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Microwave Techniques for SQUID Multiplexing JOHN MATES[1], University of Colorado, KENT IRWIN[2], LEILA VALE[3], GENE HILTON[4], KONRAD LEHNERT[5], MANUEL CASTELLANOS-BELTRAN[6], NIST TEAM, JILA TEAM, UNIVERSITY OF COLORADO TEAM — A single Superconducting Quantum Interference Device, or SQUID, is a particularly good low-noise, low impedance amplifier. However, many applications for which SQUID's are well-suited, ranging from astronomical spectroscopy to nuclear non-proliferation verification, require a large array of amplifiers. Large arrays require multiplexing techniques. Our group at NIST has fabricated several multiplexed SQUID arrays, including 1,280 pixel arrays, that use a time-division multiplexing technique. I will report on existing SQUID multiplexing techniques and the development of a SQUID multiplexer operating at microwave frequencies. This new technique uses non- hysteretic, non-dissipative rf-SQUID's to tune microwave resonators, so that, with high enough Q's, potentially tens of thousands of SQUID's could be read out on one coaxial line. I will also report on our initial experimental work, in which we have demonstrated Q's of around 100,000.

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