

PRESS RELEASE

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Fraunhofer ITWM at the International Trade Fair Jec World in Paris

Testing and Analyzing Composite Materials With Fraunhofer Expertise

JEC World describes itself as the "Festival of Composites", as composites professionals from all over the world gather under its roof in Paris every year. Researchers from the Fraunhofer Institute for Industrial Mathematics ITWM in Kaiserslautern will also be there. They will be presenting testing and analysis methods for composite materials at the joint Fraunhofer stand from March 5 to 7 2024.

Composites are materials made from two or more different materials. Dr. Matthias Kabel, team leader of "Lightweight Construction and Insulating Materials" at the Fraunhofer ITWM, explains what makes them so exciting: "Composite materials have different properties than their individual components, which is why it is more difficult to predict their behavior. This applies in particular to components made of fiber and particle-reinforced plastics, as their mechanical behavior depends on the geometry, i.e. the orientation, volume fraction and length of the fibers."

Material Cards for Composites

As the macroscopic behavior depends on the microstructure of the materials, material maps are first determined by simulation for various geometries. The FeelMath software is used for this. In the component simulation, the mechanical behavior of the actual geometry can then be predicted by interpolation. In Paris, the employees will primarily be showing their work on injection-moulded components made from short and long fiber-reinforced plastics.

Non-destructive Testing of Composite Materials

Non-destructive testing is an essential part of the production process. The earlier testing is carried out in the production process, the greater the benefits: unnecessary material, energy and time expenditure is avoided and costs are saved.

In Paris, the Fraunhofer ITWM is presenting a radar-based testing system that is specially designed for fiber-reinforced plastics. "With our system, we can examine the inner structure of materials and detect defects that are not visible from the outside," says Dr. Joachim Jonuscheit, deputy head of the "Material Characterization and Testing" department, outlining the advantages of the technology. "Thanks to the

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terahertz waves used, our system works contactlessly and non-destructively, regardless of whether manual or robot-assisted testing is used."

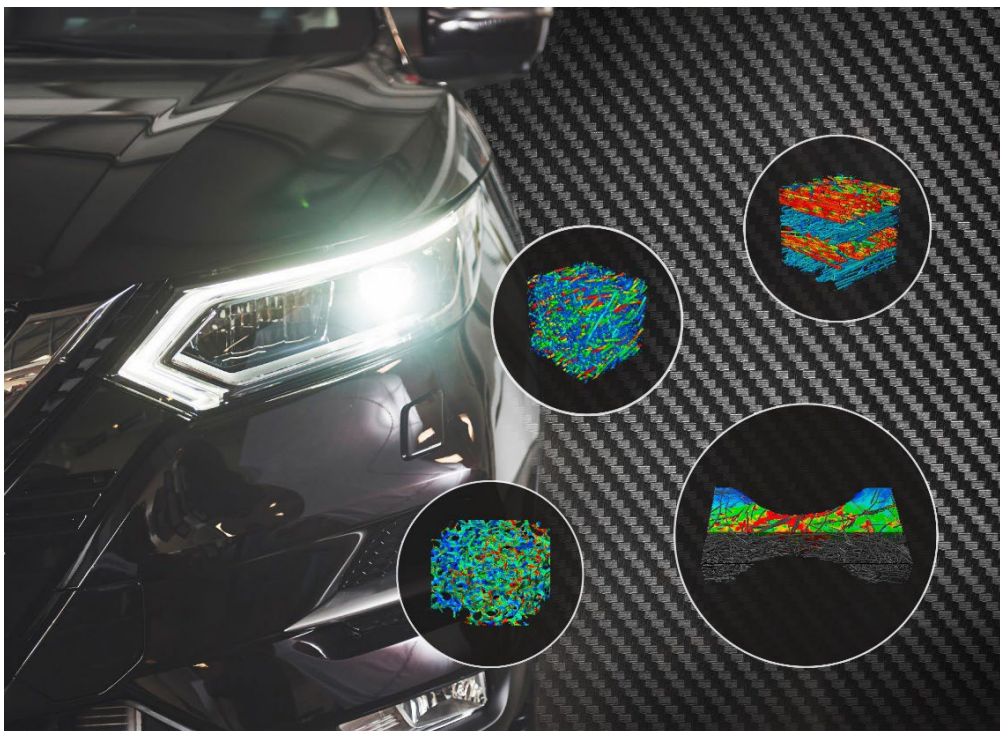
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Wide Range of Applications

The defects to be detected include uneven coating thicknesses, inclusions of foreign material or air as well as defective structures, i.e. detachments or missing material. This wide range of applications means that terahertz testing can be used in many different areas: the researchers from Kaiserslautern work with companies from the aerospace industry as well as manufacturers of rail vehicles and wind rotor blades.

The researchers can be found at the joint stand of the Fraunhofer-Gesellschaft in Hall 6 – R72.



Many fiber-reinforced plastics are used in vehicles to save weight.

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About the Fraunhofer Institute for Industrial Mathematics ITWM

The Fraunhofer Institute for Industrial Mathematics ITWM in Kaiserslautern is one of the largest research institutes for applied mathematics in the world. We see it as our task to further develop mathematics as a key technology and to provide innovative impulses. Our focus is on the implementation of mathematical methods and technology in application projects and their further development in research projects. The close cooperation with partners from industry guarantees the high practical relevance of our work.

Their integral building blocks are consulting, implementation and support in the application of high-performance computing technology and the provision of customized software solutions. Our various areas of expertise address a wide range of customers: the automotive industry, mechanical engineering, the chemical industry, energy and the financial sector. This also benefits from our excellent networking, for example in the Simulation and Software-based Innovation Center.

About the Fraunhofer-Gesellschaft

The Fraunhofer-Gesellschaft, based in Germany, is the world's leading organization for application-oriented research. With its focus on future-oriented key technologies and the utilization of results in business and industry, it plays a central role in the innovation process. As a guide and driving force for innovative developments and scientific excellence, it helps to shape our society and our future. Founded in 1949, the organization currently operates 76 institutes and research facilities in Germany. More than 30,000 employees, most of whom are trained in the natural sciences or engineering, work on the annual research volume of 2.9 billion euros. Contract research accounts for 2.5 billion euros of this total.