Demonstrating quantum speed-up in a superconducting two-qubit processor[1] ANDREAS DEWES, ROMAIN LAURO, FLORIAN ONG, VIVEN SCHMITT, DANIEL ESTEVE, PATRICE BERTET, DENIS VION, CEA Saclay, PEROLA MILMAN, Laboratoire Materiaux et Phenomenes Quantiques, Universite Paris Diderot — We operate a superconducting quantum processor consisting of two tunable transmon qubits coupled by a swapping interaction, and equipped with non destructive single-shot readout of the two qubits [1]. With this processor, we run the Grover search algorithm among four objects and find that the correct answer is retrieved after a single run with a success probability between 0.52 and 0.67, significantly larger than the 0.25 achieved with a classical algorithm. This constitutes a proof-of-concept for the quantum speed-up of electrical quantum processors [2].

[1] arXiv:1109.6735v1
[2] arXiv:1110.5170v1

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