

**Open PhD position in experimental quantum optics (m/f/d, E 13 TV-L, 50%)
„Infinite-range interactions in atomic spin systems“**

The position is available for the duration of three years, starting in summer/fall 2022.

We are seeking a PhD student in experimental physics (atomic quantum optics) to investigate large and small spin systems with cavity mediated all-to-all interactions. Therefore, we are going to use highly-excited Rydberg atoms coupled to a microwave cavity field that plays the role of a "quantum bus". Then, strong dipole-dipole interactions between the Rydberg atoms permit the formation of individual Rydberg superatoms, interacting with each other via the cavity-mediated infinite-range interactions. The development of such few- and many-body quantum systems with highly-tunable arbitrary-range interactions will be of paramount importance for scalable implementations of quantum logic gates and the realization of dynamically controlled and configurable quantum simulators.

The candidate should have a strong background and/or interest in atomic quantum optics with much attention to detail and goal-oriented scientific research capabilities. Ideally he/she has good experimental skills in atomic and quantum physics as well as experience and physical ability to work in an optical laboratory with cold and Rydberg atoms. Good communication, language (English) and programming skills (Python, Matlab) as well as flexibility to work both independently and in a team are beneficial. In addition, the candidate should hold a university degree (diploma/master) in physics or a related discipline.

The PhD position will be embedded in the Research Unit FOR 5413 „Long-range interacting quantum spin systems out of equilibrium: Experiment, Theory and Mathematics“ which is funded by the German Research Foundation (DFG). The Research Unit addresses questions concerning many-body quantum systems with long-range interactions. Its ultimate goals are the understanding, realization and control of complex quantum matter possessing collectively enhanced yet robust properties with applications in emerging quantum technologies, such as metrology and sensing. It builds on the Center for Quantum Science at the University of Tübingen and seeks to establish a flourishing research environment that brings together an interdisciplinary group of scientists from experimental and theoretical physics as well as mathematics. Founded in 1477, the University of Tübingen belongs to one of the oldest universities in Germany and whole Europe and has since then been a place of top-level research and teaching. It belongs to one of the 11 German Excellence Universities marking its outstanding reputation on national and international level. The University of Tübingen is an equal opportunity employer. All members of the Research Unit are strongly committed to increasing the number of women in research and teaching and therefore strongly encourages women to apply. Applications from persons with disabilities will be given preference in the case of equal suitability.

The employment will be carried out by the central administration of the University of Tübingen.

Please submit application documents (short motivation letter, curriculum vitae, copy of degree certificates) by May 20th, 2022 as a single pdf-file to: Prof. Dr. József Fortágh (fortagh@uni-tuebingen.de), Department of Physics, Faculty of Science, University of Tübingen.