

## **Recent publications in AUV from the NMIJ**

### **Acoustics**

- [1] R. Horiuchi, T. Fujimori, and S. Sato, "Development of a laser-pistonphone for an infrasonic measurement standard", Proc. Acoust. Soc. Am and Acoust. Soc. Jpn 4th Jnt. Meet., 2006.
- [2] R. Horiuchi, T. Fujimori and S. Sato, "Research and development for infrasonic standards", J. of Acoust. Soc. Jpn., vol. 62, no 4, pp.338~344(2006) [in Japanese].
- [3] H. Takahashi and R. Horiuchi, "Uncertainty for free-field calibration of sound measuring instruments by comparison", AIST Bulletin of Metrology, vol. 5, no 3, pp.199~208(2006) [in Japanese].
- [4] H. Takahashi, T. Fujimori, R. Horiuchi and S. Sato, "Free-field calibration of 1/4 inch microphones for ultrasound by reciprocity technique", 4th Joint Meeting of Acoust. Soc. Am. and Acoust. Soc. Jpn., 4aEA10(2006).
- [5] R. Horiuchi, T. Fujimori and S. Sato, "Development of a laser-pistonphone for an infrasonic measurement standard", 4th Joint Meeting of Acoust. Soc. Am. and Acoust. Soc. Jpn., 4aEA4( 2006).
- [6] R. Horiuchi, T. Fujimori, H. Takahashi and S. Sato, "Final report on key comparison APMP.AUV.A-K1" Metrologia 44, Tech. Suppl. 09001 (2007).
- [7] R. Horiuchi, H. Takahashi, T. Fujimori. S. Sato and S. kiryu, " Current status of research and development on acoustic standards at NMIJ", Journal of metrology society of India, 22 (2), 109 - 116 (2007).
- [8] H. Takahashi, T. Fujimori and R. Horiuchi, "Minimizing the sound reflection for free-field calibration of type WS3 microphones by using a virtual pulse method ", Proc. of internoise (2007).
- [9] R. Horiuchi, H. Takahashi, T. Fujimori and S. Sato, "Final report on key comparison APMP.AUV.A-K1", Metrologia, vol. 44, 09001(2007).
- [10] H. Takahashi, T. Fujimori and R. Horiuchi, "Minimizing the sound reflection for free-field calibration of type WS3 microphones by using a virtual pulse method", Proc. Internoise 2007, in07\_601, 2007.
- [11] R. Horiuchi, H. Takahashi, T. Fujimori, S. Sato and S. Kiryu, "Current status of research and development on acoustic standards at NMIJ", J. of Metrology Society. of India, vol. 22, no 2, pp.109~116(2007).
- [12] S. Sato, H. Takahashi and R. Horiuchi, "Measurement microphones", J. of Acoust. Soc. Jpn.,

vol. 64, no 11, pp.673~678(2008) [in Japanese].

- [13] H. Takahashi, T. Fujimori and R. Horiuchi, "Development of acoustic standards for airborne ultrasound", J. of Acoust. Soc. Jpn., vol. 65, no 1, pp.34~39(2009) [in Japanese].
- [14] R. Horiuchi, "How the reliable environmental noise measurement is ensured – Development of acoustic standards and a new calibration service system –", Synthesiology, Vol.2, No.4, Feb., pp.258~269( 2010)
- [15] H. Takahashi, W. Yoneshima and R. Horiuchi, "A study on the consistency of free-field sensitivities between type LS1 and LS2 microphones", Autumn meeting of Acoust. Soc. Jpn., 3-Q-26, Sep.( 2010) [in Japanese].

## **Ultrasound**

- [1] Y. Matsuda, "Surface breaking crack evaluation with photorefractive quantum wells and laser-generated Rayleigh waves ", Applied Physics Letters, 89(17), pp.171902-1~171902-3 (2006).
- [2] M. Yoshioka, " Difference between Nominal and Measured Active Element Sizes of Hydrophones ", J. J. A. P, 47(5), pp. 3926-3928 (2007).
- [3] Yoshimura Kazuho, Norimichi Kawashima, Shinichi Takeuchi, Takeyoshi Uchida, Masahiro Yoshioka, Tsuneo Kikuchi, Minoru Kurosawa, "Trial Fabrication of Needle-Type Hydrophone with Taper-Type Structure using Hydrothermally Synthesized Lead Zirconate Titanate", Japanese Journal of Applied Physics, Vol.47, No.5, pp.4215-4219 ( 2008).
- [4] Y. Matsuda, H. Nakano, S. Nagai, and K. Yamanaka, "Precise Sound Velocity Measurement Using Laser Ultrasound and Its Application for Temperature Measurement in Semiconductor Processing (in Japanese)," Journal of the Japanese Society for Non-destructive Inspection 57 (4), pp. 204-209 (2008).
- [5] Y. Matsuda, M. Yoshioka and T. Kikuchi, "Evaluation of Acousto-optic Effect in Underwater Ultrasonic Pressure Measurement Using an Optical Interferometer", Proceedings of Symposium on Ultrasonic Electronics, 29, pp. 57-58 (2008)
- [6] M. Yoshioka, "Difference between Nominal and Measured Active Element Sizes of Hydrophones", Japanese Journal of Applied Physics, 47(5), pp3926~3928, (2008).
- [7] K. Yoshimura, N. Kawashima, T. Uchida, T. Kikuchi and M. Kurosawa, "Fundamental study of miniature membrane-type hydrophone using hydrothermally synthesized lead zirconate titanate", Official Proceeding of the 12th Congress of the World Federation for Ultrasound in Medicine and Biology, No.35, pp. 238-239 (2009)
- [8] M. Yoshioka, "Problems in Deriving the Soft-Tissue Thermal Index Using Spatial-Peak Temporal-Average Intensity in the Near Field", Japanese Journal of Applied Physics, 48(7),

pp. 07GK04-1~07GK04-3, (2009).

- [9] T. Uchida, T. Kikuchi, T. Murakami, N. Kawashima and S. Takeuchi, “ Effect of Surface Modification of Titanium Substrate by Anodic Oxidation on Hydrothermally Synthesized PZT Poly-Crystalline Film ” 2008 IEEE Ultrasonics Symposium Proceeding, Vol.1, pp.2122-2125 (2009)
- [10] K. Yoshimura, N. Kawashima, S. Takeuchi, T. Uchida, M. Yoshioka, T. Kikuchi, M. Kurosawa, “Trial Fabrication of Needle-Type Hydrophone with Taper-Type Structure using Hydrothermally Synthesized Lead Zirconate Titanate”, Jpn. J. Appl. Phys., Vol.47, No.5, pp. 4215~ 4219 (2009)
- [11] T. Uchida, H. Sato, S. Takeuchi and T. Kikuchi, “ Characterization of output signal from cylindrical hollow type cavitation sensor”, Acoust. Sci. & Tech., Vol.31, No.2, pp. 199~201 (2009)
- [12] T. Uchida, H. Sato, S. Takeuchi and T. Kikuchi, “ Investigation of output signal from cavitation sensor by dissolved oxygen level and sonochemical luminescence “ Jpn. J. Appl. Phys., Vol.49, No.7, pp. 07HE03-1~07HE03-2 (2009)
- [13] M. Yoshioka, Y. Matsuda and T. Kikuchi, “Effect of Circular Assumption on Active Element Size Measurement for Hydrophone Sensitivity Calibration Using Narrow Beam”, Japanese Journal of Applied Physics, 49(7), pp. 07HC01-1~07HC01-2, (2010).
- [14] T. Kikuchi, ”Ultrasonic temperature phantom without simulation of thermal properties of actual human body”, Acoust. Sci. & Tech, 31(4), pp. 293-295 (2010).

## **Vibration**

- [1] T. Usuda, T. Ishigami, A. Ohta, H. Nozato, H. Aoyama, S. Sato, Current situations on vibration metrology in Japan, Proc. of IMEKO world congress (2006).
- [2] A. Oota, T. Usuda, T. Ishigami, H. Nozato, H. Aoyama, S. Sato, Preliminary implementation of primary calibration system for laser vibrometer, Proc. of 7th International Conference on Vibration Measurements by Laser Techniques, Ancona, Italy, SPIE Vol.6345, 634503(2006).
- [3] A. Oota, T. Usuda, H. Aoyama, S. Sato, Development of primary calibration system for vibration and acceleration standard in high frequency range with laser interferometer with multifold optical path, IEEJ Trans. SM, Vol.126, No.11, pp. 612~620 (2006).
- [4] H. Nozato, T. Usuda, A. Oota, T. Ishigami and K. Kudo, Development of Shock Acceleration Calibration Machine in NMIJ, Proc. of IMEKO TC-22 Symposium, Merida, Mexico (Nov. 2007).
- [5] T Usuda, A. Oota, H. Nozato, T. Ishigami, Y. Nakamura, K. Kudo, Development of charge amplifier calibration system employing substitution method, Proc. of IMEKO 20th TC3, 3rd

TC16 & 1st TC22, Mexico, ID-106(2007).

- [6] A. Oota, T. Usuda, H. Nozato, T. Ishigami, H. Aoyama, K. Kudo, Development of primary calibration system for high frequency range up to 10 kHz, Proc. of IMEKO 20th TC3, 3rd TC16 & 1st TC22, Mexico, ID-103(2007).
- [7] H. Nozato, T. Usuda, A. Oota, T. Ishigami, K. Kudo, Development of Shock Acceleration Calibration Machine in NMIJ, Proc. of IMEKO 20th TC3, 3rd TC16 & 1st TC22, Mexico, ID-109(2007).
- [8] P. Rattanangkul, B. Thummawut, V. Plangsangmas, A. Ohta, T. Usuda, The bilateral comparison for charge sensitivity of standard accelerometer between NIMT and NMIJ, Proc. of IMEKO 20th TC3, 3rd TC16 & 1st TC22, Mexico, ID-052(2007).
- [9] ISO 16063-41 (DIS): Methods for the calibration of vibration and shock pick-ups. Part 41 Calibration of Laser Vibrometers (2008).
- [10] A. Oota, T. Usuda, T. Ishigami, H. Nozato, and Y. Hino, Effect of demodulator unit on laser vibrometer calibration, Eighth International Conference on Vibration Measurements by Laser Techniques: Advances and Applications, Proc. of SPIE Vol. 7098, 70981J, (2008).
- [11] T. Usuda, A. Oota, H. Nozato, Y. Hino and H. Aoyama, TRANSPORTABLE CALIBRATION SYSTEM FOR VIBRATION TRANSDUCERS, Proceedings of the MME2008, Aachen, Germany (Sep. 2008).
- [12] T. Usuda, A. Ohta, H. Nozato, Y. Hino, H. Aoyama, Transportable calibration system for vibration transducers, Proc. of The Journal of Micomechanics and Microengineering, Aachen, Germany, pp. 303~306 (2008).
- [13] A. Oota, Effect of demodulator unit on laser vibrometer calibration, Proc. of eighth international conference on vibration measurements by laser techniques, Ancona, Italy, Vol.7098, No.7098-54 (2008)
- [14] A. Oota, T. Usuda, H. Nozato, T. Ishigami, T. Kikuchi, Estimation of uncertainty contribution of transverse sensitivity and vibration distribution on primary accelerometer calibration, XIX IMEKO World Congress, Lisbon, Portugal (Sep. 2009).
- [15] H. Nozato, T. Usuda, A. Oota, T. Ishigami, An investigation of difference between shock and vibration acceleration standards, Proceedings of 3<sup>rd</sup> Asian Symposium for Precision Engineering and Nanotechnology, Kokura, Japan (Nov. 2009)
- [16] A.Oota, T. Usuda, H.Noizato, Correction and evaluation of the effect due to parasitic motion on primary accelerometer calibration, Measurement, Vol.43, No.5, pp.714~725 (2010).
- [17] H. Nozato, T. Usuda, A. Oota, T. Ishigami, Calibration of vibration pick-ups with laser interferometry: part IV. Development of a shock acceleration exciter and calibration system, Meas. Sci. Technol., Vol.21, No.6, 065107(2010).