



# Master thesis

## Research field

In our laboratory we use ultracold strontium atoms to study quantum many-body physics. We are particularly interested in strongly correlated quantum many-body systems where interactions are comparable to kinetic energy, a situation which often leads to fascinating emergent phenomena such as high-temperature superconductivity or the fractional quantum Hall effect. We can engineer and probe quantum gases both in and out of equilibrium with a resolution down to the single particle and spin (Fig.1) using a quantum gas microscope. Such detection method offers a new paradigm to study quantum many-body systems and we plan to use it to study highly entangled phases of matter.

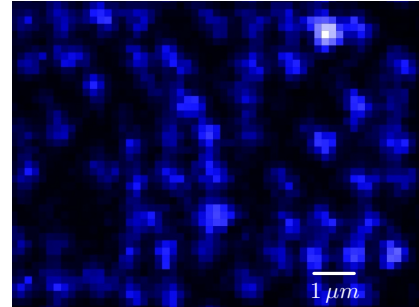


Figure 1: *Experimental picture obtained in a quantum gas microscope. Each blue dot is a single atom located on one site of a two-dimensional square optical lattice.*

## Possible Master thesis projects

We have openings for **up to three master thesis** in 2025. Possible projects (not restricted to) include the following topics:

- Building and characterization of a novel cold strontium atomic source
- Development of a system to create synthetic gauge fields for strontium
- Development of a laser system to couple strontium atoms to Rydberg states

Interested? Please get in touch in order to learn more about projects in our group.

Email: [guillaume.salomon@uni-hamburg.de](mailto:guillaume.salomon@uni-hamburg.de)

Web page: [www.aqmanybos.com](http://www.aqmanybos.com)