

## EINLADUNG

zum Vortrag  
von

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über

# AtomChips: Integrated circuits for matter waves

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**Dienstag, 6. Mai 2008, um 17.30 Uhr**

Ort: Großer Hörsaal der Experimentalphysik, Universität Wien,  
1090 Wien, Strudlhofgasse 4 / Boltzmannngasse 5, 1. Stock

### Abstract:

AtomChips [1] aim at the miniaturization and integration of quantum optics and atomic physics on to a single chip, analogous to electronic circuits. It combines the best of both worlds: The perfected manipulation techniques from atomic physics with the capability of nanofabrication. AtomChips promise to allow coherent manipulation of matter waves on the quantum level by using high spatial resolution electro magnetic potentials from structures on the atom chip or by employing adiabatic radio frequency (RF) or micro wave (MW) potentials.

The talk will give an overview of the recent advances in the concepts, fabrication and experimental realization of AtomChips by illustrating the many different tasks that can be performed using ultra cold or Bose-Einstein condensed (BECs) atoms manipulated on the chip. These range from measuring magnetic and electric fields with unprecedented sensitivity by observing the density modulations in trapped highly elongated 1d BECs [2], to fundamental studies of the universal properties in low dimensional systems like non equilibrium dynamics and coherence decay [3] or signatures of thermal and quantum noise [4] in one dimensional super fluids. The talk will give an overview of the recent advances and experiments.

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[1] For an overview see: *Microscopic atom optics: from wires to an atom chip*. Folman, R., Krüger, P., Schmiedmayer, J., Denschlag, J. & Henkel, C., *Adv. At. Mol. Opt. Phys.* **48**, 263 (2002).

[2] St. Wildermuth *et al.* *Nature* **435**, 440 (2005); S. Aigner *et al.* *Science* **319**, 1226 (2008)

[3] Hofferberth *et al.* *Nature* **449**, 324 (2007)

[4] Hofferberth *et al.* *Nature Physics* (2008), DOI:10.1038/nphys941; arXiv:0710.1575

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Vorsitzender 2007/08: Ao.Univ.Prof. Dr. Ernst Bauer, Institut für Festkörperphysik, Technische Universität Wien