



Graz Advanced School of Science
PHYSICS COLLOQUIUM OF THE UNIVERSITY OF GRAZ AND
THE GRAZ UNIVERSITY OF TECHNOLOGY

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Quantum choreography to the beat of light

Lightwave electronics has pushed the control of condensed matter to unprecedented time scales. By harnessing the carrier wave of intense light as an alternating voltage, electrons can be driven faster than a cycle of light, opening a fascinating quantum world full of promise for future quantum technologies.

We will discuss prominent examples of lightwave-driven dynamics in solids, ranging from Bloch oscillations and lightwave valleytronics via all-optical band structure reconstruction to topologically non-trivial trajectories of quasi-relativistic electrons. Moreover, we combine lightwave electronics with low-temperature scanning tunneling microscopy to take atom-scale slow-motion movies of an individual vibrating molecule and exert femtosecond atomic forces that choreograph a non-classical quantum motion of a single molecule. This concept offers a radically new direct way of watching and controlling key elementary dynamics in nature or steer chemical reactions, on their intrinsic spatio-temporal scales.

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Date:

Location:

Online: <https://uni-regensburg.zoom.us/j/66829865869>

Host: Peter Puschnig

For a regularly updated colloquium program see: <https://www.if.tugraz.at/colloquium.html>