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Tunable kinetic inductance devices for Superconducting On-chip Fourier Transform Spectrometer and Parametric-amplifiers.

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We present a comprehensive study of current tunable kinetic inductance in Atomic Layer Deposited (ALD) Titanium Nitride (TiN) and Niobium Titanium Nitride (NbTiN) thin film devices. The utility of such current tunable kinetic inductance devices extends from parametric amplifiers, to photon detectors, to phase control circuits and detector readout circuits. We study devices made with different film thicknesses to find the common scaling laws with respect to transition temperature, mm-wave transmission, and the extent of current tunablitly, given variation in material properties and geometries. These findings will enable efficient device design for the curated detector or readout projects outlined above. In particular we present results from tunable phase delay transmission lines, intended for constructing Superconducting On-chip Fourier Transform Spectrometers for (sub)millimeter science.

Less than 5 years of experience since completion of Ph.D

Y

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N

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