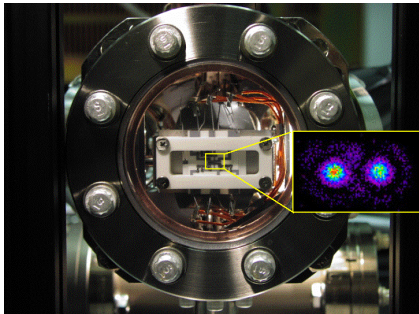
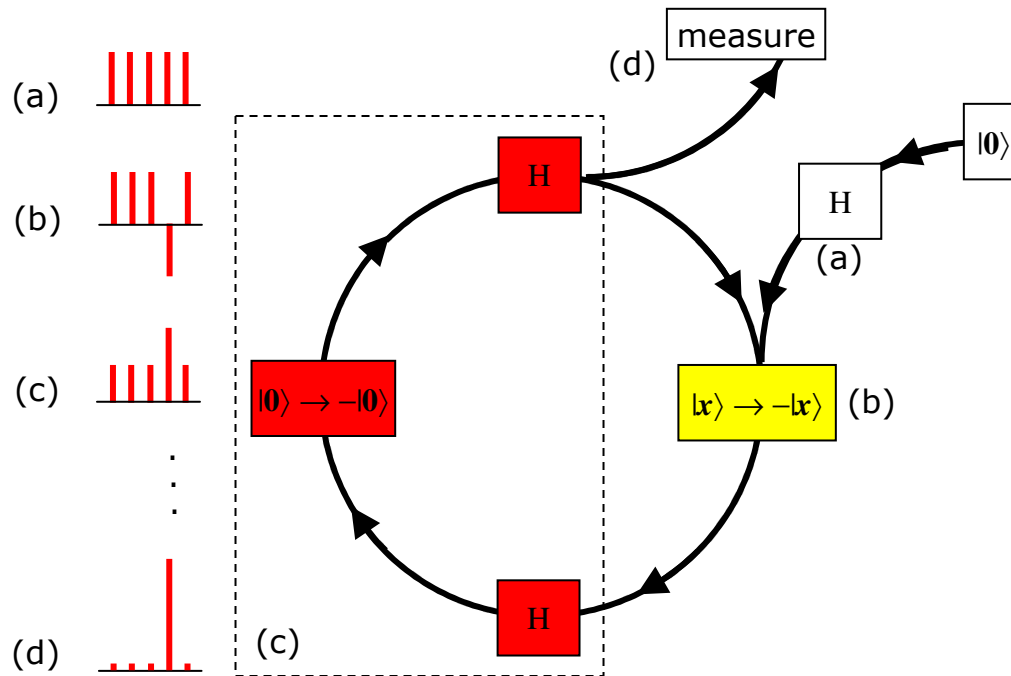


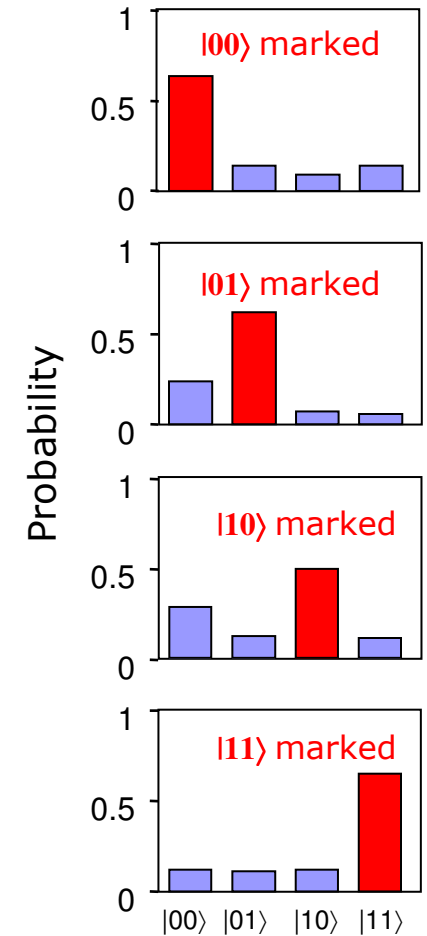
# Grover's Quantum Search Demonstrated in a Scalable System



Two  $Cd^+$  ions confined in a linear rf trap. Laser pulses entangle the "clock states" of the two ions, allowing the implementation of a simple quantum computer algorithm.



The Grover algorithm. Quantum amplitudes of all elements (left) as they evolve through the Grover circuit (right), with  $x$  signifying the marked element. H = Hadamard gate



Measured state of 4-state database with 2 trapped ion qubits, after a single Grover iteration.



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