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Rotating Frame Spin dynamics of a Single Nitrogen Vacancy Center in Diamond Nanocrystal[1] ABDELGHANI LARAOUI, CARLOS MERILES, Department of Physics, City College of New York - CUNY — We investigate the spin dynamics of a nitrogen-vacancy (NV) center contained in individual diamond nanocrystals with an average diameter of 70 ± 20 nm in the presence of continuous microwave excitation. Upon periodic reversal of the microwave phase, we observe a train of rotary (Solomon) echoes that effectively extends the system coherence lifetime to reach several tens of microseconds, depending on the microwave power and phase inversion rate [1]. Starting from a model where the NV center interacts with a bath of paramagnetic defects on the nanocrystal surface, we use average Hamiltonian theory to compute the signal envelope from its amplitude at the echo maxima. A comparison between the effective Rabi and Solomon propagators shows that the observed response can be understood as a form of higher-order decoupling from the spin bath. The observed rotary echoes can be thought of as the rotating frame analog of Hahn's spin echoes, implying that the present scheme may find use for nanodiamond-based magnetic sensing. [1] A. Laraoui, C. A. Meriles, Phys. Rev. B **84**, 161403(R) (2011).

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Carlos Meriles
Department of Physics, City College of New York - CUNY

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