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Wideband S-parameter characterization of DC-SQUID amplifiers at GHz frequencies LEONARDO RANZANI, LAFE SPIETZ, JOSE AUMENTADO, NIST, Boulder — Superconducting quantum interference devices (SQUIDs) are widely used as gain elements to achieve ultra-low noise amplification from DC to microwave frequencies. SQUID amplifiers typically have high input and output stray reactance and therefore proper impedance matching is needed to couple enough power into the device. Broadband impedance matching could be obtained by measuring the microwave S-parameters of a SQUID amplifier and then treating it as an equivalent “black box” to which standard microwave design techniques can be applied. In this talk measurement results of the full 2-port S-parameter matrix of DC-SQUID amplifiers operating at 20mK will be presented. Accurate microwave calibration was performed with an automated Through-Reflect-Line (TRL) calibration system, operating at 20mK. Input and output reflection coefficients as well as forward and backward transmission were characterized in the 1 to 8GHz range. Implications for the design of wideband SQUID amplifiers and device stability will be discussed.

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