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Single frequency precession of inhomogeneous ensemble of electron spins. ALEX GREILICH, STEFAN SPATZEK, IRINA YUGOVA, ILJA AKIMOV, DMITRI YAKOVLEV, Experimental Physics 2, TU Dortmund University, Germany, ALEXANDER EFROS, Center for Computational Material Science, Naval Research Laboratory, Washington DC, USA, DIRK REUTER, ANDREAS WIECK, Angewandte Festkoerperphysik, Ruhr-Universitaet Bochum, Germany, MANFRED BAYER, Experimental Physics 2, TU Dortmund University, Germany — We show that the spins of all electrons, each confined in a quantum dot of an (In,Ga)As/GaAs dot ensemble, can be driven into a single mode of precession about a magnetic field. This regime is achieved by allowing only a single mode within the electron spin precession spectrum of the ensemble to be synchronized with a train of periodic optical excitation pulses. Under this condition a nuclei induced frequency focusing leads to a shift of all spin precession frequencies into the synchronized mode. The macroscopic magnetic moment of the electron spins that is created in this regime precesses without dephasing. This ensemble can be used then as a macroscopic quantum bit.

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