

# Fabrication and measurement of a Ge/SiGe qubit with global accumulation gate design

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Abstract:

Due to several advantages such as high mobility, strong spin orbit coupling, and low effective mass, Germanium hole-spin qubits have become a promising platform for quantum computing. Demonstration of long coherence times and the potential for scale up thanks to its compatibility with industrial nanofabrication techniques also contributes to its potential [1][2].

In this poster I will demonstrate measurements of coherent spin qubit control on a Ge/SiGe double quantum dot device with global accumulation gate design, measured in a 10mK environment. The device is fabricated in house on a locally grown germanium quantum well heterostructure with a single aluminium fine gate layer covered by a global accumulation gate that allows for easier alignment in fabrication. We observed clear double quantum dot charge stability diagram and coherent singlet-triplet oscillation using RF reflectometry, confirming the compatibility of RF readout with the global accumulation gate.

## References

- [1] Burkard, G., Ladd, T. D., Pan, A., Nichol, J. M., & Petta, J. R. (2023). Semiconductor spin qubits. *Rev. Mod. Phys.*, 95(2), 025003. <https://doi.org/10.1103/RevModPhys.95.025003>
- [2] Scappucci, G., Kloeffel, C., Zwanenburg, F.A. et al. The germanium quantum information route. *Nat Rev Mater* 6, 926–943 (2021). <https://doi.org/10.1038/s41578-020-00262-z>

## Figures

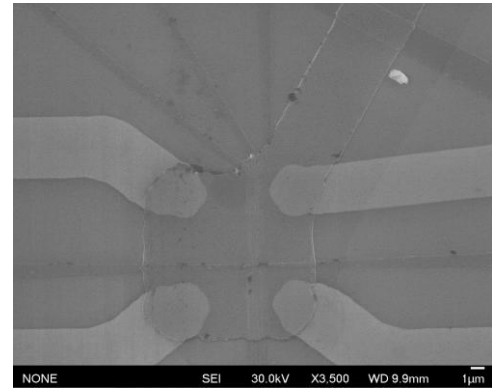


Figure 1: SEM image of similar device

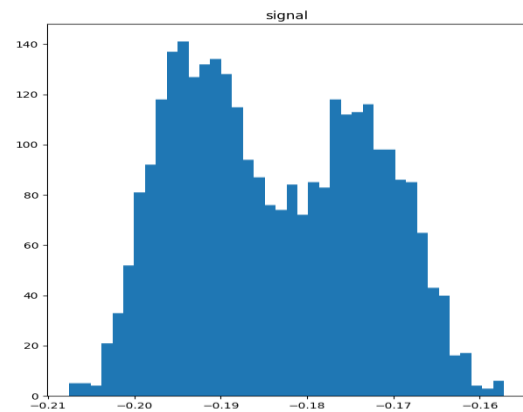


Figure 2: Pauli spin blockade

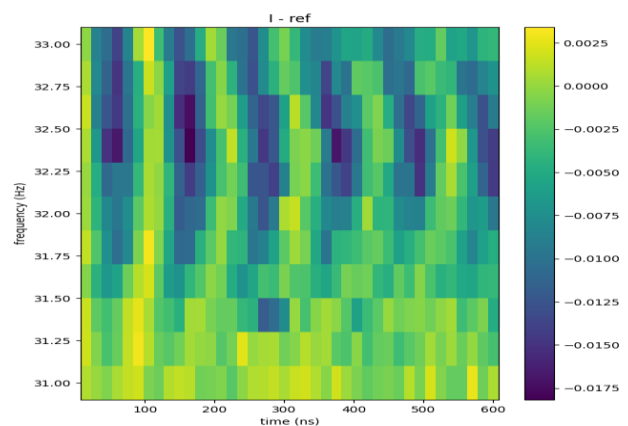


Figure 3: Rabi oscillation of a singlet triplet qubit