

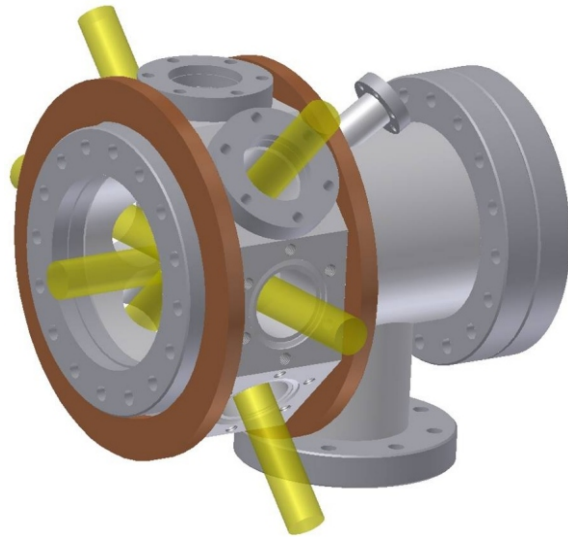
Atom Chips

Amsterdam



Atomic physics with fermions (Experiment)

Most research with ultra-cold gases is done with bosonic atoms. At low temperatures bosons tend to occupy the same quantum state to form a Bose-Einstein condensate. For fermions however, the Pauli exclusion principle prevents any two fermions from sharing the same quantum state. The peculiarities arising from these different quantum statistics are now subject of extended investigations, with potential new applications in atomic clocks and atom interferometers.



A new experiment will be used to study quantum degenerate mixtures of ^{87}Rb (bosons) and ^{40}K (fermions). In tightly confining potentials generated by atom chips, these mixtures are expected to display novel phenomena.

A first step is preparing a sample of atoms in an ultra-high vacuum environment. This project includes installing a system of single-mode diode lasers for spectroscopy on ^{40}K atoms. The atoms are emitted from a resistively heated getter source. Spectroscopy will be used to characterize the new getter source.

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