Status reports and Publication lists of Acoustics, Ultrasound and Vibration at NMIJ / AIST

【From November 2023 to September 2025】

Acoustic standards

[1] K. Yamada, K. Hirano, H. Takahashi, H. Nozato, “Calibration of the microphone sensitivity below 0.5 Hz using the liquid-column-type sound pressure generator”, Metrologia **61**, 065002 (2024.10)

[2] K. Hirano, H. Takahashi, K. Yamada, H. Nozato, “Investigation of sound pressure leakage effect for primary calibration down to 10－2 Hz using a laser pistonphone system”, Measurement Science and Technology **35**, 055009 (2024.2)

[3] K. Hirano, W. Kokuyama, H. Inaba, S. Okubo, T. Shimoda, H. Takahashi, K. Yamada, H. Nozato, “Optical sound pressure measurement using Fabry-pérot cavity for primary acoustic standards”, Optica Open, https://doi.org/10.1364/opticaopen.30092986.v1

Our resent research has been devoted to the calibration of condenser microphones and other devices, such as MEMS sensors, in the infrasound frequency range, and to the quantification of sound pressure by means of optical techniques.

Ultrasonic standards

[1] T. Uchida, Y. Tanaka, A. Suzuki, Automatic detection of pleural line and lung sliding in lung ultrasonography using convolutional neural networks, Heliyon, 10, p. e34700 (2024)

[2] C. Uehara, T. Uchida, Two-layer calorimeter with thermally insulating separator for measuring ultrasonic power, Jpn. J. Appl. Phys, 64, 03SP48 (2025).

To promote the safe and reliable application of therapeutic ultrasound devices, we have extended the ultrasonic power standard to 200 W. In addition, we have been developing calibration techniques for hydrophone phase response characteristics. As an applied research initiative, we are also conducting studies on AI-based diagnostic techniques for lung ultrasound.

Vibration and acceleration standards

[1] T. Oe, N. Kaneko, H. Nozato, H. Suma, M. Zama, M. Kumagai, “Extremely stable 10 kΩ Metal Foil Resister in nΩ/Ω level”, IEEE Trans. on Inst. and Meas., 74, 1008007 (2025).

[2] H. Nozato, W. Kokuyama, T. Shimoda, H. Inaba, “Primary calibration method for laser Doppler vibrometers using electro-optical modulator”, Prec. Eng., 93, 204-215 (2025).

[3] W. Kokuyama, T. Shimoda, H. Nozato, “Primary microvibration calibration of accelerometer with

picometer displacement", Metrologia, 62, 015007 (2025).
[4] T. Shimoda, W. Kokuyama, H. Nozato, "Measurement of the intrinsic sensitivity for a single-ended accelerometer without the influence of the mounting condition", Metrologia (accepted).
[5] W. Kokuyama, A. Hasegawa, T. Shimoda, H. Nozato, "Deformation of laser reflection surface in primary calibration of accelerometers", Metrologia, 62, 035006 (2025).

Our recent research and development efforts include the development of primary calibration methods and uncertainty assessment for broadband seismometers, the development of primary calibration techniques for laser Doppler vibrometers, and the development of reliability evaluation technology for accelerometers for infrastructure deterioration diagnosis.