Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Quantum Interference between Three Spin Qubits ANDREW SACHRAJDA, National Research Council of Canada, GABRIEL POULIN-LAMARRE, National Research Council of Canada and Sherbrooke University, JOELLE THORGRIMSON, National Research Council of Canada and McGill University, SERGEI STUDENIKIN, Natl Res Council, GEOF AERS, ALICIA KAM, PIOTR ZAWADZKI, ZBIGNIEW WASILEWSKI, National Research Council of Canada — Recently both hyperfine and exchange based qubits based on three spin states in triple quantum dot circuits have been individually demonstrated. The effective targeting of a specific qubit species required a carefully designed pulse shape and measurement sequence. We discuss results where pulses are chosen to activate both three spin qubit species simultaneously. In our results two novel coherent behaviors have been identified which are related to quantum interference effects involving an interplay between the two qubits types. Such experiments are important to gain an understanding of critical leakage paths which drive the system away from the intended qubit states. Certain features of the data are analyzed in terms of a breakdown of the usual spin blockade spin to charge conversion technique for three spin experiments and the consequences of charge noise on the measurements.

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Date submitted: 15 Nov 2013 Electronic form version 1.4