

Technology in Application

Scientific insights into tribological systems

Our studies have demonstrated that the impedance-based sensing approach offers significant potential for gaining deep scientific insight into tribological and lubrication phenomena under real-world conditions.

In-situ observation of key effects

The technology enables in-situ observation of the Stribeck curve, particularly the transitions between boundary, mixed, and hydrodynamic lubrication regimes. It also facilitates the detection and analysis of:

- Pitting – from crack initiation to particle release
- Formation of surface layers – such as reaction films and varnish
- Lubricant degradation – oxidative particle generation
- Contamination – by wear debris or external particles

Foundation for research and data-driven development

This high-resolution data provides a valuable foundation for fundamental research in tribology, materials science, and lubrication technology. It also opens new avenues for developing advanced condition monitoring strategies and predictive maintenance concepts.

Additionally, it supports the creation of data-driven models and digital twins—enabling a more precise understanding of component behavior and system reliability.