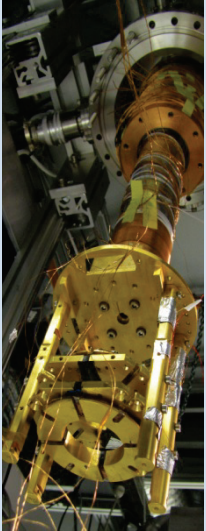


Call for a PhD thesis

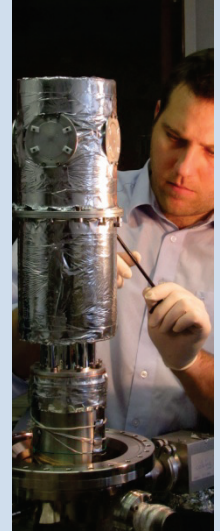
Ultra-cold atoms in a cryogenic environment



The combination of ultra cold atoms and solid state physics has a high potential to become one of the leading technologies in future quantum optics. Our final goal is to couple atomic ensembles via microwave photons to a high-Q solid state microwave cavity on a superconducting Atom Chip.

Ensembles of neutral atoms are among the most promising candidates for a long-time quantum memory, if the internal spin states are used as the register. An implementation of such an interface will allow us both to connect different quantum nodes and to collect and detect photons with near unit efficiency. Starting from cold atom, as quantum memories, and single photon source experiments related to those, the aim of the thesis is to study the physics of atoms precisely held on a chip to build a high fidelity quantum interface between photons and a quantum memory/trapped atoms.

The part of the setup on room temperature, the magnetic transport of atoms, is already operational. Now the cryogenic part is set up and the next milestone will be to store ultra cold atoms in magnetic traps in a cryogenic environment, with all its challenges of compatibility.



Additionally, cold atoms trapped above a superconducting surface will allow for the first time to study the magnetic field caused by superconducting currents on the chip, by magnetic field imaging with a Bose-Einstein condensate.

We offer an employment as a doctoral student at the TU Vienna, which includes health and social insurance.

Formal requirement:

The candidate must hold a Master's degree or equivalent, and is expected to pass the admission criteria of the *Graduate School on Complex Quantum Systems* (www.coqus.at).

A background in quantum optics, ultra cold atoms, laser physics or cryogenic physics will be beneficial, but not mandatory.

We can offer a well equipped scientific work environment in an international visible research group. A strong networking and cooperation with other groups in Europe and overseas are usual.

Starting date: from summer/autumn 2010.

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www.atomchip.org