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Nota di contenuto	Introduction -- Superconducting Circuits and Microwave Engineering -- NV Center Spins in Diamond -- Coupling Ensembles of Spins to Superconducting Circuits -- Spin-Based Quantum Memory -- Spin Ensemble Quantum Memory Protocol -- Simulations -- State of the Art & Principle of the Experiment -- Experimental Realization -- Operating the Hybrid Quantum Circuit -- Storage of Qubit States in a NV Spin Ensemble -- Conclusions on Experiment 1: The Write Step.
Sommario/riassunto	This work describes theoretical and experimental advances towards the realization of a hybrid quantum processor in which the collective degrees of freedom of an ensemble of spins in a crystal are used as a multi-qubit register for superconducting qubits. A memory protocol made of write, read and reset operations is first presented, followed by the demonstration of building blocks of its implementation with NV

center spins in diamond. Qubit states are written by resonant absorption of a microwave photon in the spin ensemble and read out of the memory on-demand by applying Hahn echo refocusing techniques to the spins. The reset step is implemented in between two successive write-read sequences using optical repumping of the spins.