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# HoMMage

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*Offen im Denken*

**Hysteresis Design of Magnetic Materials for Efficient Energy Conversion**

**Tuesday, 23 May 2023, 9:00 s.t., UDE, in person and via Zoom**



**Prof. Dr. Manfred Fiebig**  
Department of Materials,  
ETH Zürich

## Seeing is believing: Nonlinear optics on ferroic materials

### Abstract:

Presently, a large variety of ferroic, that is, spontaneous and switchable types of long-range order is discussed. All of these all have one property in common: The ferroic ordering breaks the symmetry of the host material. Nonlinear optical processes are very sensitive to these symmetry changes. Even its simplest representative, doubling of the frequency of the light or "second harmonic generation" (SHG), therefore couples to the ferroic order parameter and accesses important features of the ferroic state that are often inaccessible to non-optical techniques. In my talk I will give an overview of the most important milestones in the classification of (multi-)ferroic materials by nonlinear optics. I will discuss basic questions such as the search for yet unknown types of ferroic order as well as application-relevant issues such as the use of SHG for tracking the emergence of ferroic order in thin films. A not-too-serious concept for "magnetoelectric teleportation" will conclude the lecture.

### About the speaker:

Manfred Fiebig received his doctorate from the University of Dortmund, Germany, in 1996. From 1997 to 1999, he was a Research Fellow at the University of Tokyo, Japan. He then headed a Junior Research Group at the University of Dortmund until his habilitation in 2001. From 2002 to 2006, he worked as a Heisenberg Fellow at the Max Born Institute in Berlin. In 2006, he was appointed Professor of Experimental Solid-State Physics at the University of Bonn, Germany; a position he held until 2011. Since 2011, Manfred Fiebig has been Professor for Multifunctional Ferroic Materials in the Department of Materials at ETH Zurich where he heads a group of people from, presently, 12 nations. His honors include election an ERC Advanced Investigator Grant, APS Fellowship and membership in the Academy of Sciences and Literature, Mainz. Most recently, Manfred Fiebig was honored with the APS Frank Isakson Prize and the Stern-Gerlach Medal of the German Physical Society, their highest distinction in Experimental Physics.

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