Universität Hamburg
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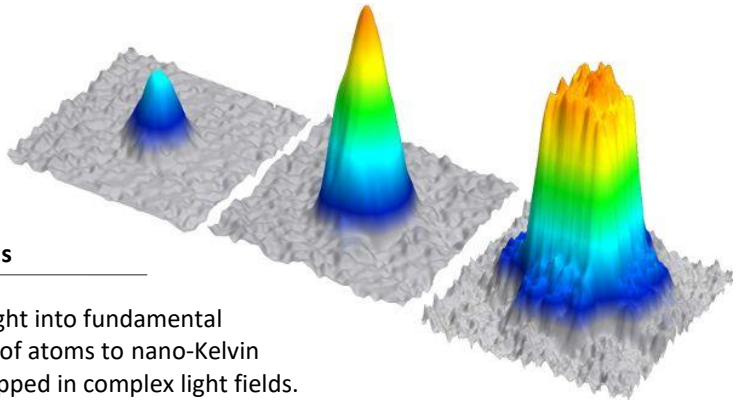

Experimental Ph.D. position 75% TV-L13
Exploration and quantum simulation of 2D superfluids

In our group we realize model systems which give insight into fundamental questions of many-body physics. We cool dilute gases of atoms to nano-Kelvin temperatures and the resulting quantum matter is trapped in complex light fields. These we use to simulate difficult problems of quantum mechanics experimentally. We have already achieved several important steps on this path: We created the world's first homogeneous 2D Fermi gases, realized Josephson junctions and demonstrated superfluidity therein.

The topic of this Ph.D. project …

… is the investigation of 2D quantum gases in a team of 3 PhD students and one senior scientist. Here, fundamental questions of many-body quantum mechanics arise, concerning e.g. the connection between superfluidity and long range order in reduced dimensions. One of the milestones is the observation of imbalanced superfluids having more spin-up than spin-down particles as well as the investigation of coupled superfluids. Quantum gases offer an unprecedented amount of control, e.g. allowing to tune the interparticle interaction at will from attractive to repulsive. This makes them uniquely suited to study the non-equilibrium dynamics of strongly correlated systems: when do strongly interacting systems thermalize, and if they do, which processes play the dominant role?

Learning opportunities

Our experiments explore the interface of atomic physics, solid state physics and many body quantum mechanics. They are designed, built and run by a small team and will provide you with the opportunity to acquire a broad range of capabilities. The PhD students develop complex optical and mechanical systems as well as laser systems and employ technologies ranging from high frequency electronics via control loops to ultrahigh vacuum technology. By solving technical and intellectual challenges creatively, you will be able to tackle fundamental questions of quantum mechanics. Obviously, we do not expect you to know all these things as you start, but rather look for excellent students with an open mind.

Our offer

We offer a PhD position in a field with high impact that is internationally rapidly expanding and provide an excellent infrastructure, both scientifically and financially. We attach great importance to a careful selection of the team members, their support and intensive supervision as well as on team work. The research project is embedded in the collaborative research centre SFB925 "Light induced dynamics and control of correlated quantum systems" and is hence adequately supported. The PhD student will become a member of the graduate school of the research center and be employed on a 75% position according to TV-L E13.

Your profile

I look forward to applications from outstanding candidates who enjoy experimental research and have a strong interest in all areas of quantum mechanics and atomic physics. Experience in experimental physics, quantum optics and the field of quantum gases is of advantage, but not necessary, some of my best PhD students have e.g. done a theoretical master's thesis. Of much greater importance are your motivation and ability to move a project forward. Please send your application including CV, contact details of references, GPA of Bsc/Master and possibly your bachelor's and master's thesis per email to

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SFB 925
LIGHT INDUCED DYNAMICS AND CONTROL OF CORRELATED QUANTUM SYSTEMS