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Scanning electron microscopy of ultracold atoms PETER WÜRTZ, Johannes Gutenberg-Universität Mainz, ANDREAS VOGLER, Universität Kaiserslautern, TATJANA GERICKE, Johannes Gutenberg-Universität Mainz, HERWIG OTT, Universität Kaiserslautern — We have adapted a scanning electron microscope for the study of ultracold quantum gases. The technique allows for *in situ* imaging of single atoms with a resolution of better than 150 nm. Thus, it can readily be applied to study quantum gases in optical lattices. The dissipative interaction of the electron beam with the atoms can be used to selectively remove atoms. In this way, one can create arbitrary patterns of occupied lattice sites. In the future, we want to exploit the single atom sensitivity to study temporal and spatial correlation functions. The system is also an interesting experimental platform to study electron-atom scattering processes and cold ion-atom collisions.

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