Integrated Single Atom Detector\textsuperscript{1} W. ROHRINGER, D. FISCHER, M. TRUPKE, J. SCHMIEDMAYER, Atominstitut, TU-Wien — Detecting single atoms is a key ingredient in developing cold atom based quantum technologies. Here we present a detector for trapped atoms, fully integrated on an atom chip (M. Wilzbach, et al. Optics Letters \textbf{34}, 259 (2009) ). The detector consists of a tapered lensed single-mode fiber for precise delivery of excitation light and a multimode fiber to collect the fluorescence. Both are mounted in lithographically defined SU-8 holding structures on an atom chip. Single Rb atoms propagating freely in a magnetic guide are detected with an efficiency of 66\% with a signal to noise ratio in excess of 100. In the talk we will give examples of how this detector can be used to probe atom-atom correlations in ultra cold degenerate quantum many body systems.

\textsuperscript{1}Supported by the FFG through the Austrian Nano Initiative: PLATON project NAP and the Wittgenstein Prize.