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Stabilizing lateral strained-Si/SiGe material quantum dots SERGEI STUDENIKIN, G. POULIN-LAMARRE, A. SACHRAJDA, National Research Council of Canada, T. LU, N. BISHOP, T. PLUYM, P. KOTULA, M. LILLY, M. CARROLL, Sandia National Laboratories — In enhancement-mode SiGe quantum dot structures [2], 2DEG electrons are generated via the application of a positive global gate. The carrier mobility in such structures is limited by disorder potential at the oxide/silicon interface. Recently it was shown that the deteriorating effect of charge fluctuations can be substantially mitigated by incorporating a shielding electron layer at the surface – a thin Si quantum well cap layer [1,2]. This cap layer can, however, cause instabilities, drifts and hysteretic behaviour. In this work we study the stability of a tunable quantum dot defined by lateral gates in a Si/SiGe structure with a thin silicon cap layer and Si3N4 dielectric layer between the global gate and the structure [2]. Different "stabilization" procedures are explored to stabilise the device using both dc transport and charge sensing measurements at 300 mK.

[1] T. M. Lu, et al., Applied Physics Letters **99** (2011)
[2] C.-T. Huang, J.-Y. Li, K. S. Chou, and J. C. Sturm, Applied Physics Letters **104** (2014)

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