Fachgruppe Physik und Astronomie Universität Bonn

Physikalisches Kolloquium
Fachgruppe Physik/Astronomie der Universität Bonn

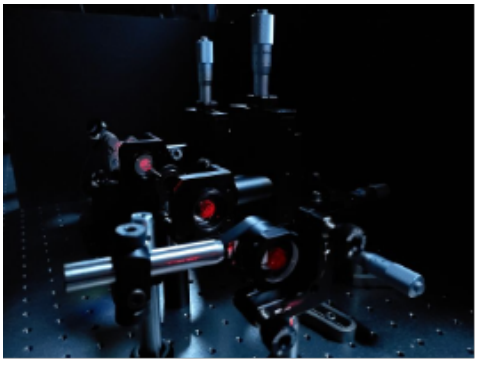
UNIVERSITÄT BONN

Friday, 17.01.2025, 1:15 p.m.
in Lecture Hall I of the Physics Institute

Stefan Rotter
TU Wien

„Coherent perfect absorption, transmission and emission of light“

In my talk I will present three recent works focused on the perfect absorption, transmission and emission of radiation by interferometric wave engineering. In the first case, we demonstrate that even a weakly absorbing film can be turned into a “coherent perfect absorber” by building a degenerate cavity around it [1]. This special cavity perfectly couples incoming light fields with arbitrary wavefronts into the absorber – even for the case that light is a dynamically varying speckle pattern. In the second case, we demonstrate how to construct an anti-reflection structure for a complex scattering system like a disordered medium. Similar to an anti-reflection coating for conventional eye-glasses, this structure leads to perfect transmission across a strongly scattering system by perfectly suppressing any back-scattering. As it turns out, these effects have a topological origin, which can be used to engineer topologically protected thermal radiation [3].



[1] Y. Slobodkin, G. Weinberg, H. Hörner, K. Pichler, S. Rotter, and O. Katz, Science 377, 995 (2022)
[2] M. Horodynski, M. Kühmayer, C. Ferise, S. Rotter, and M. Davy, Nature 607, 281 (2022)
[3] M. S. Ergoktas, A. Kecebas, K. Despotelis, S. Soleymani, G. Bakan, A. Kocabas, A. Principi, S. Rotter, S. K. Özdemir, and C. Kocabas, Science 384, 1122 (2024)

Everybody is welcome, especially students of all semester

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