

# Eugene Wigner Colloquium

*event of SFB 910*

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## Sandro Wimberger

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# Coherent control by driving and compensation

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The Colloquium will take place in a hybrid format. For information on how to access the event, please contact: [henning.reinken@itp.tu-berlin.de](mailto:henning.reinken@itp.tu-berlin.de)

**Thursday, 02.06.22 · 16:15h Zoom/EW202**

Technische Universität Berlin · Institut für Theoretische Physik · Hardenbergstraße 36 · 10623 Berlin

[www.itp.tu-berlin.de/sfb910](http://www.itp.tu-berlin.de/sfb910)

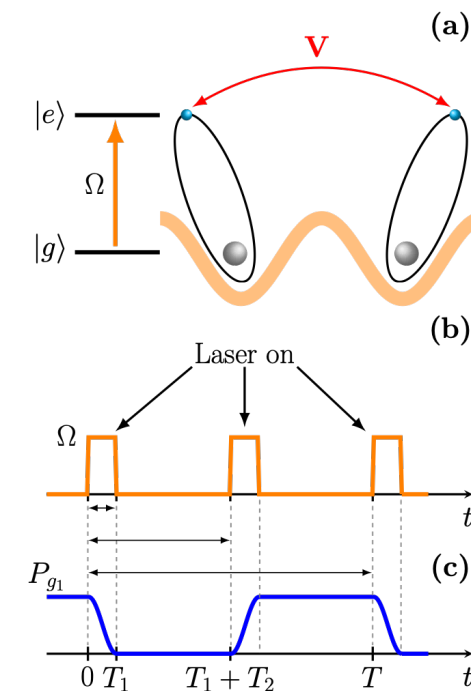
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## Coherent control by driving and compensation

We present several ways to counteract decoherence in few-body quantum systems. One way would be to accelerate the evolution toward the target state in order that decoherence has no time to destroy the system. We designed a way to use counterdiabatic driving with suitably tailored fast oscillations in the intrinsic parameters of the original Hamiltonian only [1]. Another way is to compensate systematic errors of a qubit, and we propose a specific compensation based on qubit-qubit interaction as naturally realized e.g. in Rydberg atoms [2]. Our driving protocols can also be applied to create novel coupling terms initially not present in the system at hand [3]. All these methods enhance the controllability of quantum systems to make them more suitable for applications e.g. as building blocks of a more complex quantum computer.



- (1) F. Petiziol, B. Dive, F. Mintert, S. Wimberger, *Phys. Rev. A* **98**, 043436 (2018).
- (2) M. Delvecchio, F. Petiziol, E. Arimondo, S. Wimberger, *Phys. Rev. A* **105**, 042431 (2022).
- (3) F. Petiziol, M. Sameti, S. Carretta, S. Wimberger, F. Mintert, *Phys. Rev. Lett.* **126**, 250504 (2021).