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Readout of Spin Systems with Superconducting Circuits[1] NATANIA ANTLER, KATER MURCH, R. VIJAY, STEVEN WEBER, ELI LEVENSON-FALK, I. SIDDIQI, UC Berkeley, QNL — We present progress in coupling superconducting circuitry, in particular linear resonators and dispersive magnetometers, to an ensemble of spins. Species with a zero-field splitting (ZFS), such as bismuth doped silicon or NV centers in diamond, are particularly attractive as the absence of a strong magnetic bias field facilitates compatibility with superconducting devices. We present studies of the spin linewidth, and progress towards the observation of collective strong coupling. Furthermore, we will present data on the operation of a highly sensitive nanobridge SQUID magnetometer with a flux sensitivity of 26 $n\Phi_0/\sqrt{Hz}$ and tens of MHz of signal bandwidth. We also discuss the resilience of our superconducting measurement circuitry to in-plane magnetic fields, which can be used to tune the spin splitting.

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