

# SAVE THE DATE: SCIENTIFIC LECTURE SERIES

MOVEMENT DISORDERS & NEUROMODULATION UNIT  
CHARITÉ – UNIVERSITY MEDICINE BERLIN

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Bonhoefferweg 3, Klinik für Neurologie (CCM)

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## Neural States in Deep Brain Local Field Potentials

**ABSTRACT:** The deep brain local field potentials exhibit oscillatory behaviors in different frequency bands and such neural oscillations are simultaneously involved in the neurophysiological and neuropathological functions. The emerging and vanishing synchronized spindles indicate the existence of dynamic neural states composed of multiple neural oscillations within the nucleus. Our recent study reveals distinct thalamic rhythms of theta, alpha, high beta and high gamma oscillations correlating with pain relief. The balancing and coupling measures between these neural oscillations were also significantly correlated with pain relief. A quantitative model has been developed to predict pain relief by integrating these characteristic measures of the neural oscillations. Moreover, an approach to adaptively identify synchronization level was developed to dynamically capture the neural states of multiple neural oscillations. The measures of these dynamic neural states were significantly correlated with pain relief by deep brain stimulation as well. The neural states in deep brain local field potentials provide one way of segregating and integrating neural oscillations for understanding the complicate and dynamic functions of the nucleus and could be useful for developing the state-dependent intelligent deep brain stimulation.