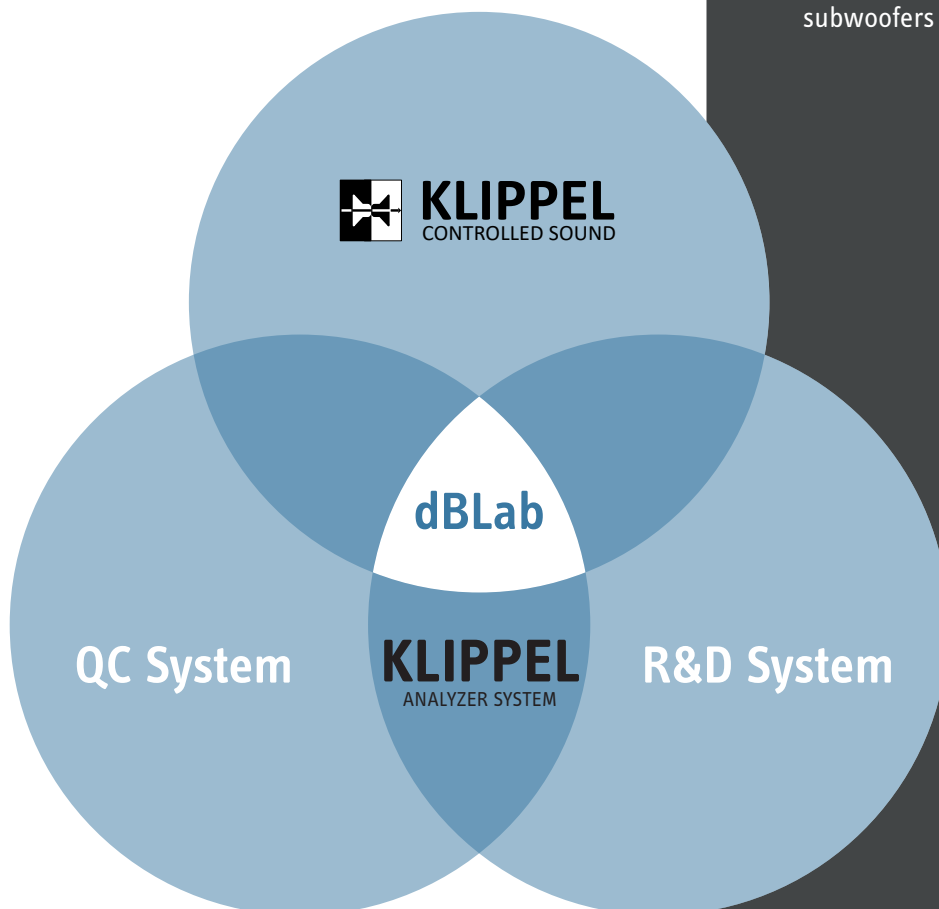




KLIPPEL leads the industry with innovative measurement and control technology for electro-acoustical transducers. Accurate modeling of physics at both small and large amplitudes is the core of what the company does. Bundled with extensive knowledge from 30 years of fundamental research, our tools empower engineers across the globe to push the limits of what is possible within audio.

KLIPPEL was founded in 1997 by Prof. Dr. Wolfgang Klippel and offers a broad portfolio of products and services. The main products are the KLIPPEL Analyzer System, for laboratory and end-of-line applications, and the KLIPPEL Controlled Sound Technology.



MEASUREMENT APPLICATIONS

- **Every-day acoustical tests**
- **Small and large signal parameter measurement**
- **Distortion measurements**
- **Accelerated life and power test**
- **Simulation and auralization**
- **Vibration and radiation analysis**
- **Cone and spider testing**
- **Speaker material measurement**
- **End-of-line testing**
- **Incoming goods inspection**
- **Quality assurance at service stations**
- **Speaker control**

For all kinds of speakers, from micro-speakers to subwoofers as well as audio systems



Diagnostics of Audio Systems
Speaker Control

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Near Field Scanner System

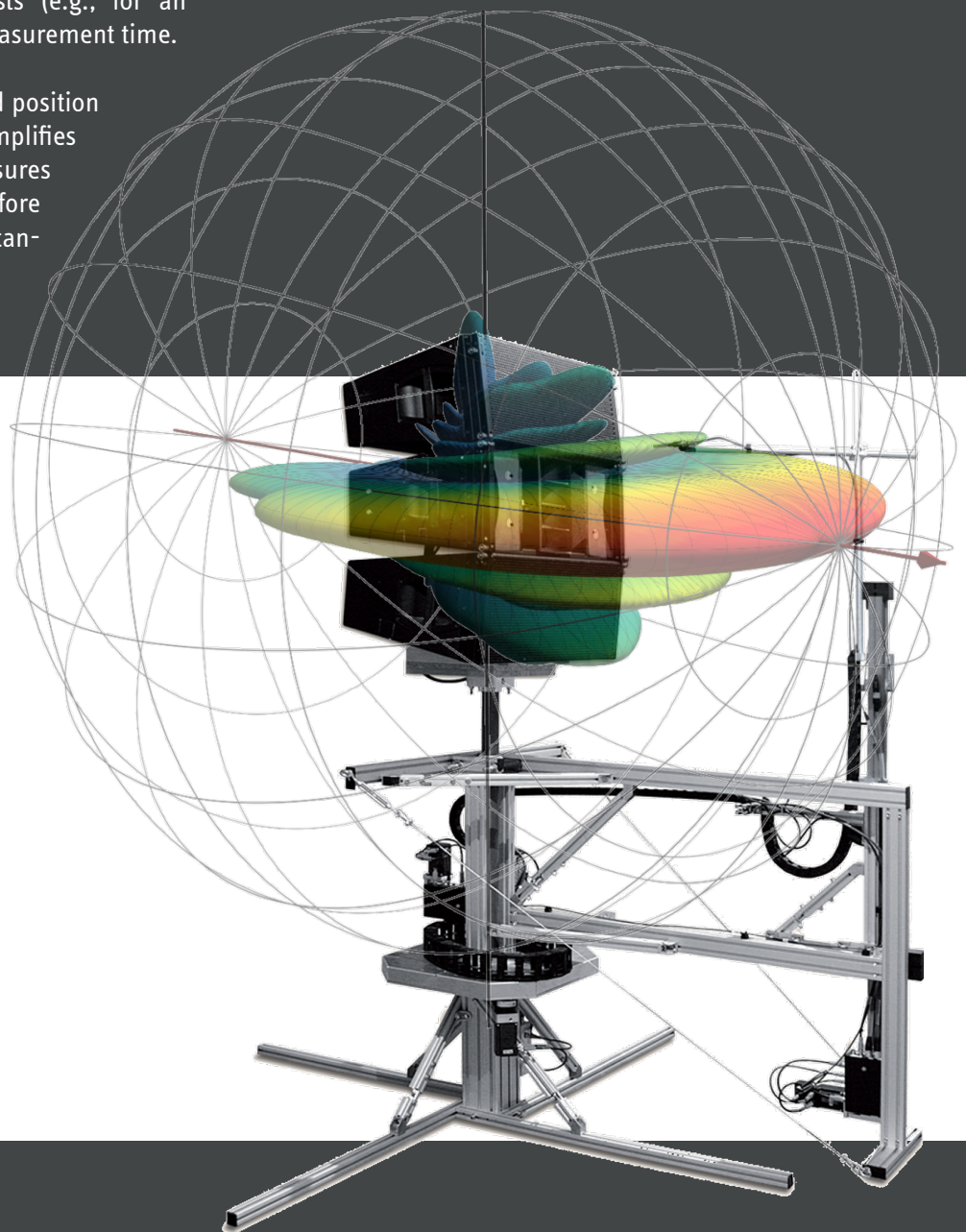
To develop a new loudspeaker system a balance between simulation and measurement during the development process is key to ensure continuous verification and improvement of the models and algorithms as well as the enhancement of sound quality.

The **KLIPPEL's NFS System** uses a holographic measurement approach to determine the directivity of a loudspeaker. This method uses special solutions of the wave equation (spherical harmonics, Hankel function) to determine the 3D sound pressure output of the audio device. Compared to traditional measurement techniques this provides more comprehensive and accurate measurement data while minimizing costs (e.g., for an expensive measurement room) and measurement time.

The device under test remains at a fixed position in the center of the scanner. This simplifies the handling of heavy devices and ensures constant room excitation and therefore constant room reflections during the scanning process.

The robot arm moves a microphone around the device under test, capturing the sound pressure in the near field.

Due to the scanning along a double layer, the Direct Sound Separation (**KLIPPEL's** patented technology) detects the direction of the sound wave. It can remove all room reflections from the direct sound of the loudspeaker. Thus, the measurement system provides accurate free-field data for full-space (4π) and half-space (2π) measurements in any environment (e.g. in the workshop or office).



Near Field Scanner

More accurate than anechoic chambers

- Automated scanning solutions
- Holographic testing in normal rooms
- SPL at any point in 3D space (near & far field)
- Non-moving loudspeaker
- True anechoic SPL and directivity



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