Physikalisches Kolloquium — Physics Colloquium

Einladung — **Invitation**

Monday, 13 May 2024

BE AWARE - ROOM CHANGE - Lecture Hall O25/H2, at 16:15
Coffee and cookies will be served in front of the lecture hall from 16:00

Structured Light and the Twisted Talbot Effect

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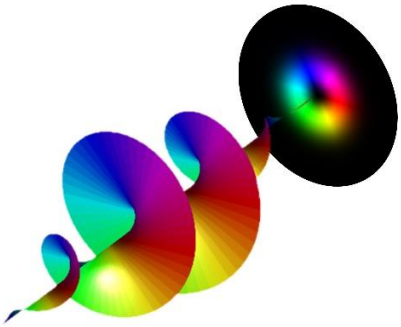
Structured light, i.e. light fields with a non-trivial shape in time, space, and polarization, has become a versatile approach to explore fundamental optics effects and develop novel applications.
In this colloquium, I will first introduce the field of structured light and give a brief overview of the different applications in classical and quantum optics. Here, the main focus will be on complex structures in the light's transverse spatial extend, such as the popular donut-shaped Laguerre-Gaussian modes of light. The latter is also known as twisted light due to its azimuthally varying phase front, which enables the light to have orbital angular momentum, and is a popular laboratory realization for high-dimensional quantum states.
Following this introduction, I will present our recent studies on utilizing twisted light inside ring-core fibers to observe the fundamental optics effect known as the Talbot effect, which describes a self-imaging phenomenon of periodic waves. In this scenario, the self-imaging is observed in the angular domain leading to powerful implementations of higher-order beams splitters. Interestingly, such splitting operations becomes more compact the higher the splitting ratio, which is a promising feature when utilized e.g. as a signal multiplexer. Finally, I link the angular Talbot effect to its Fourier-analog in orbital angular momentum space and describe how combining both can be used to vastly increase the control over structured light fields.



Host: Prof. Benjamin Stickler, Institute of Complexe Quantum Systems

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