FT-AQuA
Fault tolerant atomic qubit array

• Preliminary team: University of Wisconsin-Madison, University of Colorado, University of New Mexico, University of Arizona, Aarhus University, ColdQuanta, SRI, Sandia

• PI - Mark Saffman, UW-Madison

• Preliminary team member list: MS, Robert Joynt, Ivan Deutsch, Poul Jessen, Dana Anderson, Sterling McBride, Klaus Mølmer, Grant Biedermann
• Our goal is to demonstrate logical qubit operation based on arrays of neutral atom qubits.
• The project will leverage existing capabilities developed under IARPA-MQCO.
• We will also develop new capabilities in the areas of: scalable hw/sw for event driven error correction, stable lasers, optical subassemblies, compact UHV cells, protocols for high fidelity single, two and multi-qubit gates, error correction codes optimized for neutral atom qubits
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Qubit array scaling

3.8 µm

Single qubit Clifford fidelity

Gate infidelity

Bell state fidelity

1 Grangier/Browaeys, PRL 104, 010502 (2010); 2 Madison, PRL 104, 010503 (2010); 3 Madison PRA 82, 030306(R) (2010); 4 AQuA site array, unpublished (2014); 5 Biedermann lab Sandia, arXiv: 1501.03862; 6 AQuA 49 site array, April (2015).
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Interested in adding expertise in

• Design and analysis of quantum error correcting codes, optimization for neutral atom qubits with asymmetric error rates

• Real time hw and sw control systems

• Packaging of electro-optical systems
Contact Information

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