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Three-Dimensional μ-Printing: An Enabling Technology

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Abstract

During the last years direct laser writing via two-photon absorption has reached a level of maturity and ease of application that it can be considered as 3D printing on the micron scale. This technology is still developing towards higher resolution and increasing speed of fabrication. Among the recent technological achievements are the fields of super-resolution lithography and spatial-light-modulator based lithography, enabling novel fields like transport in aperiodic photonic structures and optical quantum simulators.

In my presentation I will give an overview over our recent progress regarding spatial-light-modulator based direct laser writing and will discuss transport phenomena arising in aperiodic deterministic photonic structures as well as in photonic topological insulators. In aperiodic deterministic structures we observe lateral Anderson localization of light, depending on the type and strength of disorder introduced [1]. In photonic topological insulators, we especially study the influence of time-dependent defects in topologically protected edge modes [2]. Here, we observe scattering into the bulk modes depending on the driving frequency of the defect.

A similar kind of wave-based transport can be studied in spin-wave systems. Here, I will discuss transport in optically reprogrammable magnetic periodic structures, a novel lithography-free approach of micro-structuring for magnetic materials [3].

[1] Spatial correlations and optical properties in three-dimensional deterministic aperiodic structures, M. Renner and G. von Freymann, Scientific Reports **5**, 13129 (2015)

[2] Dynamic defects in photonic Floquet topological insulators, C. Jörg, F. Letscher, M. Fleischhauer, and G. von Freymann, New Journal of Physics **19**, 083003 (2017)

[3] Optically-Reconfigurable Magnetic Materials, M. Vogel, A. V. Chumak, E. H. Waller, T. Langner, V. I. Vasyuchka, B. Hillebrands, and G. von Freymann, Nature Physics **11**, 487 (2015)

ההרצאה תתקיים ביום רביעי, ה- 11.4.18, בשעה 12:30
באודיטוריום המכון למצב מוצק, קומת כניסה

The lecture will take place on Wednesday, 11.4.18 at 12:30
at the Solid State Institute auditorium, entrance floor

Host: Distinguished Professor Moti Segev