

Physikalisches Kolloquium



Thursday, 27.06.2024, 16:15, HS 100

Reception with coffee & cookies 16:00

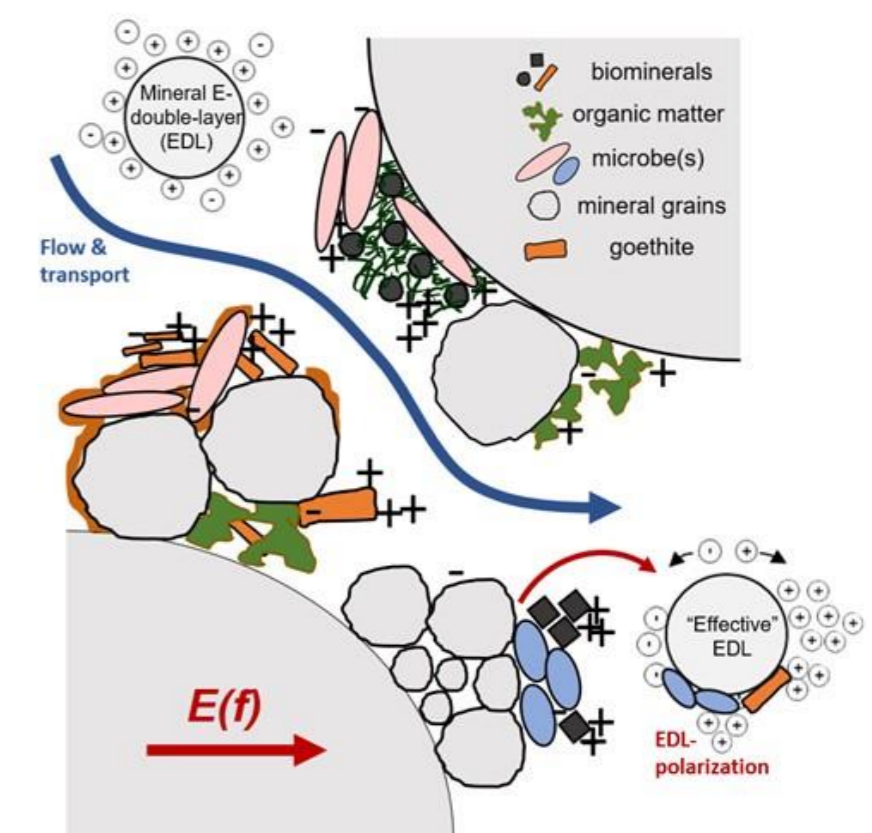
(For university staff: please bring your own cup for sustainability reasons)

Prof. Dr. Adrian Mellage, Institute for Water, Waste, Environment
University of Kassel:

Monitoring (bio)reactive transport in groundwater using geophysics

Abstract

Geophysical methods, in particular, spectral induced polarization SIP, capture the changing electrical properties of geologic media as they are modified by biogeochemical reactions. Their unique sensitivity to biogeochemically-induced changes poises non-invasive geophysical approaches at the forefront of novel methodologies that can revolutionize our ability to access the poorly accessible subsurface. For example, SIP has been shown to detect the polarization of bacterial cells in porous media, and thus provide information on the microbes that modulate the breakdown of harmful contaminants in groundwater, and their dynamics. A reliable 'non-invasive' window into the subsurface can provide key insights into the efficiency of natural attenuation reactions at larger and more refined spatial and temporal scales. This presentation will review the application of SIP to capture groundwater-quality-relevant processes, such as heavy metal removal and microbial dynamics during biodegradation, with a focus on the link between the electrical properties of the subsurface and its physico-chemical makeup. Ultimately, I aim to highlight new avenues for the application of non-invasive tools as methods to quickly monitor a system's reactivity without the need for often unattainable biogeochemical analysis.



All of you interested in physics are cordially invited!