Call 2017

Topoquant

2D hybrid materials as a platform for topological quantum computing

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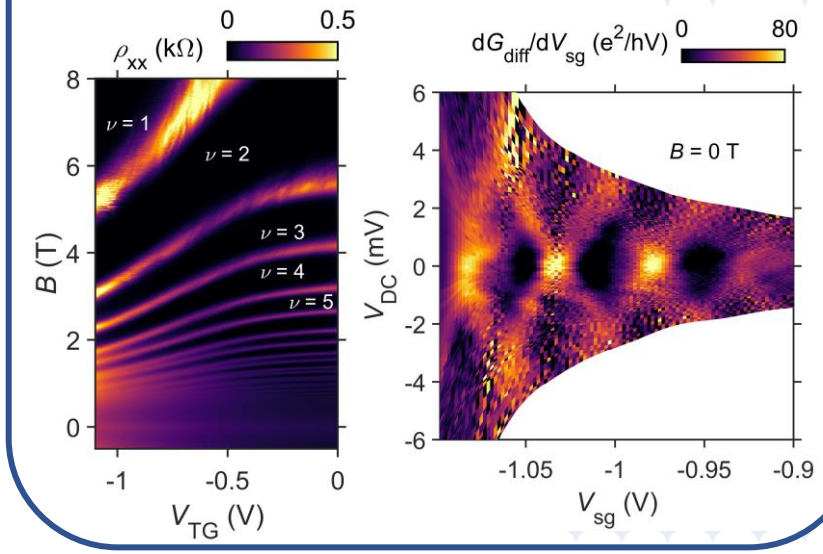
High-quality InSb Quantum Well Devices

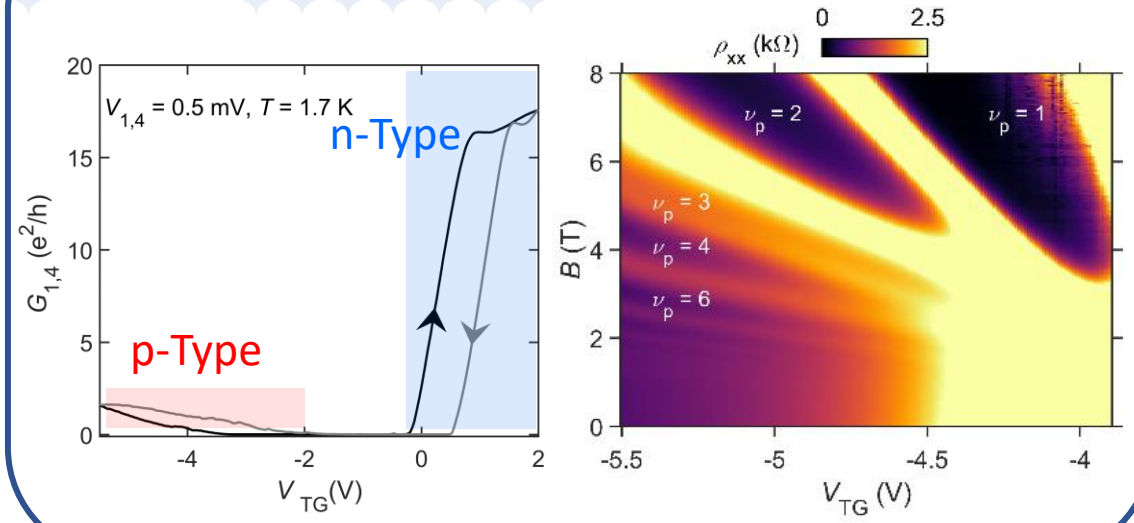
Material growth: Wegscheider Group, ETH Zurich

- **MBE Growth:** high-quality semiconductor materials
- Nano Fabrication for Quantum Devices
- Low-temperature Quantum Transport Measurements
- Understanding of Quantum Properties

n-type InSb, 2D and 1D



p- and n-type InSb in a Single Device



Z. Lei *et al.*, Phys. Rev. Research 3, 023042 (2021)

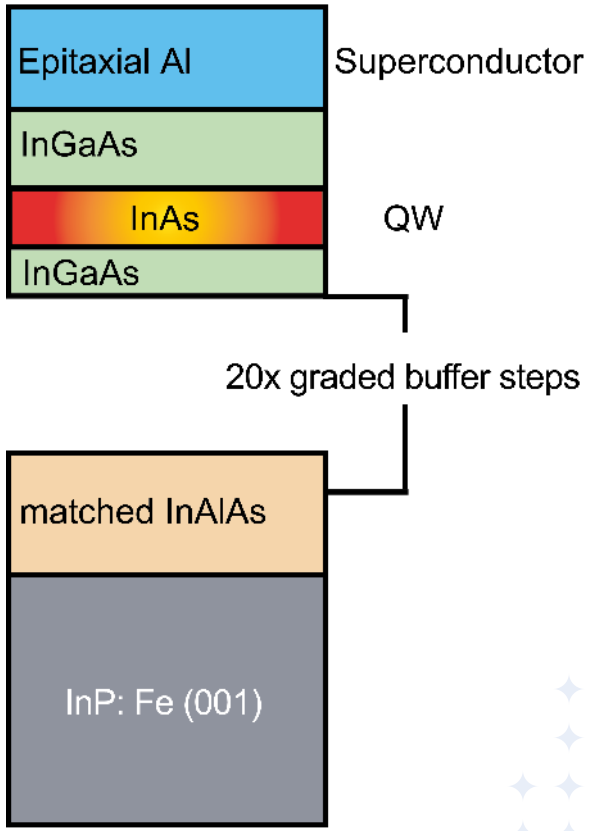
Z. Lei *et al.*, Phys. Rev. Research 2, 033213 (2020)

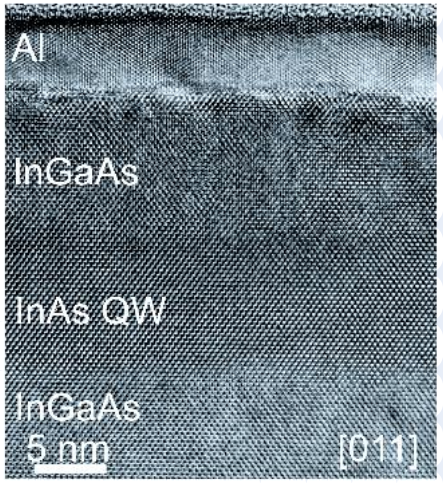
Z. Lei *et al.*, Phys. Rev. Research 4, 013039 (2022)

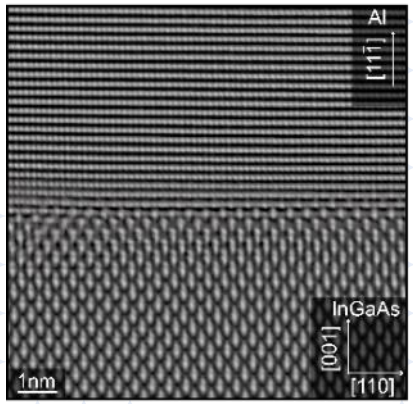
Z. Lei *et al.*, arXiv:2208.10427

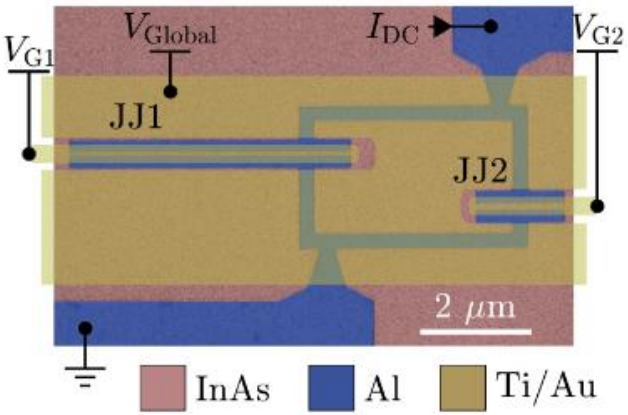
Epitaxial InAs/Al Heterostructures

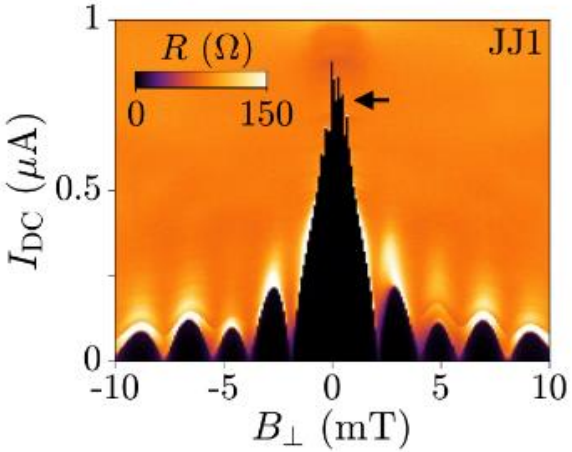
2D InAs/Al for Topological Quantum Computing











Material growth: Wegscheider Group, ETH Zurich

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Topological Quantum Computing

(FU Berlin)

[1] Mishmash, Bauer, von Oppen, Alicea, PRB 101, 075404 (2020)
[2] Steiner, von Oppen, PRR 2, 033255 (2020)
[3] Lesser, Flensberg, von Oppen, Oreg, PRB 103, L121116 (2021)

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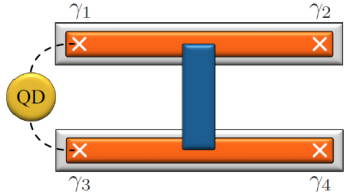
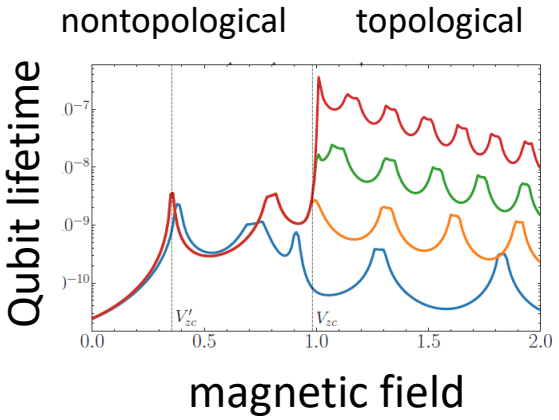
von Oppen, Oreg, Ann. Rev. Cond. Mat. Phys. 11, 397 (2020)
Flensberg, von Oppen, Stern, Nature Rev. Mat. 6, 944 (2021)

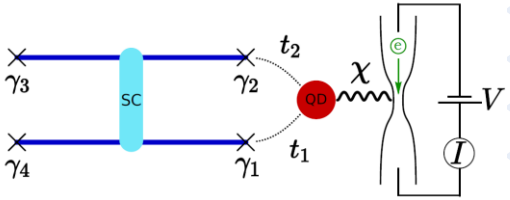
Dephasing[1]



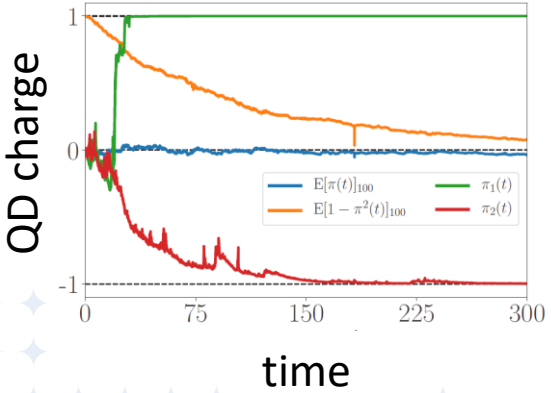
Dephasing rate as signature of Majorana bound states



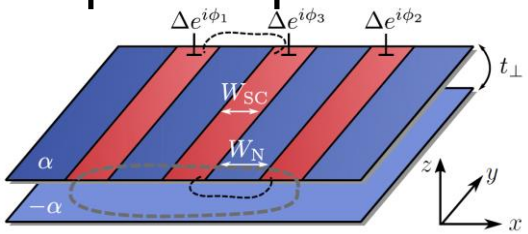
Qubit readout[2]



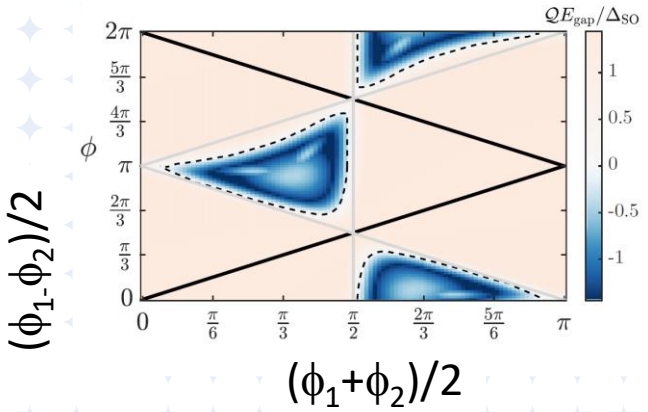
Continuous readout of QD charge to detect qubit state



Improved platform[3]



Topological phase due to phase bias w/o magnetic field



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