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Neutral Atom Nanolithography Using a Pulsed Magnetic Lens<sup>1</sup> ERIK ANCIAUX, RODRIGO CASTILLO-GARZA, JAMIE GARDNER, MARK RAIZEN, UT Austin — We present the status of a method of neutral atom lithography that achieves sub-10nm resolution. This method is based on the nanoscale imaging of a beam of metastable atoms with an aberration-corrected hexapole lens. The lens creates a magnetic field gradient that increases with the distance from the center of the lens so as to focus divergent low field seeking atoms toward a single focal spot past the lens. The scheme takes advantage of the narrow velocity distribution of a pulsed supersonic beam as well as an optical pumping and cooling scheme that selects the magnetic state of the atoms and further reduces its velocity dispersion. This method can be used not only to pattern but to spectroscopically probe surfaces with spatial resolution below 10nm.

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Erik Anciaux UT Austin

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