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# Quantum Zeno Dynamics in 3D circuit-QED

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We present our observation of the quantum Zeno dynamics (QZD) [1] in a 3D circuit-QED [2] system, where an artificial atom, consisting of a superconducting circuit called a transmon [3], is coupled to the electric field of a microwave cavity resonator. The transmon and resonator energy levels are aligned in a novel way enabling the manipulation of individual Fock states of the cavity, while minimizing its transmon-induced Kerr non-linearity [4]. We induce the QZD as in [5] by displacing classically the cavity field while continuously driving strongly a transmon transition specific to a particular Fock state. The QZD is then observed by measuring the Wigner function of the fields at regular time intervals, by standard quantum tomography and reconstruction of the density matrix. We observe three examples of QZD proposed in [6], and analyze the observed decoherence with the help of quantum simulations of the system.

[1] P Facchi and S Pascazio, J. Phys. A: Math. Theor. 41 (2008).
[2] A. Blais et al., Phys. Rev. A. 69 (2004).
[3] J. Koch et al., Phys. Rev. A. 76 (2007).
[4] K. Juliusson et al., Phys. Rev. A 94 (2016).
[5] L. Bretheau et al., Science 348, 6236 (2015)
[6] J. M. Raimond et al., Phys. Rev. A. 86 (2012).

## Choix de session parallèle

4.3 Simulateurs quantiques

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