



**03.07.2018 / 10 Uhr c.t., Raum MG 272  
Campus Duisburg**

## **A (superradiant) terahertz-view on low energy excitations in matter**

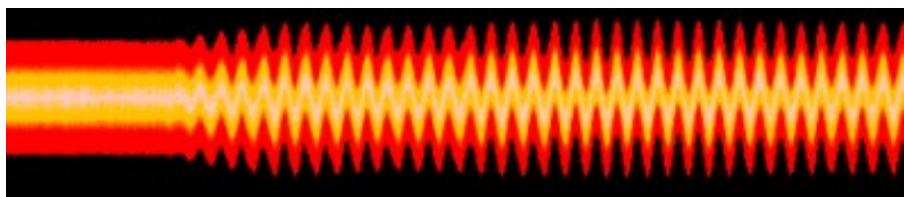
**Dr. Michael Gensch**

**Helmholtz-Zentrum Dresden-Rossendorf, 01328 Dresden**

Recent progress in accelerator technology has made strong, tunable CEP stable, multicycle terahertz pulses available with repetition rates that can be matched optimally to the requirements of individual experiments. The low quantum energies and narrow-bandwidth of the pulses from these superradiant sources allows to selectively target specific low energy degrees of freedom in matter in its electronic groundstate. The evolving transient states can be monitored on femto- to nanosecond timescales by ultra-fast laser spectroscopies, whereby the optionally available high repetition rates in the 100 kHz to MHz regime will enable to investigate THz driven phase transitions or chemical reactions by novel duty-cycle hungry probe techniques such as time-resolved nearfield microscopy or time-resolved ARPES in the medium term future. Opportunities and challenges are discussed based on example experiments ranging from selective control of magnetic order [1] to THz control of molecular orientation in aqueous solutions and water. Future directions in the emerging field of THz driven ultra-fast science are discussed with a particular emphasis on arising possibilities at the THz user facility TELBE [2].

[1] S. Kovalev et al, Journ. Phys. D 51, 11407 (2018).

[2] B. Green et al, Sci. Rep. 6, 22256 (2016).



Artistic view on a THz driven spin excitation in NiO measured by transient Faraday rotation after resonant excitation of the antiferromagnetic mode by a 1 THz pulse from the TELBE undulator source.

**Für diese Zeit steht eine Kinderbetreuung nach vorheriger Anmeldung zur Verfügung.**

Contact: Dr. Manuel Ligges, Faculty of Physics  
Phone: +49 (203) 379-4547 / Mail: manuel.ligges@uni-due.de