Addressing a spin ensemble via superconducting circuits to implement a quantum memory

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Abstract

Quantum information processing can require less ressources when done in conjunction with a quantum memory. Among platforms for storing quantum states in the microwave domain, solid state spin ensembles addressed via superconducting circuits stand out for their multimodal storage capability and the second-long coherence time when operated at clock transitions. Successful implementation of a practical memory scheme requires several keys features, such as the ability to tune on-demand the frequency and the bandwidth of the resonator. In this talk, I will present a superconducting circuit architecture accomplishing both, allowing strong coupling to an ensemble of bismuth dopants in silicon. I also present how this architecture would behave as a quantum memory and its possible embedding with a superconducting circuit architecture.

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