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Dipolar Physics in an Erbium Quantum Gas Microscope ANNE HEBERT, AARON KRAHN, GREGORY PHELPS, SUSANNAH DICKERSON, MARKUS GREINER, Harvard University, ERBIUM LAB TEAM — Erbium offers exciting possibilities for extending the single-site imaging work of current quantum gas microscopes. With a magnetic dipole moment of $7\mu_B$, the dipole-dipole interaction of erbium is 50 times that of alkali atoms. The long-range and anisotropic nature of the dipole interaction adds richness to the short-range interactions that dominate the physics of the ground-state alkali atoms commonly used in ultracold experiments today. Erbium has several abundant isotopes, giving the added flexibility of studying both bosonic and fermionic systems. We present proposed avenues of research for the dipolar microscope being developed, including studies of magnetism, the Einstein-de Haas effect, and quantum phase transitions with fractional filling factors.

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