Quantum Information S&T

Dear Friends and Colleagues,

Sandia National Laboratories has an immediate opening for a post-doctoral position. The candidate will be hired to work in the area of silicon-based quantum computing. We are looking for an outstanding and motivated candidate that is interested in the areas of few electron silicon quantum dots and single donor devices for quantum bits. Experience in any of the following areas will be of significant interest: silicon or SiGe device nanofabrication, single donor fabrication techniques (e.g., STM based approaches), single electron devices in either column IV or III-V systems, cryogenic CMOS, low-temperature measurement or device modeling.

Selected recent papers from the semiconductor quantum information science group include:

1. J. Seamons et al., "*Room Temperature Single Ion Detection with Geiger Mode Avalanche Diode Detectors*", Applied Physics Letters 93, 043124 (2008).
2. R. Rahman et al., "*Atomistic simulations of adiabatic coherent electron transport in triple donor systems*", Physical Review B 80, 035302 (2009)
3. L. A. Tracy et al., "*The observation of percolation-induced two-dimensional metal-insulator transition in a Si MOSFET*", Physical Review B 79, 235307 (2009)
4. E. P. Nordberg et al., "*Enhancement mode double top gated MOS nanostructures with tunable lateral geometry*", Physical Review B 80, 115331 (2009)
5. E. Nielsen et al., "*Implications of Simultaneous Requirements for Low Noise Exchange Gates in Double Quantum Dots*", eprint arXiv:0909.0047 and submitted to Physical Review B
6. E. P. Nordberg et al., "*Charge sensing in enhancement mode double-top-gated metal-oxide-semiconductor quantum dots*", Applied Physics Letters 95, 202102 (2009)
7. L. Tracy et al., "*Enhancement of valley splitting in (100) Si MOSFETs at high magnetic fields*", Solid State Communications 150 (2010) 231
8. H. Stalford et al., "*Capacitance modeling of complex topographical silicon quantum dot structures*", accepted in IEEE Transactions on Nanotechnology
9. E. Bielejec et al., "*Single ion implantation for single donor devices using Geiger mode detectors*", Nanotechnology 21 (2010) 085201

The position will also provide the opportunity to interact with internal modeling and quantum computing architecture teams, offering a rare perspective on theoretical quantum bit and quantum circuit development. The physical qubit team collaborates with numerous internationally recognized groups outside of Sandia National Laboratories affording significant visibility and future opportunities for the candidate.

Minimum qualifications for the candidate are:

- Strong background in semiconductor device physics, nanofabrication or the physics of quantum confined structures
- Background in cryogenic temperatures is highly desirable
- Experience with numeric simulation of quantum confined structures
- Desired minimum GPA of 3.4 (undergraduate) and 3.8 (graduate).

Please forward a resume and a minimum of two letters of recommendation or email in PDF format to both:

Malcolm Carroll
Sandia National Laboratories
PO Box 5800
Mail Stop 1082
Albuquerque, NM 87185-1082
mscarro@sandia.gov

Mike Lilly
Sandia National Laboratories
PO Box 5800
Mail Stop 1303
Albuquerque, NM 87185-1303
mplilly@sandia.gov

Sandia is a multiprogram laboratory operated by Sandia Corporation, a Lockheed Martin Company, for the United States Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000.