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Sorting atoms in a 3D optical lattice AISHWARYA KUMAR, TSUNG-YAO WU, The Pennsylvania State University, YANG WANG, University of Maryland, DAVID WEISS, The Pennsylvania State University — We report on an atom sorting scheme for perfect pattern formation in a 3D 5x5x5 optical lattice of Cesium atoms, originally proposed in Phys. Rev. A 70, 040302(R) (2004). The combination of site selective state flips and with state selective motion steps can quickly and reliably fill site vacancies. We have previously demonstrated high fidelity site selective single qubit gates in this lattice which can be adapted to be the state flips in this scheme [Science 352, 1562-1565 (2016)]. Our newer work demonstrates high fidelity state selective atomic motion.

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