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Maximal Rabi frequency of an electrically driven spin in a disordered magnetic field[1] ANDRAS PALYI, GABOR SZECHENYI, Institute of Physics, Eotvos University, Budapest — We present a theoretical study of the spin dynamics of a single electron confined in a quantum dot. Spin dynamics is induced by the interplay of electrical driving and the presence of a spatially disordered magnetic field, the latter being transverse to a homogeneous magnetic field. We focus on the case of strong driving, i.e., when the oscillation amplitude A of the electron's wave packet is comparable to the quantum dot length L. We show that electrically driven spin resonance can be induced in this system by subharmonic driving, i.e., if the excitation frequency is an integer fraction (1/2, 1/3, etc) of the Larmor frequency. At strong driving we find that (i) the Rabi frequencies at the subharmonic resonances are comparable to that at the fundamental resonance, and (ii) at each subharmonic resonance, the Rabi frequency can be maximized by setting the drive strength to an optimal, finite value. Our simple model is applied to describe electrical control of a spin-valley qubit in a weakly disordered carbon nanotube. Reference: http://arxiv.org/abs/1310.7350

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