



2025 HGF – OCPC – Programme for the involvement of postdocs in bilateral collaboration projects

Title of the project:

Fundamental Physics with modern atomic, molecular, and optical methods

Helmholtz Centre and institute:

Helmholtz Institute Mainz (HIM)

Project leader:

Prof. Dr. Dmitry Budker

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Matter-Antimatter (MAM) Section

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Description of the project (max. 1 page):

We have multiple projects spanning a broad range of fundamental and applied science. Some examples include experimental searches for ultralight bosonic dark matter (CASPER, GNOME, and various other experiments), measurement of atomic parity violation effects in atoms and molecules, science and applications of nuclear magnetic resonance at near-zero magnetic fields, remote measurement in the upper atmosphere using laser-guidestar methods, measurements of biomagnetic fields from plants and human patients, physics and applications of color centers in diamond, trapping of matter and antimatter ions, spectroscopy of thorium ions sympathetically cooled in ion crystals of calcium ions, and development of novel spectroscopic techniques using femtosecond frequency combs and high magnetic fields.



Description of existing or sought Chinese collaboration partner institute (max. half page):

We have broad collaborations in China, with our primary collaborating institutions being at USTC (Hefei), PKU (Beijing), and Tsinghua University (Beijing). We are open to further collaboration opportunities with top Chinese Institutions that may be facilitated by this postdoctoral program in the areas of research interests of our group.

Required qualification of the post-doc:

- PhD in Physics, Chemistry, or Electrical Engineering
- Experience with planning and conducting advanced experimental research projects
- A proven record of research accomplishments (publications)
- Additional skills in electronics, optics, lasers, spectroscopy, detectors, data analysis and modelling are a plus
- Language requirement: fluent conversational English (C1-level+); technical writing skills. The working language in our group is English, and it is very important to have no barriers in communication.

The above mentioned qualifications will be verified through the submitted documents, recommendation letters, and interviews with the candidates.
