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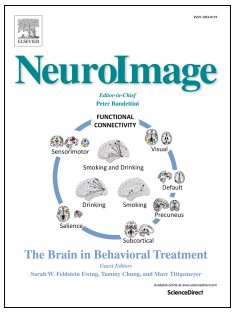

Ultra-high resolution blood volume fMRI and BOLD fMRI in humans at 9.4☐T: Capabilities and challenges

Laurentius Huber, Desmond H.Y. Tse, Christopher J. Wiggins, Kâmil Uludağ, Sriranga Kashyap, David C. Jangraw, Peter A. Bandettini, Benedikt A. Poser, Dimo Ivanov

PII: S1053-8119(18)30532-9

DOI: 10.1016/j.neuroimage.2018.06.025

Reference: YNIMG 15031

To appear in: *NeuroImage*

Received Date: 12 March 2018

Revised Date: 23 May 2018

Accepted Date: 7 June 2018

Please cite this article as: Huber, L., Tse, D.H.Y., Wiggins, C.J., Uludağ, Kâ., Kashyap, S., Jangraw, D.C., Bandettini, P.A., Poser, B.A., Ivanov, D., Ultra-high resolution blood volume fMRI and BOLD fMRI in humans at 9.4☐T: Capabilities and challenges, *NeuroImage* (2018), doi: 10.1016/j.neuroimage.2018.06.025.

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ACCEPTED MANUSCRIPT

Submitted as NeuroImage technical Note

Ultra-high resolution blood volume fMRI and BOLD fMRI in humans at 9.4 T: Capabilities and Challenges

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Running Title: layer-dependent CBV fMRI at 9.4 T

The body of the text contains 7400 words (with additional 2200 words in references)

Highlights:

- CBV-sensitive VASO was implemented at 9.4 T for layer-dependent fMRI in humans
- 9.4 T VASO is challenging due to: blood-inflow, SAR, T_2^*-decay, B_1^+ *and* B_0 constraints
- Alternating pTx shimming and advanced adiabatic pulses can overcome these challenges
- Layer-dependent CBV changes can be reliably detected in human motor cortex at 9.4 T

Abstract

Functional mapping of cerebral blood volume (CBV) changes has the potential to reveal brain activity with high localization specificity at the level of cortical layers and columns. Non-invasive CBV imaging using Vascular Space Occupancy (VASO) at ultra-

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