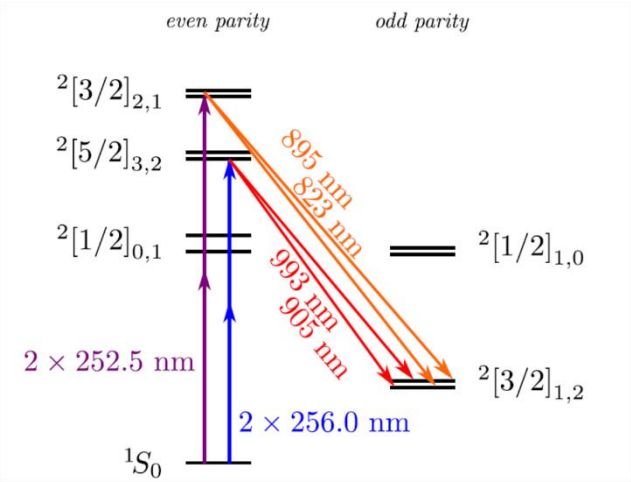
PHYSIKALISCHES INSTITUT

UNIVERSITÄT HEIDELBERG
ZUKUNFT SEIT 1386

PhD Position for Nonlinear Quantum Optics in Ground-State Noble Gases

Low-Energy Precision Physics (LEPP), Physikalisches Institut, Heidelberg University



Multiphoton interactions in closed-shell atoms provide new degrees of freedom for precision measurement and quantum sensing.

The new LEPP group at Heidelberg will soon acquire and bring into service a new laser system to develop these principles, using direct frequency comb spectroscopy in the deep ultraviolet.

Measurements with this laser system will investigate ^{129}Xe as a candidate for optical magnetometry, and can take advantage of the recently installed magnetically shielded measurement facility at the Physikalisches Institut.

Tasks: This project begins with a conceptual focus on the new pulsed laser system, which will be supported by calculation/simulation and demonstration experiments using cw lasers. The data acquisition system and spectroscopy apparatus for pulsed experiments will be designed, installed, and commissioned together with the new laser system – these will then be used to study the nonlinear atom-light interaction for spin-polarized atoms, in extremely low background magnetic fields. Involvement in connected precision measurements, searching for the low-energy signatures of beyond-Standard-Model CP-violation via the permanent electric dipole moment of ^{129}Xe, could accompany further optimization of the apparatus. Data analysis, writing and publishing research articles, and presenting at topical conferences/workshops are an integral part of this project.

Requirements:

- Master degree in physics or similar (grades equivalent to 2,0 or better in the German system)
- Coursework and lab experience in atomic/optical or low-energy nuclear/particle physics
- Strong supporting letters of recommendation
- English-language proficiency (reading, writing, speaking)

Applications will be considered until the position is filled. Those received **before November 9th 2023** are guaranteed full consideration. If you have any questions, please do not hesitate to contact us! ***sekretariat-degenkolb@physi.uni-heidelberg.de***

Heidelberg University is an equal opportunity employer and welcomes applications from women. Handicapped applicants will be preferentially treated, if equally qualified.