

## Photonics

**Topology in space, time, and space-time****Alexander Szameit**Professor, Chair for Experimental Solid-State Optics  
University of Rostock**Monday, February 3, 2025****2:00 – 3:30 pm****EEB 248**

**Abstract:** In recent years, topological phenomena in photonic systems have attracted much attention, with their striking features arising from robust states in the energy gaps of spatially periodic media. However, light waves are entities that extend in space as well as time, such that one may ask whether topological effects can also occur in the temporal domain, or even space-time. Intuitively, systems that are periodic in time may be gapped in momentum, leading to topological states localized at time interfaces. However, time - in contrast to space - exhibits a unique unidirectionality often referred to as the “arrow of time”. Inspired by these features, I will present our most recent experiments on topological states residing at temporal interfaces. Moreover, I will discuss the formation of spacetime-topological events and demonstrate unique features such as their limited collapse under disorder and causality-suppressed coupling.



**Bio:** Alexander Szameit (\*1979 in Halle, Germany) studied Physics at the Universities of Halle and Jena, Germany. He obtained his Diploma and PhD in 2004 and 2007, respectively. After spending time in Australia and Israel, he returned to Jena as an Assistant Professor in 2011. After receiving his habilitation in 2015, he was appointed as Full Professor at the University of Rostock in 2016, where he holds the chair for Experimental Solid-State Optics. His work deals with all aspects of complex light evolution in large-scale integrated photonic waveguide circuits, with a particular focus on topological photonics.

**Hosted by:**

Mercedeh Khajavikhan and Demetri Christodoulides