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Coherent dynamics of collective modes in the fluxonium qubit FARSHAD FOROUGHI, CNRS, Institut Nel, F-38000 Grenoble, France, ETIENNE DUMUR, University of Chicago, United states, DORIANE DROLET, University of Sherbrooke, Sherbrooke, Canada, YURIY KRUPKO, REMY DASSONNEVILLE, LUCA PLANAT, JAVIER PUERTAS-MARTINEZ, CECILE NAUD, OLIVIER BUISSON, NICOLA ROCH, CNRS, Institut Nel, F-38000 Grenoble, France, IOAN POP, Karlsruhe Institute of Technology, Karlsruhe, Germany, WIEBKE GUICHARD, CNRS, Institut Nel, F-38000 Grenoble, France — When biased at the sweet spot, the fluxonium qubit outperforms any other superconducting qubit regarding the relaxation time T1. This performance is related to the implementation of a superinductor made of a Josephson junction chain. We have fabricated and measured a 3D fluxonium qubit. The relaxation time peaks at half flux quantum at about T1=450μs. In the standard fluxonium circuit one can neglect the electromagnetic modes of the Josephson junction chain because their frequency is much higher than the qubit frequency. We present on-going results on the design of a fluxonium qubit where the frequencies of these electromagnetic modes is in the order of the qubit frequency. We expect coherent dynamics between the qubit and the collective modes.

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