Submillimeter T2 weighted BOLD fMRI of human visual cortex

Propositions of the thesis

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1. A deeper understanding of the functional organization within cortical areas would be highly desirable resolving the debate about the cortical column as a basic functional processing unit. If ever achievable, this goal will require a joint effort of various neuroimaging modalities, and modeling approaches.
2. Ultra-high field high spatial resolution functional MRI is an essential tool in bridging the gap between brain macro- and microscale topography. Recent examples in the visual domain are ocular dominance, orientation, axis of motion, disparity, and color selectivity.
3. 3D-GRASE has less T_2^* contamination in T_2 weighted fMRI than large field of view 2D SE-EPI (in practical experiments), and hence better functional specificity. However, blurring in partition direction may be critically strong.
4. The variable flip angle approach can reduce the slice blurring in 3D-GRASE at little to no cost in terms of functional sensitivity. It can also be employed to increase the imaging coverage.
5. High resolution T_2 weighted fMRI at 9.4 Tesla of early visual cortex is possible even without the application of subject-specific parallel transmission RF pulses.
6. The retinotopical boundary of primary visual cortex to secondary visual cortex corresponds well to the seizing observation of the Stria Gennari in T_2^* weighted cortical depth profiles.
7. Submillimeter spatial resolution and cortical depth specificity may allow investigation of informational flow between cortical areas. Local mircocircuity must be taken into account carefully in the analysis.
8. The degree to which the methodological knowledge from this thesis can be "valorized" in other applications scales inversely with their "methodical distance" from it, and is theoretically infinite ($\int_{\mathbb{R}^+} 1/x \, \mathrm{d}x = \infty$).
9. The term "raw data" may refer to various stages of the processing chain of fMRI data depending on the scientific interest and background of the communicator.