

Abstract Submitted  
for the MAR11 Meeting of  
The American Physical Society

**Real time electron counting through wavelet edge detection<sup>1</sup>**

BJORN VAN BAEL, JONATHAN PRANCE, CHRISTIE SIMMONS, TECK SENG KOH, ZHAN SHI, DON SAVAGE, MAX LAGALLY, ROBERT JOYNT, MARK FRIESEN, SUSAN COPPERSMITH, MARK ERIKSSON, University of Wisconsin-Madison — We have recently demonstrated single-shot measurements of individual electron spins in a Si/SiGe quantum dot. These experiments were analyzed using a wavelet-based technique that allows detection of charging events in real time. An alternative method, based on level thresholding, is not well suited for real time detection, due to drifting background currents in the charge sensor. In contrast, the wavelet technique relies on edge detection and is hence robust against drifting currents levels. In this talk, we describe our wavelet algorithm and its applications for charge sensing. We benchmark the performance of the algorithm under realistic signal noise conditions.

<sup>1</sup>This work was supported by ARO, LPS, NSF and DARPA.

Bjorn Van Bael  
University of Wisconsin-Madison

Date submitted: 07 Dec 2010

Electronic form version 1.4