Carl von Ossietzky
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Institut für Physik

Physical Colloquium

„Localisation of light in photonic lattices induced by drive and dissipation“

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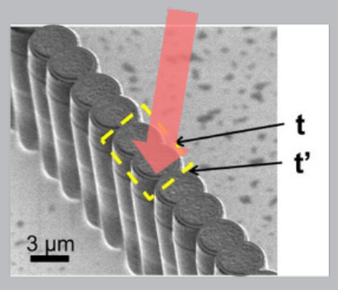
Room No. W02 1-148

The engineering of localised modes in photonic structures is one of the main targets of modern photonics. An efficient strategy to design these modes is to use the interplay of constructive and destructive interference in periodic photonic lattices. This mechanism is at the origin of defect modes in photonic bandgaps, bound states in the continuum and compact localised states in flat bands. In this presentation we show that in lattices of lossy resonators made of coupled semiconductor micropillars, the addition of external optical drives with controlled phase enlarges the possibilities of manipulating interference effects and allows designing novel types of localised photonic responses [1]. We show that light can be localised down to a single site of a photonic lattice in a fully reconfigurable manner. Nonlinear effects allow enhancing the localization effects and inducing in-gap topological states [2,3].



References

[1] O. Jamadi et al., Reconfigurable Photon Localization by Coherent Drive and Dissipation in Photonic Lattices, Optica 9, 706 (2022).
[2] N. Pernet et al., Gap Solitons in a One-Dimensional Driven-Dissipative Topological Lattice, Nat. Phys. 18, 678 (2022).
[3] A. Muñoz de las Heras, A. Amo, and A. González-Tudela, Nonlinearity-enabled localization in driven-dissipative photonic lattices, Phys. Rev. A 109, 063523 (2024).

Host: Dr. Martin Esmann