

# PRESS RELEASE

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The Fraunhofer IST at the Hanover Fair

## **For improved quality, efficiency and sustainability - thin-film sensors from the Fraunhofer IST record data directly in high-load zones of tools and components**

**The measurement of force, pressure, temperature, wear and other variables, directly in main load zones or on tool active surfaces by means of thin-film sensor technology, provides valuable data for the optimization of existing production processes or simulation models. With the wear-resistant thin-film sensors developed at the Fraunhofer Institute for Surface Engineering and Thin Films IST and adapted to the respective application, measurements can also be undertaken in areas which were previously difficult to access. For the first time, the researchers have succeeded in carrying out a spatially resolved temperature measurement in rolling contacts subjected to mixed friction.**

For the optimization of partially or fully lubricated tribosystems such as gear wheels, knowledge of the temperature in the lubrication gap is immensely important. For an improved design of the scuffing load capacity of gears, however, the temperature must be measured directly in the tooth flank contact that is subjected to mixed friction. Sensory thin-film systems are suitable for this purpose; they are, however, subjected to very high wear in these contact zones. Until now, such measurements have only been possible under liquid friction.

For the sensor solution developed and produced at the Fraunhofer IST, the thermoresistive properties of a microstructured metal layer are used. In the long term, the use of the thin-film system should make permanent monitoring of components possible. "Furthermore, the existing system can be further developed so that pressures and lubrication gap heights can also be determined," explained Project Manager Marcel Plogmeyer.

At the Hannover Messe from 30<sup>th</sup> May to 2<sup>nd</sup> June 2022, the Fraunhofer IST, as part of the Fraunhofer business unit Adaptronics, will be presenting, amongst other items, various demonstrators such as disks and gears on which the described thin-film system has been applied by a production process tailored to the application. These can be found at the central joint stand of the Fraunhofer-Gesellschaft (Hall 5, Stand A06).

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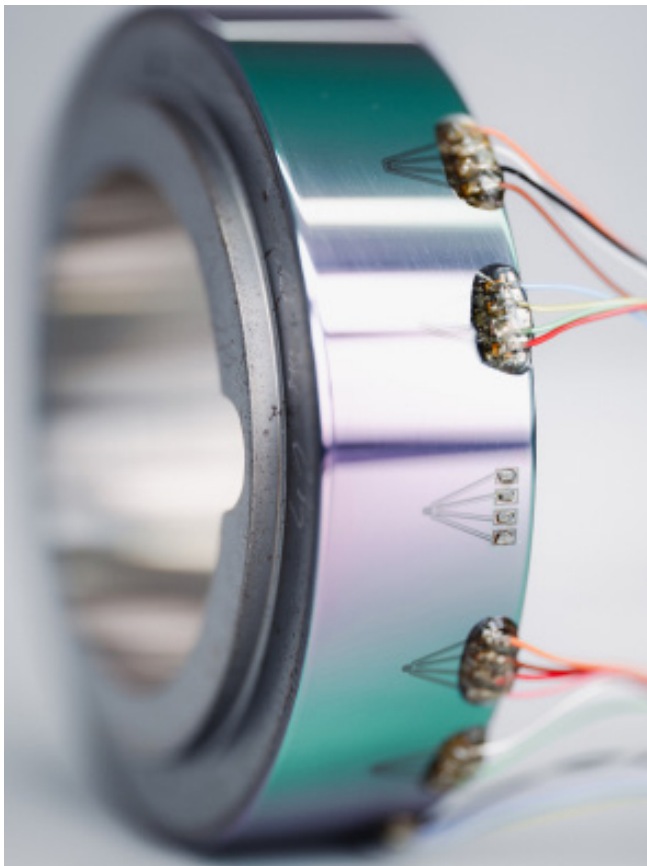
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### About the project

The described results were achieved within the FVA project 789 I “Sensor technology for mixed friction” with the topic “Development of a robust thin-film sensor system for measuring the temperature in thermo-elastohydro-dynamic contacts subjected to mixed friction”, within which the Fraunhofer IST is working in collaboration with the Institute of Machine Design (IMK) of the Otto von Guericke University Magdeburg. The project is funded by the German Federal Ministry for Economic Affairs and Climate Action (BMWK) on the basis of a resolution of the German Bundestag and the Federation of Industrial Research Associations (AiF, funding project No.: 19330BG).

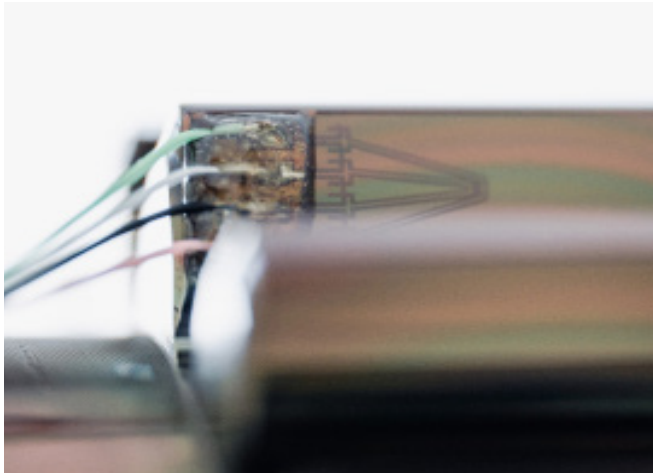
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**Thin-film sensors for temperature measurement in rolling contacts. © Fraunhofer IST**

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**Gear flanks with sensor structures.** © Fraunhofer IST

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