

European Network on NMR Relaxometry

http://www.cost.eu/COST_Actions/ca/CA15209

High Field FFC-MRI – A System for 3T: Initial Experience

Markus Bödenler¹, Hermann Scharfetter¹

Graz University of Technology, Graz, AT

Fast field-cycling magnetic resonance imaging (FFC-MRI) is a technique based on cycling the magnetic field B_0 during an imaging sequence [1], thus giving access to new types of contrasts based on the dispersive properties of contrast agents [2,3,4] and tissue [5,6].

At low magnetic fields, FFC-MRI allows for a protein dependent contrast by exploiting the naturally occurring quadrupolar cross-relaxation due to nitrogen nuclei in protein backbones [7,8]. CONQUER (contrast by quadrupole enhanced relaxation) aims at the development of novel extrinsic MRI contrast agents by upscaling this effect to a clinical field strength of 3T. This should be achieved by means of relaxation enhancement of water protons by quadrupolar nuclei with high spin quantum number.

Here, we report our initial experience with the implementation of a small animal FFC-MRI system on a clinical 3T MRI system (Skyra, Siemens Healthineers, Germany) by means of a shielded B_0 insert coil (Resonance Research Inc., USA). This allows for evaluation of the new compounds in future MRI experiments.

Acknowledgement:

This project receives financial support by the European Commission in the frame of the H2020 Programme (FET-open) under grant agreement 665172.

References:

- [1] Lurie DJ, et al., C.R. Physique (2010);11:136-148
- [2] Hogain DO, et al., Phys. Med. Biol. (2011);56:105-115
- [3] Alford JK, et al., Magn. Reson. Med. (2009);61(4):796-802
- [4] Hoelscher UC, et al., Magn. Reson. Mater. Phy. (2012);25:223-231
- [5] Broche LM, et al., Magn. Reson. Med. (2012);68:358-362
- [6] Araya YT, et al., Proc. Intl. Soc. Mag. Reson. Med 23 (2015)
- [7] Lurie DJ, Proc. Intl. Soc. Mag. Reson. Med 7 (1999)
- [8] Ungersma SE, et al., Magn Reson, Med. (2006);55:1362-1371