

PRESS RELEASE

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Fraunhofer IZFP presents a magneto-optical sensor system for visualizing properties and defects in steel components at the 37th Control 2025.

Intelligent sensor technology for quality assurance: Fraunhofer IZFP exhibits VISiMOS demonstrator at Control 2025

At this year's Control - the international trade fair for quality assurance - the Fraunhofer Institute for Nondestructive Testing IZFP from Saarbrücken is presenting a demonstrator that can visualize properties and defects in steel components. This is part of the public research project "Visualization of properties and defects in steel components using intelligent magneto-optical sensor technology" - VISiMOS. Researchers from Fraunhofer IZFP will be exhibiting the intelligent demonstrator at the 37th Control trade fair from May 6 to 9, 2025 at the joint Fraunhofer Vision business unit stand in Stuttgart (Neue Messe, Hall 7, Stand 7301).

Steel components are used in various industries and often have to fulfill safety-critical requirements. The evaluation of material properties and conditions as well as the absence of defects are indispensable criteria for quality assurance. Quality assurance using destructive testing techniques is not only uneconomical but can only be carried out on a random basis. Nondestructive testing techniques - such as micro-magnetic material characterization - on the other hand, make it possible to assure the quality of the entirety of steel products but reach their technical limits when combining high spatial resolution and testing speed.

"In the VISiMOS project, steel components are to be tested nondestructively, quickly and with high spatial resolution. We have developed a new type of magneto-optical testing system based on the so-called Faraday effect. Using a digital camera, we can visualize magnetic field strength distributions on material surfaces in the form of grey-scale images in quasi real time," explains Lukas Lauck, scientific project manager of the VISiMOS project at Fraunhofer IZFP.

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Faster and more precise testing methods for industrial applications

As part of a preliminary scientific project, it has already been demonstrated that micromagnetic characteristics can be derived from magneto-optical image sequences, which in turn enable a precise assessment of material conditions. In addition, the Fraunhofer IZFP research group was able to realize an effective method for detecting cracks. "Using a special high-speed camera, we have now further optimized the VISiMOS demonstrator in order to be able to generate high-resolution stress distributions and defect images within a very short time," continues Lukas Lauck.

An important goal is to increase the testing speed so that even large-scale industrial applications, such as the testing of wheelset shafts, can be realized in just a few seconds. VISiMOS thus enables fast and highly precise measurement of material surfaces: The high spatial resolution in the micrometer range allows an exact analysis of material conditions and defects. Since the test specimens remain intact, costs are reduced, and valuable material resources are saved. The technology also meets the industry's growing demands for precise, environmentally friendly and cost-efficient testing methods.

Funding and project partners

The public research project [VISiMOS](#) is funded by the German Federal Ministry of Education and Research (BMBF) as an individual project within the VIP+ funding program with € 1.03 million (funding code: 03VP10900). The project will run from March 2023 to February 2026 and its results will be presented to a broad specialist audience for the first time at Control 2025.

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