

## Award Achievements

### The 2<sup>nd</sup> Heinrich Rohrer Medal –Rising Medal–

Dr. Sascha Schäfer

**"For his outstanding contributions to the development and application of ultrafast electron microscopy and diffraction".**

Dr. Schäfer has made widely recognized contributions to the development and application of ultrafast transmission electron microscopy (Ultrafast TEM) and diffraction based on highly coherent electron sources. In ultrafast TEM, the transient state of an optically excited sample is imaged by ultrashort electron pulses. This approach combines the femtosecond temporal resolution of ultrafast pump-probe techniques with the nanometer spatial resolution of electron microscopy. The use of nanoscale electron sources in time-resolved electron microscopy can be considered a breakthrough in this field.

His work has now made it possible to conduct electron diffraction experiments with a few nanometer spatial and 200-fs temporal resolution. Although the full implications of this work in the dynamical study of structure and magnetization would continue to evolve in the near future, the Ultrafast TEM even at the first stage has already opened up completely new possibilities in terms of manipulating electron beams in a quantum coherent manner. These works have created a new link between quantum optics and electron microscopy, and they are expected to lead to electron microscopy with attosecond precision in the future. By his intense involvement in the conceptual and experimental realization of the Ultrafast TEM, Schäfer has played a key role in making these works possible. He also made a major contribution to the first ultrafast low-energy electron diffraction (ULEED) experiment, which has enabled the study of the dynamics of a polymer monolayer on top of freestanding graphene.

Demonstrating his broad scientific scope, Schäfer has recently directed a study on the creation of a completely new and unexpected type of magnetic texture composed of a network of topological defects in a ferromagnetic thin film.

