Title:	Quantum Computation with Trapped Ions
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Abstract:	In this project, I am exploring the field of quantum computation which is realised using trapped ion method. The project mainly based on the work of Schindler in ion trap quantum information processor published in 2013. Along with this paper and other important research papers given in the reference, I tried to learn and reproduce the result in the original work. The ion used for this technique is the Ca + ion, because of its abundance and availability of laser sources for manipulation. The qubit state is initialised, manipulated and de- tected using the laser beams. The electric component of the beam will interact with the ion. The semi-classical approach, in which the quantum particle is interacting with the classical field is considered mainly for the calculations. The system we are considering will act as the two-level system, where the ground and the excited level will act as the computational basis state. This states will have perturbation due to the interaction of atomic dipole and electric field. This perturbation will be used to create the rotation of the system. The single qubit operations are done with the addressed beam, which acts on the single particle. Global beams are used for manipulation of the entire system. The MS- gate is found as the important and efficient gate for the coupling of qubit state with the motional modes. The gate is introduced by Molmer and Sorenson in 1996. Here we consider the two-level quantum state in the oscillating field interacting with the electric field. The three gates allow performing any transformation on the system.
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