

Department of Materials Science and Engineering
Materials Science Colloquium
WiSe 2023/24

Tuesday, 24.10.2023

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Chair of Aroma and Smell Research
Department of Chemistry and Pharmacy
Friedrich-Alexander University , Erlangen

Advanced Magnetic Nanomaterials at the Frontier of the Wireless Neurotech

Smart nanoscale materials hold potential for less invasive neural prosthetics, enhancing neurostimulation therapies, which is particularly appealing to materials scientists. In biointerfaces lab, we employ wireless technologies driven by novel functional magnetic nanomaterials for neural manipulation. These nanomaterials are heated through hysteresis in high frequency alternating magnetic fields (MFs) or exert piconewton torques under slow MFs. This bimodality along with precise surface chemistry, allows for the selective switching of mechanical and thermal neural responses across the Hz and kHz regimes. This holds great promise for wireless control of deep brain regions and the restoration of excitation-inhibition balance in pathological conditions. Surface engineering techniques further enable ferromagnetic clustering through the reversible binding of neural Ca^{2+} , facilitating rapid activity detection and offering exciting prospects for bidirectional wireless communication with the deep brain (*read-write*). Integration of advanced materials, electronic engineering, and neurobiology is driving compelling biomedical approaches and biomaterials research.

Tuesday, 4 pm
Bernhard-Ilschner-lecture hall (H14)
Martensstr. 5-7, Erlangen



or zoom
meeting-ID: 648 8554 2073
code: 173088