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Three imaging methods for lattice-trapped ultracold gases LIYUAN QIU, HAOXIANG YANG, TIAN TIAN, XIANGHAO MU, Center for Quantum Information, IIIS, Tsinghua University, China, YINGMEI LIU, Department of Physics, Oklahoma State University, Stillwater, OK 74078, USA, LUMING DUAN, Center for Quantum Information, IIIS, Tsinghua University, Beijing 100084, China; Department of Physics, University of Michigan, Ann Arbor, MI 48109, CENTER FOR QUANTUM INFORMATION, IIIS, TSINGHUA UNIVERSITY, BEIJING 100084, CHINA TEAM — An optical lattice is a versatile technique to control the mobility of atoms and enhance interatomic interactions. A Bose-Einstein condensate confined in optical lattices has attracted much attention for its abilities to simulate condensed matter models. We have developed and compared three different methods for detecting lattice-trapped sodium Bose-Einstein condensates. Our study shows that the in-situ imaging implemented with a digital micro-mirror device can provide a few interesting advantages. These detecting methods may be applicable to other optically trappable atomic species and molecules.

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