Lawrence Berkeley National Laboratory
Recent Work

Title
Formation of integrated single atom arrays

Permalink
https://escholarship.org/uc/item/1b34q31

Author
Nilsson, J.

Publication Date
2002-12-02
Formation of integrated single atom arrays


Several solid state quantum computer schemes are based on the manipulation of electron and/or nuclear spins of single $^{31}\text{P}$ atoms in a semiconductor matrix [1]. The fabrication of qubit arrays requires the placement of individual atoms with nanometer precision and high efficiency. We are developing a single ion implantation scheme for $^{31}\text{P}^{q+}$ ions, integrated with processing of control and readout structures [2]. Single ion implantation is achieved through detection of secondary electron bursts from the impact of highly charged dopant ions such as $\text{P}^{12+}$. We will present results on implant alignment, single dopant atom activation and damage repair and SET formation for fabrication of integrated qubit arrays.


Acknowledgments
This work was supported by the National Security Agency (NSA) and Advanced Research and Development Activity (ARDA) under Army Research Office (ARO) contract number MOD707501, and by the U. S. Department of Energy under Contract No. DE-AC03-76SF00098.