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Multiplexed Readout of Transmon Qubits with Josephson Bifurcation Amplifiers[1] VIVIEN SCHMITT, DANIEL ESTEVE, XIN ZHOU, KRISTINN JULIUSSON, Service de Physique de l'Etat Condensé (CNRS URA 2464), IRAMIS, CEA Saclay, 91191 Gif-sur-Yvette, France, ALEXANDRE BLAIS, Départment de Physique, Université de Sherbrooke, Sherbrooke, Québec, Canada, PATRICE BERTET, DENIS VION, Service de Physique de l'Etat Condensé (CNRS URA 2464), IRAMIS, CEA Saclay, 91191 Gif-sur-Yvette, France, QUANTRONICS TEAM, A. BLAIS GROUP TEAM — Achieving individual qubit readout is a major challenge in the development of scalable superconducting quantum processors. We have implemented the multiplexed readout of a four transmon qubit circuit using non-linear resonators operated as Josephson bifurcation amplifiers. We demonstrate the simultaneous measurement of Rabi oscillations of the four transmons. We find that multiplexed Josephson bifurcation is a high-fidelity readout method, the scalability of which is not limited by the need of a large bandwidth nearly quantum-limited amplifier as is the case with linear readout resonators.

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