TECHNISCHE UNIVERSITÄT DRESDEN

School of Science Faculty of Physics

PHYSICS COLLOQUIUM

Speaker:

Dr. Christian Kohlfürst
Institute of Theoretical Physics,
Helmholtz-Zentrum Dresden-Rossendorf

Topic:

Quantum physics with high-intensity electromagnetic fields
Introduction for habilitation

Time and place:

Tuesday, January 10, 2023, 4:40 pm – hybrid event
The colloquium will be held in REC/C213.
Online participation possible:
Zoom-Meeting: Meeting-ID: 631 3817 8900 / passcode: PK-WiSe22
https://tu-dresden.zoom.us/j/63138178900?pwd=RVVZM3N4azdmNmVJQ2RWUTZ0TkhXdz09

Host:

Prof. Ralf Schützhold

Abstract:

In this colloquium we will introduce the audience to Strong-Field Physics and the novel features of quantum physics in high-intensity background fields. This includes a broad overview over the research areas where strong background fields play a crucial role in explaining observed phenomena, e.g., in astro-, nuclear and particle physics.
As an example of my personal research work, we will explore the unique possibilities ultrahigh-intensity lasers provide in terms of accessing, probing as well as shaping physics on a nuclear or even sub-nuclear level. As such, the concept of dynamically assisted quantum tunneling is introduced. We show how a perfectly timed electric pulse can directly modify particle dynamics even in the quantum regime. Thus, high-intensity fields provide the opportunity to enhance, for example, the cross section in nuclear fusion.
At last, we will shortly discuss further novel aspects of high-intensity fields, e.g., the possibility of light-by-light scattering and how to convert or transmute energy into massive particles.

Bio:

Master's degree at University of Graz (2012) / Promotion at University of Graz, Supervisor: Prof. Dr. R. Alkofer (2015) / PostDoc at University of Jena (2015-2016) / Helmholtz Fellow at Helmholtz Institute Jena (2016-2019) / Research Scientist at Helmholtz-Zentrum Dresden-Rossendorf (since 2019) / Further Research stays at TPI Jena (2013), University Plymouth (2014), IPFN Lisbon (2019) and Chalmers University Gothenburg (2019) / Grants: Helmholtz Postdoc Grant (2016) and Victor Franz Hess Award (2017).