

Abstract Submitted
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Electroelastic Hyperfine Tuning of Phosphorus Donors in Silicon¹

LUKAS DREHER, TIMON A. HILKER, Walter Schottky Institut, Technische Universitaet Muenchen, Am Coulombwall 3, 85748 Garching, Germany, ANDREAS BRANDLMAIER, SEBASTIAN T.B. GOENNENWEIN, HANS HUEBL, Walther-Meissner-Institut, Bayerische Akademie der Wissenschaften, Walther-Meissner-Strasse 8, 85748 Garching, Germany, MARTIN STUTZMANN, MARTIN S. BRANDT, Walter Schottky Institut, Technische Universitaet Muenchen, Am Coulombwall 3, 85748 Garching, Germany — We demonstrate an electroelastic control of the hyperfine interaction between nuclear and electronic spins opening an alternative way to address and couple spin-based qubits. The hyperfine interaction is measured by electrically detected magnetic resonance in phosphorus-doped silicon epitaxial layers employing a hybrid structure consisting of a silicon-germanium virtual substrate, a piezoelectric actuator, and a loop-terminated coplanar strip line for on-chip microwave magnetic-field generation. By applying a voltage to the actuator, the hyperfine interaction is changed by up to 0.9 MHz, which would be enough to address spin-qubits in isotopically purified ²⁸Si with a sufficient fidelity under optimized conditions.

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