

Abstract Submitted
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Electron Microscopy of Quantum Gases GIOVANNI BARONTINI, VERA GUARRERA, RALF LABOUVIE, FELIX STUBENRAUCH, ANDREAS VOGLER, HERWIG OTT, TU Kaiserslautern, AG ULTRAKALTE QUANTEN-GASE TEAM — The technique of scanning electron microscopy allows for the investigation of solid surfaces and structures with a spatial resolution of few nanometers. Extending the application of this tool to a cloud of ultracold atoms, we obtain a novel way to image and manipulate the gaseous target, characterized by high spatial and temporal resolutions and by single atom sensitivity. A focussed electron beam is moved over the cloud and ionizes the atoms by electron impact ionization. The produced ions are subsequently extracted and detected. We successfully employed the technique for in situ imaging of ultracold atomic clouds, for single site addressability in optical lattices and for the observation of temporal correlations in a cold samples, both in 3d and 1d. The electron beam can also be used to locally introduce losses, thus paving the way to investigate dissipative processes in quantum gases and to generate topological defects.

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