

BDR SEMINAR (Kobe & online hybrid)

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Thursday, September 4, 2025

13:00-14:00

1F Auditorium, DB Building C, Kobe / Broadcast online via Zoom

Zoom meeting URL will be announced on the event day by e-mail.

※Non-BDR members: Please register from the following link.

<https://krs2.riken.jp/m/bdrseminarregistration> (Registration deadline: Sep 1)

Towards Low-Field, High-Resolution fMRI: Spin-Lock Imaging and Informatics Integration

Summary

Understanding brain function is one of the key challenges in neuroscience. Many researchers around the world have developed techniques to measure brain activity. However, non-invasive brain measurements still face technical limitations. One major issue is the trade-off between spatial and temporal resolution, which depends on the measurement method.

Functional magnetic resonance imaging (fMRI) is widely used to observe brain function. It detects changes in blood flow related to neural activity, but this hemodynamic response is delayed by a few seconds. This delay limits the temporal resolution and makes it difficult to capture fast neural dynamics.

To address this problem, I focus on spin-lock fMRI, a technique that directly detects magnetic fields generated by neural activity. This approach offers a new way to improve temporal resolution by avoiding reliance on blood flow. I will introduce our recent studies on spin-lock fMRI and discuss how we combine this method with informatics to enhance both spatial and temporal resolution.

These technologies are assumed to work with low-field MRI systems, which are smaller and more affordable than conventional high-field MRI. They can be installed in more places and make brain imaging more accessible.

I believe that combining physics-based methods with informatics will open new possibilities in non-invasive brain research and help bring advanced neuroimaging tools to a wider community.