



TECHNISCHE UNIVERSITÄT  
CHEMNITZ

# Institut für Physik Physikalisches Kolloquium



**Mittwoch, 30.11.2016, um 16:00 Uhr**

**Ort: Reichenhainer Str. 90;  
Zentrales Hörsaal- und Seminargebäude,  
Raum 2/N013**

**Prof. Dr. Olav Hellwig**

Technische Universität Chemnitz  
Institut für Physik

## Functional Magnetic Materials inspired by Hard Disk Drive R&D

After working for almost 15 years on magnetic material optimization in the Hard Disk Drive (HDD) industry in Silicon Valley at companies such as IBM, Hitachi and Western Digital, I would like to apply my knowledge and experience now in an academic environment on a broader scope of more general "Functional Magnetic Materials". In my talk I will take you on a journey through the past 17 years of HDD technology development as I have experienced it during my industrial Research and Development (R&D) time. I will point out past and current challenges for the industry as well as opportunities for academic research to impact and contribute to future developments for applications in an environment, where intrinsic fundamental industrial research activities fade more and more away as larger and larger corporations continuously optimize their profit margins.

HDD related research, such as for the optimization of Giant Magneto Resistance (GMR) and Tunneling Magneto Resistance (TMR) sensors [1], AF-coupled longitudinal recording media [2], perpendicular recording media (PMR) [3-5], bit patterned recording (BPR) [3-6] and heat assisted magnetic recording (HAMR) [3-5,7] not only pioneers new magnetic nanoscale physics, but also addresses many challenges that are key to other areas of science and technology as well. The industrial technology development also creates in parallel a high demand for more sophisticated and advanced characterization techniques in order to explore and understand the ever increasing complexity of magnetic nano-devices. This demand has fueled the evolution of a variety of synchrotron and free electron laser-based characterization techniques that provide besides the unique element specificity of synchrotron radiation also high spatial [8] and temporal resolution [9] as devices get smaller and smaller and have to operate on shorter and shorter time scales to improve performance, i.e. capacity and speed.

In my talk I will provide an overview over HDD related magnetic materials systems and corresponding advanced characterization techniques and motivate how such structures and techniques may be used to provide a good basis for future functional magnetic materials research and development on a broader scope [10-12].

### References

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[6] Thomas R. Albrecht, IEEE Trans. Magn. **51** (2015) 0800342.  
[7] B. C. Stipe et al., Nature Photonics **4**, (2010) 484 – 488.  
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**Alle Zuhörer sind ab 15:45 zu Kaffee und Tee vor dem Hörsaal eingeladen.**

**Informationen zum Vortrag erteilt:**

**Prof. Dr. Thomas Seyller, Tel. 0371 531-32898**

