

Abstract Submitted
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Integrated Single Atom Detector¹ 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* **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.

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