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Multiple Nuclear Polarization States in a Double Quantum Dot
JEROEN DANON, Delft University of Technology — In a double quantum dot under conditions of electron paramagnetic resonance we have observed multiple stable states of nuclear polarization and also switching between those states. The system exhibited strong hysteretic behavior over a large range of magnetic fields, indicating the dynamical buildup of effective nuclear magnetic fields up to 150 mT. We have explained these findings in the framework of an elaborated theoretical model. The results reported enable applications of this nuclear polarization effect, including manipulation and control of the nuclear fields and possible use of this for improving the electron spin coherence time.

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