

PHYSICS COLLOQUIUM

Speaker: **Jun.-Prof. Salome Flegr**
Didaktik der Physik,
Technische Universität Dresden



Topic: **The role of dynamic and interactive visualizations (simulations) for enhancing instructional physics experiments to foster conceptual understanding** – *Inaugural lecture*

Time and place: Tuesday, December 16, 2025, **2:50 pm** – hybrid event
The colloquium will be held in REC/C213.
Online participation possible:
Zoom-Meeting: Meeting-ID: 631 3817 8900 / passcode: PC-WiSe25
<https://tu-dresden.zoom-x.de/j/63138178900?pwd=TIImGawPz1dtDA6VzO2N1XdqgI7bE6b.1>

Host: Dean of the Faculty of Physics Prof. Gesche Pospiech

Abstract: Conceptual understanding is one of the main goals in physics education. However, given the sometimes complex or intangible nature of physics topics, conceptual understanding is not always easy to achieve. One way of fostering conceptual understanding in learners is to make use of the instructional strategy of inquiry-based learning. This means that learners perform instructional physics experiments to investigate certain relationships and processes by themselves, guided with appropriate scaffolds and cognitively activated by accompanying tasks. To support students' learning from experiments even more, accompanying visualizations can be used to model conceptual aspects and allow learners to access important information for their knowledge construction more easily. Especially dynamic and interactive visualizations (also called "simulations for learning") provide opportunities for self-paced investigation and inquiry within the simulation. When students perform both real experiments and simulated experiments, the different formats support the connection between practice and theory and can help learners to build deeper conceptual understanding of the respective physics topic. In this talk, I will give an overview of the important role that visualizations can play for conceptual understanding in physics and showcase some examples from my previous and current research on this topic, ranging from traditional computer simulations to visualizations with Augmented and Virtual Reality. Topics in my current research focus include optics, electricity, mechanics, astronomy, particle physics, and quantum physics.

Bio:

Salome Flegr completed a B.Sc. in Physics and a Master of Education in physics and mathematics for secondary school teaching. After that, she completed her doctorate at the intersection of physics education research and research on effective learning with digital technologies with summa cum laude. From summer 2022 to summer 2024, she worked as a postdoctoral researcher at the chair of physics education at LMU Munich. Since September 2024, Salome Flegr has been working as a Juniorprofessor (with Tenure-Track) for physics education at TU Dresden. In 2024, she earned the prestigious “Lehrinnovationspreis” at LMU Munich and the “Future Education Award” for her innovative and groundbreaking research on learning with educational technology.