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An Erbium Quantum Gas Microscope with a Reflective Objective
AARON KRAHN, GREGORY PHELPS, ANNE HEBERT, SUSANNAH DICKERSON, MARKUS GREINER, Harvard University, ERBIUM LAB TEAM — Dipolar atoms present an exciting opportunity to extend previous quantum gas microscope (QGM) experiments to more complex systems influenced by long range, anisotropic interactions. We present on current progress toward the construction of a QGM for ultracold Erbium atoms in an optical lattice, including the development of a novel imaging system for single-site resolution. While most QGMs until now have typically utilized a high numerical aperture microscope objective, we discuss a reflective mirror alternative that offers an equally high NA (.9-.95), a comparable field of view (34 micrometers radial), and a larger working distance (25 millimeters) that keeps the atoms far from any surfaces. By operating in a Schmidt telescope configuration, this imaging system is well-suited both for collecting 401 nm imaging fluorescence and for the creation of an expandable lattice with a variety of associated lattice geometries.

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