RUHR-UNIVERSITÄT BOCHUM
FAKULTÄT FÜR PHYSIK UND ASTRONOMIE

RUB

PHYSIKALISCHES KOLLOQUIUM

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Montag, 11.07.2022, 12 Uhr c.t. im HNB und
hybrid als Zoom meeting (Meeting-ID: 632 5520 9938, Passwort: 526977)

High average power ultrafast lasers from the THz to the XUV: a solution looking for a problem?

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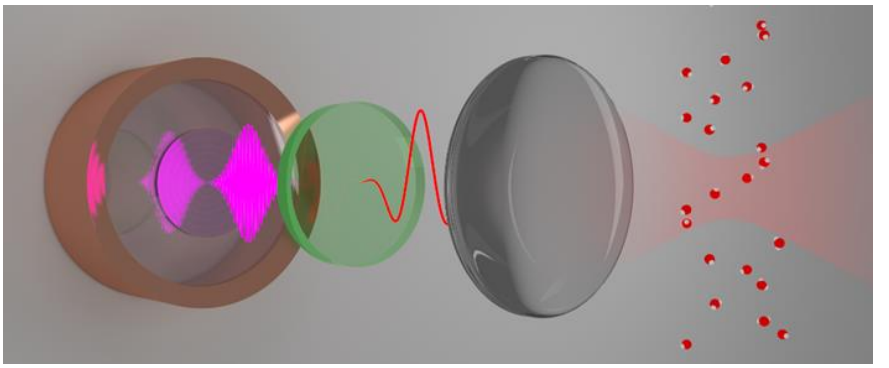

Ultrafast lasers (lasers generating pulses with durations in the femtosecond range) have been at the forefront of many breakthroughs in physics, chemistry, biology as well as mechanical and electrical engineering - including several Nobel Prizes - since their invention in the 1990s. They have progressed from specialized laboratory tools to commercial equipment extensively used in both laboratories and industry. In this progress line, those who were at the forefront of laser technology could access unique regimes of light-matter interaction, make scientific breakthroughs and push science forward. Among the many areas where ultrafast lasers are the main workhorse, ultrafast spectroscopy is one of the most prominent ones. Techniques such as pump-probe spectroscopy have become ubiquitous to study dynamics of atomic and molecular systems from the attosecond to the picosecond regime, with light pulses spanning the entire electromagnetic spectrum (XUV to THz). Nowadays, ultrafast spectroscopy continues to expand, supported by immense progress of ultrafast laser technology.

Nevertheless, often ultrafast technology and ultrafast science remain disconnected from each other – the developers seeking applications for their unique systems, and the experimentalists settling with available performance in the market. In this context, high-power ultrafast laser technology has seen extremely fast-paced progress in the last decades, but their potential in many cases still remain to be demonstrated. Nowadays, laser systems delivering hundreds of watts to kilowatts of average power with pulse energies ranging from microjoules to hundreds of millijoules become increasingly available, based on fiber, slabs and disk laser geometries. In this talk, we will discuss this fast-paced progress, the technologies that enabled it, areas where these sources have already provided breakthroughs, and some potential future opportunities in scientific research. We will discuss in more detail the example of table-top sources of few-cycle THz radiation with extremely high average power – reaching a performance level which was so far restricted to accelerator facilities.

Einführung: Prof. Dr. Ilya Eremin
Vor dem Vortrag werden Kaffee und Kekse angeboten.

Die Fakultät lädt alle Interessierten herzlich ein.