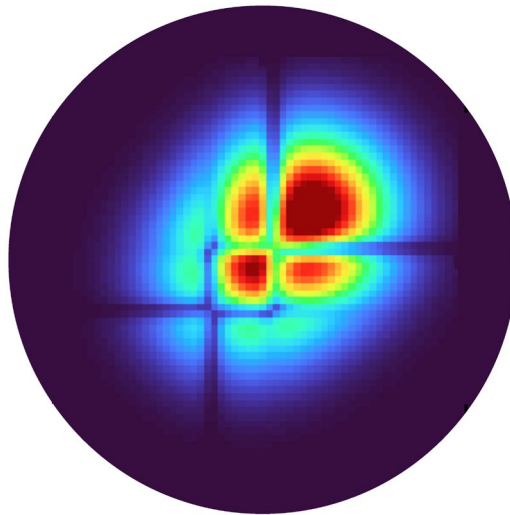




# PHYSIKALISCHES KOLLOQUIUM

AM 26. JANUAR 2026 UM 16 UHR C.T.  
IM GROßEN HÖRSAAL



## QUANTUM COHERENCE ACROSS SCALES: FROM ATTOSECOND PHOTOIONIZATION TO MANY-BODY INTERFERENCE

CHRISTOPH DITTEL

*UNIVERSITÄT FREIBURG*

Interference and coherence of quantum objects are fundamental principles of modern physics: they reveal how wave-like interference patterns modulate the statistics of particle-like detection events, a defining feature that distinguishes the quantum from the classical realm. In this talk, I will present a perspective on quantum interference across two seemingly different frontiers — many-particle systems and ultrafast electron dynamics — and show how they are connected by the same underlying questions.

In the many-body domain, I explore how indistinguishability, interactions, and symmetries shape interference, from two-particle tunneling to collective interference phenomena governed by entanglement, and decoherence. In the ultrafast regime, I investigate how attosecond photoionization provides a window into coherence at the timescale of electron motion, offering perspectives for quantum state tomography of photoelectrons, time-resolved probing of correlations, and even tests of the postulates of quantum mechanics.

Together, these studies show how interference is both fragile and robust: it can be suppressed by distinguishability and which-path information, yet it also provides a powerful resource to probe dynamics, correlations, and the very foundations of quantum theory.

AKTUELLE INFORMATIONEN FINDEN SIE HIER: [WWW.PHYSIK.UNI-FREIBURG.DE](http://WWW.PHYSIK.UNI-FREIBURG.DE)

**universität freiburg**