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Magnetic-field compatibility of SNS transmon qubits[1] FLORIAN LUTHI, THIJS STAVENGA, ALESSANDRO BRUNO, CHRISTIAN DICKEL, NATHAN LANGFORD, ADRIAAN ROL, QuTech and Kavli Institute of Nanoscience, Delft University of Technology, Delft, The Netherlands, DAVID THOEN, AKIRA ENDO, Department of Microelectronics and Kavli Institute of Nanoscience, Delft University of Technology, Delft, The Netherlands, THOMAS JESPERSEN, JESPER NYGARD, PETER KROGSTRUP, Center for Quantum Devices and Station Q Copenhagen, Niels Bohr Institute, University of Copenhagen, Copenhagen, Denmark, LEO DICARLO, QuTech and Kavli Institute of Nanoscience, Delft University of Technology, Delft, The Netherlands — We present an experimental investigation of the magnetic-field resilience of superconductor-semiconductor-superconductor (SNS) transmon qubits. Our study includes fixed-frequency and gate-tuneable single-junction transmons and flux-tunable, two-junction variants. The clean interface between the InAs nanowires and epitaxially-grown aluminium shells that constitute the Josephson element give these transmons energy relaxation times T_1 up to 15 μs and echo dephasing times T_{2e} up to 30 μs at zero field. We track the evolution of transition frequency and coherence at in-plane fields up to 70 mT, using standard spectroscopy and time-domain techniques to identify dominant sources of relaxation and dephasing.

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