A U S H A N G

FREIE UNIVERSITÄT BERLIN
Fachbereich Mathematik und Informatik

Promotionsbüro, Arnimallee 14, 14195 Berlin

D I S P U T A T I O N

Freitag, 28. Oktober 2022, 14:15 Uhr

Ort: Seminarraum 032
(Fachbereich Mathematik und Informatik, Arnimallee 6, 14195 Berlin)

Disputation über die Doktorarbeit von

Frau Roya Ebrahimi Viand

Thema der Dissertation:
Molecular Dynamics Simulation of Open Systems far from Equilibrium

Thema der Disputation:
Solution to Archie's law puzzle in porous media

Die Arbeit wurde unter der Betreuung von **Prof. Dr. F. Höfling** durchgeführt.

Abstract: Archie's law, proposed around 80 years ago, relates transport and geometry in porous media; specifically, the electrical conductivity σ is proposed to depend on the porosity ϕ as $\sigma \propto (\phi - \phi_c)^{m}$.
Despite being widely used and evaluated in a variety of porous media, details are poorly understood. It is observed that the threshold porosity ϕ_c is practically zero, the exponent m is confined to different ranges, and it is unclear what it depends on. Percolation theory is used to provide a solution and physical explanation to the puzzle associated with this small threshold porosity and the m values that characterize Archie's law. It is shown that this law represents a phase transition phenomenon, and that the predictions from this solution are compatible with various experimental results.

Die Disputation besteht aus dem o. g. Vortrag, danach der Vorstellung der Dissertation einschließlich jeweils anschließenden Aussprachen.

Interessierte werden hiermit herzlich eingeladen

Der Vorsitzende der Promotionskommission
Prof. Dr. F. Höfling