Postdoctoral Researcher (f/m/d)
Hierarchical and dose-efficient X-ray imaging of biological specimen with synchrotron radiation

Job description:

The Laboratory for Application of Synchrotron Radiation (LAS) and the Institute of Photon Science and Synchrotron Radiation (IPS) at KIT collaborate closely with the Centre for Organismal Studies (COS) of Heidelberg University and the State Museum of Natural History Stuttgart (SMNS) in the field of biological X-ray imaging of small animals. COS and SMNS host leading groups in the fields of developmental biology and insect biodiversity, respectively, while LAS and IPS develop and apply cutting-edge X-ray imaging instrumentation and methods.

Within the joint project “HIGH-LIFE” supported by the German Federal Ministry of Education and Research (BMBF), we develop and apply hierarchical (i.e. considering different length scales) and dose efficient X-ray imaging for large comparative studies of biological specimen like model organisms (fish, frog) or ecologically important insects (e.g. parasitic wasps) at synchrotron sources with high sample throughput. We hereby exploit unique properties of synchrotron X-ray beams in terms of high coherence, high flux and variable energy ranges.

A major methodical challenge and hot topic at modern synchrotron facilities is the realization of variably adjustable X-ray imaging scales (i.e. spatial resolution and field of view - FOV). This will be tackled by the development and combination of suitable X-ray optical elements, in particular dedicated crystal optics designed for coherent imaging and strong image magnification by highly asymmetrical Bragg diffraction (so-called Bragg Magnifier optics). This instrumentation, which is pioneered by KIT together with partners form Slovakia and XFEL, will now be refined and extended to higher photon energies and combined with highly efficient 2D detector systems as well as a dedicated sample exchanger and powerful reconstruction tools, allowing to drastically increase dose efficiency of imaging for radiation sensitive biological samples and to achieve high sample throughput.

The candidate will be primarily involved in the methodical development, the design and the instrumentational realization of the Bragg Magnifier setup as well as its integration into our hard X-ray microscope at KIT’s IMAGE beamline, which will perspective transferred to the PETRA III storage ring at DESY. The work includes the careful design and implementation of the entire system including crystals and crystal holders (supported by FEM simulations) and dedicated mechanical manipulation units for optics and samples, eventually enabling a flexible variation of resolution and FOV. The final setup shall be commissioned, tested and applied as experimental end-station for hierarchical and dose efficient imaging of biological specimen with high sample throughput within comparative scientific studies. The work will be supported by PhD student(s) and...
We offer you:

- The possibility to choose one of the hot topics in X-ray imaging with highly relevant applications in biological research.
- Exciting research in an international and multidisciplinary environment including development of imaging methods as well as instrumentation and conducting experiments at national and international synchrotron sources.
- The possibility to publish your results in scientific journals and at international conferences.

Employment will be at KIT/LAS and place of work will be at KIT Campus South and Campus North. However, regular business trips e.g. between KIT and DESY and to international large-scale facilities for experiments are part of the work plan.

**Qualification:**
You must have a doctoral degree in physics or materials science, preferably specialized on crystal optics, X-ray imaging, diffraction and/or beamline instrumentation. We expect them to demonstrate an independent working attitude in order to successfully coordinate and realize the Bragg Magnifier setup within the HIGH-LIFE project. The results of the work should be published and presented at conferences. We require them to show a strong interest in experimental and theoretical work and in the design of cutting edge instrumentation for synchrotron sources. The working language is English, which should be spoken and written confidently. Prior research experience in X-ray optics, (dynamical) X-ray diffraction and 2D/3D X-ray imaging as well as experience with project management and leadership will be considered strong assets. The applicant shall have good knowledge in programming (Matlab, C/C++, Python or equivalent), simulation (e.g. FEM) and data analysis.

**We offer:**
We offer an attractive and modern workplace with access to excellent facilities of KIT, diverse and responsible tasks, a wide scope of advanced training options, supplementary pension with the VBL (Pension Authority for Employees in the Public Service Sector), flexible working time models, a job ticket (BW) allowance, and a cafeteria/canteen.

**Salary:**
The remuneration occurs on the basis of the wage agreement of the civil service in TV-L, E13.

**Institute:**
Laboratory for Applications of Synchrotron Radiation (LAS)

**Contract duration:**
limited to three years

**Starting date:**
As soon as possible

**Application up to:**
15.09.2019

**Contact person in line-management:**
For further information, please contact Prof. Dr. Tilo Baumbach, E-Mail: tilo.baumbach@kit.edu or Dr. Elias Hamann, E-Mail: elias.hamann@kit.edu.

**Application:**
Please send the full application with a motivation letter, curriculum vitae, copies of academic degrees and transcripts of records as a
We prefer to balance the number of employees (f/m/d). Therefore we kindly ask female applicants to apply for this job.

If qualified, severely disabled persons will be preferred.

KIT is certified as a family-friendly university (familienfreundliche Hochschule) and offers part-time employment, leaves for family-related reasons, dual career options, and individual coaching for family-work balance.