

## Liquid Metals Are in the Focus of a New Research Alliance

### LIMTECH Studies Liquid Metal Technologies for a Broad Spectrum of Applications



Research on the highest level: Scientists of HZDR and KIT develop liquid metal technologies. (Photo: Martin Lober)



KIT Energy Center: Having future in mind

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Liquid metals are in the focus of the new LIMTECH (Liquid Metal Technologies) Helmholtz Alliance. The Helmholtz-Zentrum Dresden-Rossendorf (HZDR), which coordinates the Alliance, and Karlsruhe Institute of Technology (KIT) pool their competences in this Alliance together with other Helmholtz centers and universities in Germany and abroad. LIMTECH is aimed at studying and further developing liquid metal technologies for a broad spectrum of applications. Funds in the amount of EUR 20 million are available for this purpose.

Liquid metals are used in numerous industrial branches, for example when casting steel and light metal. They are gaining importance for future applications, such as liquid-metal batteries for energy storage, CO<sub>2</sub>-free hydrogen production, or the manufacture of solar cells. This is due to their capabilities of storing large amounts of energy or removing heat effectively. Their thermal conductivity is 50 to 100 times higher than that of water. In addition, they remain liquid over a large temperature range. Hence, liquid metals are suited well for cooling down high-energy processes. Consequently, they contribute

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to improving energy and resource efficiency, as the efficiency of thermodynamic processes increases with increasing temperatures. This is why two subprojects of the Alliance are dedicated to the use of liquid metals in solar power plants.

In the past years, operational safety of technologies based on liquid metals increased significantly. This is mainly due to new measurement methods, by means of which the flows can be monitored completely. Further development of these methods is one of the goals of the new LIMTECH Helmholtz Alliance. Another objective is to increase the energy and resource efficiency of liquid metal technologies, for example, when casting metals, separating valuable metals from molten slags, or producing solar silicon. "German research already is top in the world and we are planning to strengthen our position even further," says Dr. Gunter Gerbeth from the Helmholtz-Zentrum Dresden-Rossendorf, who coordinates the LIMTECH Alliance.

In this Alliance, the Helmholtz-Zentrum Dresden-Rossendorf (HZDR) and Karlsruhe Institute of Technology (KIT) pool their competences in liquid metal technologies together with other Helmholtz centers and universities in Germany and abroad. The LIMTECH Helmholtz Alliance is scheduled for a period of five years and has an overall investment volume of EUR 20 million. The funds are provided at an equal ratio by the Helmholtz Association's Initiative and Networking Fund and the participating Helmholtz centers and partners. Within the scope of the Alliance, it is planned to establish a program for doctoral candidates. Another focus lies on close cooperation with industry partners for a rapid technical implementation of the results.

The Helmholtz centers participating in LIMTECH are the Helmholtz-Zentrum Dresden-Rossendorf (HZDR; coordination), Karlsruhe Institute of Technology (KIT), Forschungszentrum Jülich (FZJ), and the German Aerospace Center (DLR).

External partners are the Ilmenau University of Technology, the Technische Universität Dresden, the Leibniz Universität Hannover, TU Bergakademie Freiberg, University of Potsdam, Georg-August-Universität Göttingen, RWTH Aachen University, Institute of Physics Riga (Latvia), and Coventry University (UK).

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**The Helmholtz-Zentrum Dresden-Rossendorf (HZDR) conducts research in the sectors Matter, Health, and Energy. The HZDR research focuses on the following topics:**

- **How does matter behave in strong fields and at small-scale dimensions?**
- **How can malignant tumors be identified at an early stage and treated effectively?**
- **How can resources and energy be used safely and efficiently?**

**To answer these scientific questions, five large-scale research facilities provide, in part, unique research opportunities. These facilities are also accessible to external users.**

**The HZDR has been a member of the Helmholtz Association, Germany's largest research organization, since January 01, 2011. It has four locations in Dresden, Leipzig, Freiberg, and Grenoble and employs about 900 people, approximately 400 of whom are scientists, including 140 doctoral candidates.**

**Karlsruhe Institute of Technology (KIT) is one of Europe's leading energy research establishments. The KIT Energy Center pools fundamental research with applied research into all relevant energy sources for industry, households, services, and mobility. Holistic assessment of the energy cycle also covers conversion processes and energy efficiency. The KIT Energy Center links excellent competences in engineering and science with know-how in economics, the humanities, and social science as well as law. The activities of the KIT Energy Center are organized in seven topics: Energy conversion, renewable ener-**

gies, energy storage and distribution, efficient energy use, fusion technology, nuclear power and safety, and energy systems analysis.

Research, education, and innovation at KIT foster the energy turnaround and reorganization of the energy system in Germany. Clear priorities lie in the areas of energy efficiency and renewable energies, energy stores and grids, electromobility, and enhanced international cooperation in research.

Karlsruhe Institute of Technology (KIT) is a public corporation according to the legislation of the state of Baden-Württemberg. It fulfills the mission of a university and the mission of a national research center of the Helmholtz Association. KIT focuses on a knowledge triangle that links the tasks of research, teaching, and innovation.

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