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Noise performance of a three-wave mixing kinetic inductance traveling-wave amplifier

Kinetic inductance traveling-wave amplifiers (KITs) have the potential to read out large numbers of qubits and cryogenic sensors due to their wide bandwidth, high saturation power and promising noise performance. When measuring this performance with a wideband noise source, care must be taken to account for the noise inputting the idler port of the amplifier [1]. In this talk, I will present a KIT operated in a three-wave mixing fashion, whose noise performance has been characterized both at 30 mK and 4K using a shot noise tunnel junction. This KIT presents near-quantum-limited performance at mK and is also a potential alternative to a high-electron mobility transistor as the 4K-stage amplifier.

[1]: Malnou et al. PRX Quantum 2, 010302 (2021)