qubits, eventually covering the entire system.

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