Setup of a magnetic transport apparatus for experiments on a Rubidium BEC

M. Theis, G. Thalhammer, K. Winkler, J. Hecker Denschlag and R. Grimm

Institut für Experimentalpyhsik, Universität Innsbruck
Technikerstr. 25, A-6020, Innsbruck, Austria
Tel +43-512-5076339, Fax +43-512-5072921
E-mail: Matthias.Theis@uibk.ac.at, Website: http://exphys.uibk.ac.at/ultracold

The interaction of coherent quantum matter with 2D and 3D optical lattices promises many interesting quantum mechanical effects and insights into the properties of atomic quantum gases. We report on the progress and current status of our Rubidium condensate project in which we will study this interaction.

Experiments with a condensate in such optical potentials require good optical access to the trapped atoms. Therefore we implement a magnetic transport scheme following a concept recently developed in Munich [1]. A sequence of quadrupole coils is used to transfer Rubidium atoms from a MOT into a UHV glass cell with excellent optical access. In this cell the condensation and lattice experiments will take place.

In a second stage we will extend our setup by an additional multi-purpose science chamber allowing a whole new range of experiments. For example we can introduce material samples into the vacuum and investigate their interaction with the condensate.

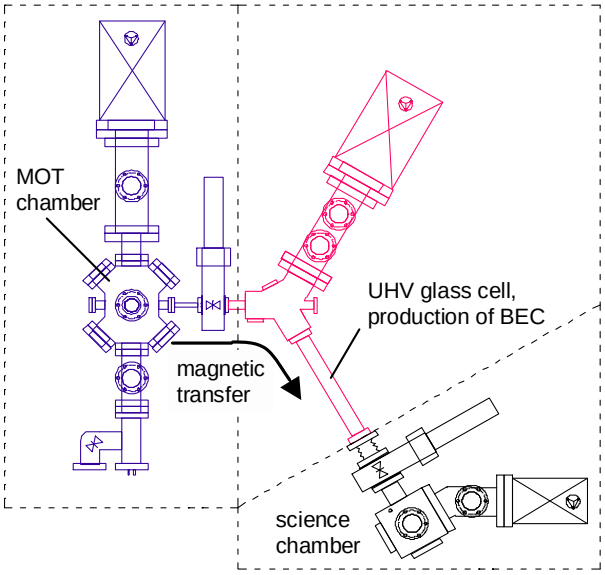

Figure 1: Setup of the experiment. The magnetic transport route from the MOT to the glass cell is indicated by an arrow.

We have completed the MOT section together with the MOT laser system. Our laser setup uses grating stabilized diode lasers as well as a Ti:Sa-Laser.

After installing the glass cell section and the magnetic transport coils in the next few months we expect to produce our first condensate this autumn.

[1] M. Greiner *et al.*, Phys. Rev. A **63**, 031401(R) (2001).