



Press Release

27 October 2025

Liuliu Han receives DGM Prize for Young Talent

Materials scientist awarded for advancing sustainable magnets

In a nutshell:

- **Award:** Dr. Liuliu Han receives the DGM Prize for Young Talent from the German Society for Materials Science.
- **Research focus:** Development of sustainable, rare-earth-free magnetic materials based on high-entropy alloys (HEAs).
- **Impact:** Contributes to greener, more efficient technologies such as electric motors and sustainable magnet production.
- **Scientific breakthrough:** Successfully decouples mechanical and magnetic hardening mechanisms, achieving both strength and magnetic softness.
- **Methods used:** Combines atom probe tomography, transmission electron microscopy, and advanced alloy design techniques.

The German Society for Materials Science (DGM) has awarded Dr. Liuliu Han with the DGM Prize for Young Talent on 22 October 2025. Being a project group leader at the Max Planck Institute for Sustainable Materials (MPI-SusMat), Han is recognised for his outstanding research on developing advanced multifunctional alloys – a crucial step towards more sustainable technologies such as electric motors. The award honours his impressive career trajectory since completing his PhD.

“I’m happy and honoured to receive the DGM Prize for my research. My special thanks goes to both Professor Oliver Gutfleisch, professor at Technical University of Darmstadt and external group leader at MPI-SusMat, and Professor Dierk Raabe, director at MPI-SusMat who supervised and motivated me to keep pushing the limits of magnetic materials and harvest the potential of high-entropy alloys”, says Han. High-entropy alloys (HEAs) are in the focus of his work. Unlike conventional alloys, which typically rely on one or two main elements, HEAs combine five or more elements in nearly equal proportions. This unusual composition makes it possible to unite very different material properties in a single material. Han has used this approach to design magnets that are mechanically robust yet magnetically soft – decoupling mechanical and magnetic hardening mechanisms in a way not possible with traditional alloys. The next target is to design advanced magnets without relying on rare-earth free elements, making them more sustainable and cheaper than conventional magnets.

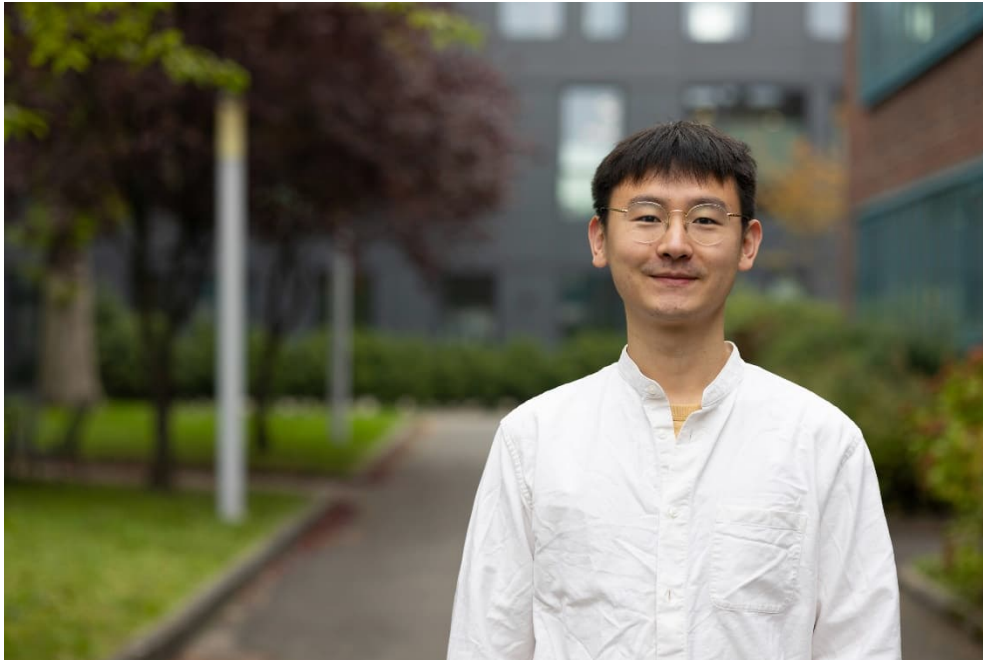
“Liuliu started here with his PhD thesis and I encouraged him to stay on as a postdoc and later as a project group leader. Within just a few years, he has published and collaborated in publishing high-ranking scientific papers. This award is well deserved”, says Raabe. Han’s research combines a broad set of processing and characterization techniques including atom probe tomography and transmission electron microscopy to uncover the link between microstructure and magnetic behaviour.

After completing his Master’s degree in Materials Science and Engineering at Central South University in China in 2019, Liuliu Han joined MPI-SusMat (formerly the Max-Planck-Institut für Eisenforschung) for his doctoral studies on multicomponent alloys



for soft magnetic applications. He completed his PhD with distinction and was subsequently appointed project group leader.

The DGM is one of Europe's largest technical and scientific societies in the field of materials science and engineering. The DGM Prize for Young Talent promotes doctoral researchers and early-career scientists who have already made outstanding contributions to the field.



The German Research Foundation (DGM) awarded Dr. Liuliu Han with the DGM Prize for Young Scientists. Han is project group leader at the Max Planck Institute for Sustainable Materials and focusses on developing rare-earth free magnets. Copyright: Max-Planck-Institut für Nachhaltige Materialien GmbH

At the Max Planck Institute for Sustainable Materials (MPI-SusMat), we develop new ways to design, produce, and recycle materials for a climate-neutral future. From green steel and circular aluminium to advanced batteries, our research tackles key challenges in energy, mobility, and resource efficiency. By combining cutting-edge materials science with artificial intelligence, we drive sustainable innovation. Until 2024, the institute was known as the Max-Planck-Institut für Eisenforschung GmbH.

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