

Abstract Submitted  
for the DAMOP10 Meeting of  
The American Physical Society

**Ion-BEC Interactions**<sup>1</sup> DAVID A. ANDERSON, RACHEL E. SAPIRO, GEORG RAITHEL, University of Michigan — Recently, a significant amount of theoretical work on dilute atomic BEC has focused on how condensates interact with ultra- cold charged impurities. The phenomena one may expect to find include the formation of mesoscopic molecular ions via recombination of BEC atoms by ion-induced polarization potentials, ion-induced structures in the BEC wave-function, quantum charge diffusion, and self trapping of ions in BECs. Here, we present progress towards experimental studies of such ion-BEC interactions using a  $^{87}\text{Rb}$  BEC setup. It is paramount that the ions have a sufficiently long dwell time in the BEC ( 100us) and move slowly to avoid unwanted BEC excitations. These conditions are met by (1) creating the ions via photo-ionization of ultra-cold atoms close to the photo- ionization limit, and (2) by minimizing stray electric fields in the interaction region using Stark spectroscopy of high- lying Rydberg states. The electric field of a small tip-like structure is used to extract and image the ions onto a micro- channel plate detector, allowing ion counting, time-of-flight analysis and spatial imaging.

<sup>1</sup>Supported by AFOSR and NSF-FOCUS

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Date submitted: 22 Jan 2010

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