

## Press Release

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# StahlDigital: MPIE coordinates project on digital strategies for steel materials

German Federal Ministry of Education and Research supports digitization of materials research with 26 million euros

The German Federal Ministry of Education and Research (BMBF) is launching the MaterialDigital initiative to advance the digitization of materials research in Germany. 13 funded collaborative projects from the first funding round are now starting their work. Federal Research Minister Anja Karliczek explains:

“We need strong materials research in Germany as a driver of innovation that benefits from digitization. After all, the basis of any technological innovation is often the presence of a suitable material - be it metal, plastic, glass, ceramic or concrete. Materials of all kinds form the basis for a wide range of key technologies - whether, for example, battery materials for future electromobility, high-performance metals for 3D-printed machine parts or fiber-reinforced plastics for wind turbines. Materials are becoming increasingly complex and undergo many development steps on their way to the final result. With digital methods, we can make this development far more efficient and competitive and, for example, identify causes of defects more quickly, adapt design specifications at shorter notice, and exploit tolerances more skilfully. Enhanced materials can thus be developed faster and more cost-effectively and made available for application. The German Federal Ministry of Education and Research is therefore supporting the digitization of materials research with 26 million euros over the next three years. The second funding announcement will even increase this amount significantly.” [Translated by MPIE, [original quote](#)]

Of the 13 projects, funding is also being provided for a common project by the Max-Planck-Institut für Eisenforschung (MPIE), the Institute for Applied Computer Science (Leipzig) and the Fraunhofer Institute for Mechanics of Materials (Freiburg). The “StahlDigital” project, headed by Dr. Franz Roters, group leader at MPIE, is looking at the production of steel, the processing procedures and the design of the finished components so that they can be developed more quickly and more accurately in the future. Digital knowledge and data processing methods are being used in the process. The aim of the project is to develop and establish an application-specific knowledge network using the process chain of two sheet steel materials as an example. To this end, software tools will be created for flexible process flows in simulations and tests. The performance of these tools will be demonstrated using industrial application scenarios in the context of the development and optimization of sheet steel for car body components. The entire manufacturing process from semi-finished product production to component manufacture and component properties (crash safety) will be included. Due to the transferability of the project results, especially via the “MaterialDigital” platform, research as well as the production and processing of materials with digital methods, concepts and processes will be strengthened in the long term.

In the 13 collaborative projects now funded from the first funding round, leading scientific institutions in the subject area from all major German research associations are working together. Each of the funded projects addresses a specific application

case as an example. The “MaterialDigital” platform, in which Prof. Jörg Neugebauer, Director of the Department of Computational Material Design at MPIE, and Dr. Tilmann Hickel, group leader in the department, are playing a key role, synchronizes the activities, connects the experts and ensures that standardized formats, structures, concepts for data transfer, interfaces of various process simulations and a standardized language for describing the materials are established. It is essential that the expertise coming from industry and academia is combined. This should make future digital collaboration across companies and between science and industry much easier. Virtual design from the atom up to the component will become possible in this way.

“MaterialDigital” also aims to add the material aspect to the concepts of “Industry 4.0”. “Industry 4.0” already impressively demonstrates how digitally accompanying a product through the entire manufacturing process can create added value, which is reflected in lower reject rates, higher quality as well as greater flexibility.

Text in excerpts from [BMBF press release](#)

The international team of the Max-Planck-Institut für Eisenforschung conducts advanced basic materials research for the fields of mobility, energy, infrastructure, medicine and digitalisation. The focus lies on nanostructured metallic materials as well as semiconductors, which are analysed down to their atomic and electronic scales. This enables the MPIE team to develop new, tailor-made structural and functional materials embracing their synthesis and processing, characterization and properties, as well as their response in engineering components exposed to real operating environments.

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**Contact:**

Yasmin Ahmed Salem, M.A.  
Press and Public Relations Officer  
E-Mail: [y.ahmedsalem@mpie.de](mailto:y.ahmedsalem@mpie.de)  
Tel.: +49 (0) 211 6792 722  
[www.mpie.de](http://www.mpie.de)

