GERMAN CANCER RESEARCH CENTER IN THE HELMHOLTZ ASSOCIATION

Research for a Life without Cancer

„Research for a life without cancer“ is our mission at the German Cancer Research Center. We investigate how cancer develops, identify cancer risk factors and look for new cancer prevention strategies. We develop new methods with which tumors can be diagnosed more precisely and cancer patients can be treated more successfully. Every contribution counts – whether in research, administration or infrastructure. This is what makes our daily work so meaningful and exciting.

Doctoral Position in Physics, Medical Physics, Engineering or Mathematics for Simulation of MRI Magnets

Reference number: 2024-0248

Heidelberg | Full-time | Medical Physics in Radiology

Within a project funded by the German Federal Ministry of Education and Research (BMBF) we are investigating the integration of magnetic resonance (MR) imaging and radiation therapy with ions.

The irradiation with ions offers the possibility to deposit high doses of radiation specifically in a tumor. For this purpose, the tissue must be modeled very precisely in the context of radiation planning. Here, MR imaging offers a more detailed insight into the distribution of soft tissue in comparison to computed tomography (CT), which is conventionally used in radiotherapy planning. As MR imaging is a non-invasive imaging method, it also offers the possibility to assess the patient anatomy prior to or during therapy, from which the therapy can be adjusted. The combination and integration of both technologies is a highly innovative field of research.

As part of this project we offer a PhD position for a physicist, medical physicist, engineer, or mathematician. The aim of the project is to develop and investigate novel magnet geometries optimized for MR-guided ion therapy based on superconducting magnets constructed with high-temperature superconductors (HTS). The project will use magnetostatic simulations with FEM tools (CST, Opera) to design homogenous magnetic fields, investigate coil design, perform magnetic force calculations, calculate power consumption, design magnetic shielding arrangements, and evaluate safety and compliance. Although the project is primarily based on numerical simulations, there will be significant opportunities to interact with a commercial magnet vendor to incorporate practical design parameters.

The first year of the doctoral contract will be with Heidelberg University Hospital, the second and third years with the German Cancer Research Center (DKFZ).

YOUR TASKS

- Active participation in significant multidisciplinary research project
- Close cooperation with scientific partners at the German Cancer Research Center in Heidelberg and at the Heidelberg Ion Beam Therapy Center (HIT)
- Interaction with a commercial magnet vendor
- Simulation of magnets that are optimized for MR-guided radiation therapy with protons and heavier ions (e.g. carbon ions), exploiting the material parameters of HTS to realize more open or single-sided geometries
- Derivation of specific requirements for the magnet design as well as for materials and material distributions of the coil windings and housing by means of numerical simulations under consideration of material constraints
- Collaboration within a larger team examining optimizations of other MRI subsystems like gradients and radiofrequency hardware
- Publication in high-ranked journals; presentation at scientific conferences

YOUR PROFILE

- Completed studies with diploma or master's degree in physics, medical physics, engineering, mathematics, applied mathematics, or a related discipline
- Experience in the following areas is an advantage: MR physics, scientific programming (MATLAB, C/C++, etc.), electromagnetic simulations
- Target-oriented working methods and communication skills in a multidisciplinary work environment
- Reliability, self-initiative, motivation, and ability to work in a team
- Very good knowledge of English, both written and spoken; German beneficial

WE OFFER

Excellent framework conditions: state-of-the-art equipment and opportunities for international networking at the highest level

Access to international research networks

Doctoral salary with the usual social benefits

30 days of vacation per year

Flexible working hours

Possibility of mobile work and part-time work

Family-friendly working environment

Sustainable travel to work: subsidized Germany job ticket

Unleash your full potential: targeted training and mentoring through the DKFZ International PhD Program and DKFZ Career Service

Our Corporate Health Management Program offers a holistic approach to your well-being

Contact:
Prof. Dr. Mark Ladd
Telefon: +49 6221 42-2550

The position is initially limited to 3 years.

ARE YOU INTERESTED?

Then become part of the DKFZ and join us in contributing to a life without cancer!

Apply now

We are convinced that an innovative research and working environment thrives on the diversity of its employees. Therefore, we welcome applications from talented people, regardless of gender, cultural background, nationality, ethnicity, sexual identity, physical ability, religion and age. People with severe disabilities are given preference if they have the same aptitude.

Notice: We are subject to the regulations of the Infection Protection Act (IfSG). Therefore, all our employees must provide proof of immunity against measles.

Zertifikat seit 2005 audit berufundfamilie

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