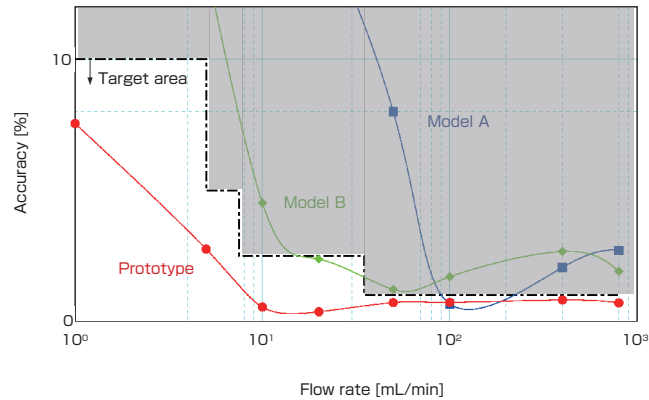


An ultrasonic flowmeter for accurate measurement of micro-flow rates

Improving the performance of semiconductor manufacturing equipment and reducing running costs

AIST has developed an ultrasonic flowmeter that can accurately measure micro-flow rates of less than 10 mL/min (error: ± 0.1 mL/min) in collaboration with Atsuden and Tokyo Keiso.

In developing the flowmeter, we examined the fundamental theory of ultrasonic wave (guided wave) propagation, increased the frequency of ultrasonic waves, and optimized the design of the ultrasonic flowmeter. This ultrasonic flowmeter can measure flow rates in the micro-flow rate range that has not been possible with conventional ultrasonic flowmeters. It allows highly accurate control of the liquid chemicals used in semiconductor manufacturing equipment and is expected to contribute to the increased performance, reduced environmental load, and reduced running costs of semiconductor manufacturing equipment.



Accuracy of flow rate measurement

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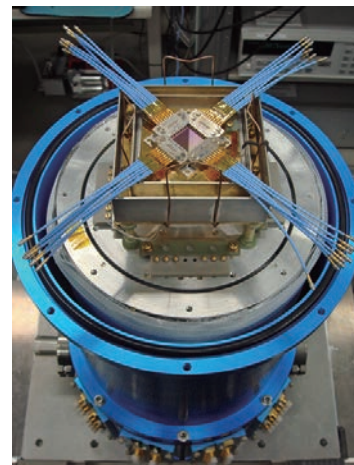
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Metrology and Measurement Science

Development of AC Josephson voltage standards

Approaches for realization of the next-generation quantum AC voltage standards

We are developing the next-generation AC voltage standard systems based on the Josephson effect. These systems will enable direct calibration for AC voltage with quantum accuracy, drastically improving the measurement uncertainty in our conventional systems. They are also expected to open new metrological and physical fields such as waveform standard, Johnson noise thermometry, etc. Up to now, many types of methods have been proposed for realizing quantum AC voltage standards. It is important to carefully understand both advantages and disadvantages of each method and put the right method in the right application. This article focuses on some of them and reviews basic mechanisms and characteristics of the methods. The present status and the prospects of our researches in AIST are also reported.



New 4-K cryocooler system with wideband cryo-probes (under development)

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