

# A U S H A N G

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## FREIE UNIVERSITÄT BERLIN

Fachbereich Mathematik und Informatik

Promotionsbüro, Arnimallee 14, 14195 Berlin

## D I S P U T A T I O N

**Donnerstag, 15. Februar 2024, 14:30 Uhr**

**Ort: Hörsaal B (0.1.01)**

**(Fachbereich Physik, Arnimallee 14, 14195 Berlin)**

**Disputation über die Doktorarbeit von**

**Dilara Abdel**

**Thema der Dissertation:**

**Modeling and simulation of vacancy-assisted charge transport in innovative semiconductor devices**

**Thema der Disputation:**

**Solving differential equations using physics-informed deep operator networks**

Die Arbeit wurde unter der Betreuung von **PD Dr. P. Farrell** durchgeführt.

Abstract: Differential equations are fundamental in science and engineering and are typically addressed using classical numerical techniques. However, modifying parameters or input functions in classical discretizations requires re-executing simulations, posing computational challenges. Recently, deep operator networks (DeepONets) were introduced as an innovative neural network architecture to address this challenge. However, in their conventional form, DeepONets operate as purely data-driven methods. In response, physics-informed DeepONets were formulated as an alternative, ensuring network predictions align with the underlying physics encoded by the differential equation, even without specific real-world measurements. This talk aims to describe the basic concepts of neural networks, deep operator networks, and the integration of a priori known physical knowledge within a neural network framework.

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  
PD Dr. P. Farrell