

## Position in high-field X-nuclear magnetic resonance imaging

Magnetic Resonance Imaging (MRI) is a powerful non-invasive technique that is widely used to examine inner organs. In addition, MRI is non-radiating like computer tomography and positron emission tomography that is ideal for repetitive screening. The unique advantage of MRI is that it gives insights on process on molecular level (**Fig. 1, left**), hemodynamics or can provide pulmonary parameters such as ventilation (**Fig 1, right**), perfusion, lung-blood gas exchange, or diffusion. Here we aim to advance X-nuclear MRI and magnetic resonance spectroscopy (MRS) for clinical needs. Developed X-nuclear MRI protocols will be utilized for *deuterium* metabolic and *xenon* hyperpolarized pulmonary imaging.

### The main tasks would be:

- A. **<sup>2</sup>H-synthesis.** Synthesis of three selectively deuterated disease specific tracers.
- B. **Hyperpolarized xenon.** Establishment of xenon hyperpolarization using available commercial equipment.
- C. **In vivo X-MRI.** Translation of the developed X-MRI protocols to pre-clinical in vivo imaging.

### Description of the position:

We are looking for an MRI scientific assistant. You should have finished master thesis (or above) in physics, chemistry, engineering or interdisciplinary fields.

Experience and background knowledge in magnetic resonance imaging is preferable.

You will have access to facilities of the Molecular Imaging North Competence Center ([www.moincc.de](http://www.moincc.de)) led by Prof. Jan-Bernd Hövener and Prof. Claus-Christian Glüer. You will also gain an experience in writing academic paper and grants.

### Project funds:

Intramural grant of the Medical faculty of Kiel University and funds of SBMI, MOIN CC.

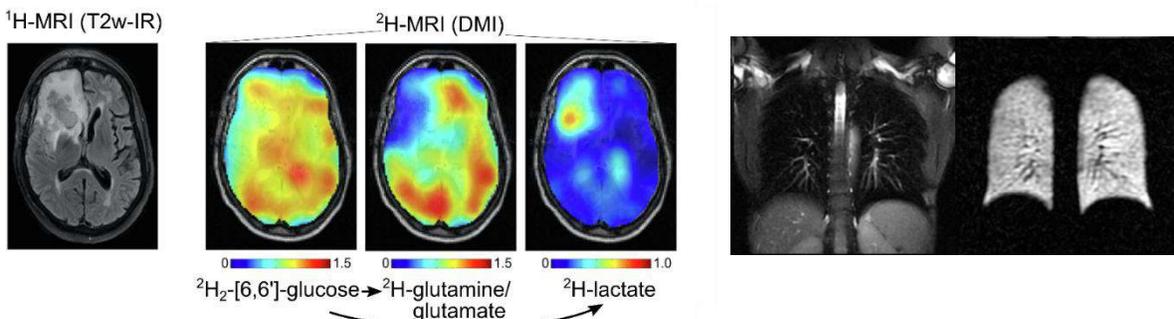
The initial contract duration is one year, starting from 1 June 2022 (or as soon as possible).

**Position:** TV-L E13 (1-year, 100% position of the researcher with possible prolongation).

### PIs of the project and contact persons:

Dr. Andrey Pravdivtsev, [andrey.pravdivtsev@rad.uni-kiel.de](mailto:andrey.pravdivtsev@rad.uni-kiel.de), BMBF “hyperpolarization group leader”

Dr. Mariia Anikeeva, [Mariia.anikeeva@rad.uni-kiel.de](mailto:Mariia.anikeeva@rad.uni-kiel.de), SFB/TRR 287 “BULK-REACTION”



**Figure 1. (left) <sup>1</sup>H-MRI and <sup>2</sup>H-MRI (DMI) images of clinical glioblastoma multiform (GBM).** T2-weighted fluid-attenuated inversion recovery MR image from a patient diagnosed with GBM in the right frontal lobe. DMI of glucose and metabolites Glx = glutamine/glutamate and lactate. DMIs show lower levels of <sup>2</sup>H-labeled Glx and higher concentrations of <sup>2</sup>H-labeled lactate in and around the tumor. The figure is adapted from DOI 10.1126/sciadv.aat7314. **(right) 1H MR anatomic and <sup>129</sup>Xe ventilation image of lung of a healthy volunteer.** The figure is adapted from DOI 10.1148/radiol.11102172.