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Investigating the Effect of Density Inhomogeneity on Photoemission Spectroscopy TARA DRAKE, JOHN GAEBLER, RABIN PAUDEL, JILA, University of Colorado, JAYSON STEWART, JILA, University of Colorado, Los Alamos NL, DEBORAH JIN, JILA, University of Colorado — Ultracold atomic gases realize clean and controllable model systems for investigating many-body quantum physics. However, trapped gases are intrinsically spatially inhomogeneous in their density, and in many cases, one would like to compare measurements of these systems with theoretical understanding for a homogeneous gas. In particular, density inhomogeneity can complicate the interpretation of data taken in momentum space, as the original spatial information is lost during time of flight expansion. The effect of density inhomogeneity due to a harmonic trapping potential is studied in a degenerate gas of 40K atoms. Using a method to select only the atoms in the center of the trap, we study how a more homogenous sample changes what can be seen in time of flight experiments, including photoemission spectroscopy.

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