

Rydberg quantum simulator using strontium atoms in tweezers

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We demonstrate the preparation of defect-free patterns of single Sr atoms in optical tweezers. The Sr atoms form the qubit register of our programmable Rydberg quantum simulator. This platform is highly suitable to study for example large scale spin-1/2 systems or spin squeezing. The qubit states are encoded onto two electronic levels of the atoms. The qubits are selectively read-out using fluorescence imaging on the narrow $S_{0} \rightarrow P_{1}$ transition with 99.9% [1] W.J. Eckner, et al., pre-print: ArXiv:2303.08078

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