

Quantum state reconstruction on atom-chips

Thu, 2016-03-03 14:01 - [Werner Weiss](#) [1] **Date:** 2015-09-16

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Reference:

New J. Phys. 17, 93024 (2015)

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We realize on an atom-chip, a practical, experimentally undemanding, tomographic reconstruction algorithm relying on the time-resolved measurements of the atomic population distribution among atomic internal states. More specifically, we estimate both the state density matrix, as well as the dephasing noise present in our system, by assuming complete knowledge of the Hamiltonian evolution. The proposed scheme is based on routinely performed measurements and established experimental procedures, hence providing a simplified methodology for quantum technological applications.

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