To strengthen our team at the Chair of Medical Physics of the Ludwig-Maximilians-Universität München (LMU Munich) we are offering

1 Postdoctoral position (TVL-E13 100%, 1 year, with possibility of extension) for ion based imaging

within the DFG project "Hybrid ImaGing framework in Hadrontherapy for Adaptive Radiation Therapy" (PIs Dr. Chiara Gianoli and Prof. Dr. Katia Parodi).

Project mission and research question

The primary goal of this research project is to enhance the quality of low-dose ion transmission imaging by combination with prior X-ray information for Adaptive Radiation Therapy (ART) in modern ion therapy. To overcome the major uncertainties in the calibration of X-ray computed tomography (CT) to ion stopping power ratio (relative to water) for treatment planning, ion radiographies are under study with the purpose of adjusting (or replacing) the X-ray image for treatment planning and/or anatomical verification in ion therapy. In particular, the adjustment of the X-ray image is based on the numerical optimization of the matching between the ion radiography and the numerically modeled radiography of the adjusted X-ray image. However, inter-fractional anatomical changes can impair the co-registration between the treatment planning and delivery scenarios, thus impairing the adjustment of the X-ray image based on ion radiographies.

Your tasks

The research gap that you will have to fill consists in developing different deformable image registration schemes to adapt the X-ray image to the ion radiographies. This will enable the ion radiographies to play a fundamental role in Adaptive Radiation Therapy (ART). Particularly, dedicated approaches for both list-mode (with single particle tracking) and integration-mode (in pencil beam scanning) detector configurations of ion transmission imaging will be considered.

Your specific requirements

- PhD in physics or biomedical engineering, or similar
- Good knowledge in medical imaging and ample experience in deformable image registration software development (coding and testing)
- Experience in coding and documentation standards, programming languages (preferably C/C++, MATLAB, Python and imaging libraries) and Linux and Windows OS
- Excellent self-managing and team-working skills
- High level of creativity
- Fluent English knowledge (spoken and written)
- Expertise in Monte Carlo simulation platforms is appreciated.

Our offer

The LMU Chair of Medical Physics offers a multi-disciplinary environment and works on various core-topics of ion beam therapy. You will be given the opportunity to join a stimulating project, contributing to the devel-

opment of a novel approach of adaptive therapy combining modern ion radiographic imaging with more conventional X-ray CT imaging.

The working place will be at the Forschungszentrum Garching, which is well connected with public transportation to the city of Munich and to the collaborating Department for Radiotherapy and Radiation Oncology of the Klinikum der Universität München. The project will also benefit from a wide network of international collaborations on ion transmission imaging. Disabled candidates are preferentially considered in case of equal qualification. Applications from women are encouraged.

If you are interested in the position, please send us your application (letter of motivation, curriculum vitae, last school certificate, university degree including grades, publication list, other qualification certificates like TOEFL if available) until the **15th of November 2018** via email to

Katia.Parodi@lmu.de and Chiara.Gianoli@physik.uni-muenchen.de

indicating also your earliest possible entry date.