Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Dependence of ^{29}Si concentration on deposition temperature in ^{28}Si epilayers KEVIN DWYER, JOSHUA POMEROY, HYUN SOO KIM, DAVID SIMONS, National Institute of Standards and Technology — In an effort to gain predictive power for the enrichment of ^{28}Si epilayers deposited at elevated temperatures, we correlate the ^{29}Si concentration due to natural abundance silane adsorption with measured SIMS values. We have previously shown very high enrichments up to 99.99996 % (0.3 ppm ^{29}Si) using mass filtered ion beam deposition. However, the incorporation at higher deposition temperatures of naturally abundant silane gas from our ion source has the potential to reduce the final film enrichment. Knowledge of the expected reduction in ^{29}Si concentration is important because removal of the 4.7% ^{29}Si nuclear spins in natural silicon allows for exceedingly long coherence (T_2) times of qubits, approaching an hour at room temperature for ^{31}P nuclear spins. This makes incorporation of highly enriched ^{28}Si into devices critical for solid state quantum information.

Kevin Dwyer
National Institute of Standards and Technology

Date submitted: 14 Nov 2014 Electronic form version 1.4