

Friday January 28th 2021- 15h 00

Amphitheater of C2N

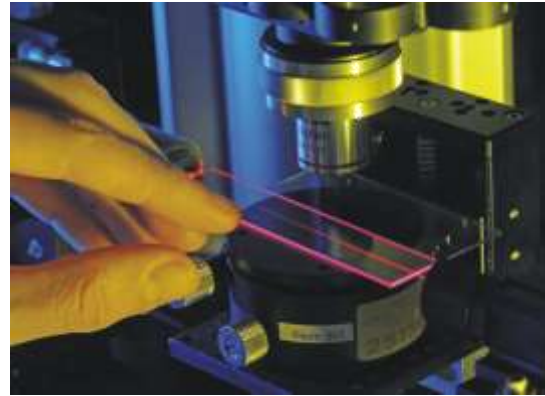
” Topological Photonics”

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Link:

In the context of photonics, topology has emerged as an abstract, yet surprisingly powerful, new paradigm for controlling the flow of light. As such, it holds great promise for a wide range of advanced applications, from scatter-free routing and switching of light along arbitrary three-dimensional trajectories to long-distance transmission of slow-light waves. Whereas topological effects in condensed matter originate typically from the fermionic Kramer’s degeneracy or the quantum Hall effect in the presence of strong magnetic fields, these mechanisms cannot be readily adapted due to the bosonic nature of photons and the notoriously weak magnetic interactions at optical frequencies. Recently, a number of approaches for the realization of photonic topological transport have been put forward. Among these, perhaps the most promising one follows the spirit of Floquet topological insulators, in which temporal variations of solid-state systems induce topological edge states. In the context of photonics, temporal modulations serve to break the time-reversal symmetry and thereby give rise to topologically protected one-way edge states.



In my talk, I will present an introduction to topology in photonics, with a particular focus on our work on the implementation of photonic Floquet topological insulators. The purpose is to review these and other recent developments, to discuss potential applications and to stimulate new conceptual ideas.



Alexander Szameit was born in 1979 in Halle (Saale), Germany, and received his Physics Diploma, PhD, and his habilitation at the Friedrich-Schiller-Universität Jena (Germany) in 2004, 2007, and 2015, respectively. He was a visiting intern astronomer at the Institute for Astronomy in Hilo, HI in 2002 and a visiting fellow at the Nonlinear Physics Centre at the Australian National University in 2007. He spent from 2009-2011 as PostDoc at the Technion in Haifa (Israel) and returned in 2011 as Assistant Professor to Jena. Since 2016, he is full professor for experimental solid-state optics at the University of Rostock.

Alex Szameit’s research includes various aspects of modern optics, such as linear and nonlinear waves in periodic media, micro and nano-photonics, the integration of complex optical circuits and chip-based photonic quantum computing. He published more than 200 peer-reviewed papers in internationally recognized scientific journals, including Nature, Nature Photonics, Nature Materials, Nature Physics, Nature Communications and Physical Review Letters, and gave more than 150 invited presentations and colloquia. His current h-index is 54 with more than 9000 citations in total.

