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A disordered kinetic superinductor[1] M. HAYS, G. DE LANGE, K. SERNIAK, Z. WANG, U. VOOL, L. FRUNZIO, M.H. DEVORET, Department of Applied Physics, Yale University — The superinductance is a superconducting circuit element whose reactance exceeds the resistance quantum at the relevant microwave operation frequencies of quantum circuits. It must also be as non-dissipative as possible. Such an element is key to the fluxonium artificial atom, a highly anharmonic, charge insensitive superconducting qubit that has been proposed as the detection circuit for Majorana Fermions. So far fluxonium qubits are made exclusively from arrays of Al-AlOx-Al Josephson junctions. However, aluminium is difficult to employ in conjunction with the strong magnetic fields required in Majorana Fermion experiments. The large kinetic inductance of highly resistive disordered superconducting alloys, such as NbTiN, is currently explored as an alternative material for superinductance in quantum electronic circuits. We report the results of measurement of quality factors and phase-slip rates of high-impedance resonators made from thin-film NbTiN.

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