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Hysteresis Design of Magnetic Materials for Efficient Energy Conversion

Tuesday, 17 Nov. 2020, 9:00 s.t., TU Darmstadt, Zoom

Prof. Dr. Kanta Ono

Institute of Materials Structure Science,

High Energy Accelerator Research Organization (KEK), Japan

Machine-learning-based automated materials characterization of magnetic materials

Future research and development in magnetic materials require to focus on the following four essential research areas:

1. Automation of research and development or automated scientific discovery
2. Autonomous robotic technology for research and development
3. AI or machine learning technology for magnetic materials research
4. Data collection, integration, and infrastructure for public access

In this talk, we will discuss a methodology to maximize the information obtained per time and cost in the characterization of magnetic materials [1-4]. While high-throughput measurements are becoming more common, most of the measurement data analysis is done manually by skilled experts, which is a bottleneck in research and development efficiency. In addition to freeing researchers from simple tasks to devote themselves to research activities, the measurement and analysis will be commoditized so that anyone can perform the measurement and analysis tasks that were previously performed only by skilled experts.

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2) K. Saito, M. Yano, H. Hino, T. Shoji, A. Asahara, H. Morita, C. Mitsumata, J. Kohlbrecher and K. Ono, “Accelerating small-angle scattering experiments on anisotropic samples using kernel density estimation”, Sci. Rep. 9, 1526 (2019)

3) Y. Suzuki, H. Hino, M. Kotsugi and K. Ono, “Automated estimation of materials parameter from X-ray absorption and electron energy-loss spectra with similarity measures”, npj Computational Materials 5, 39 (2019).

4) Y. Ozaki, Y. Suzuki, T. Hawai, K. Saito, M. Onishi and K. Ono, “Automated crystal structure analysis based on blackbox optimisation”, npj Computational Materials 6, 75 (2020).

Zoom information
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