

# Japan Geoscience Union Meeting 2011

(May 22-27 2011 at Makuhari, Chiba, Japan)

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SGD022-03

Room:201A

Time:May 23 15:00-15:15

## Development of a gravity gradiometer for precise on-board measurements

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We have been developing a gravity gradiometer that could measure vertical gravity gradients on a moving vehicle, such as an aircraft and a ship, to a level of a few microgal. This target sensitivity of a few microgal is about two orders of magnitude better than the sensitivity of mechanical gravimeters, which are typically used on aircraft and ships. This gravity gradiometer would allow us to carry out on-board measurements in inaccessible areas, with an unprecedented high sensitivity.

This gravity gradiometer employs the concept of the free-fall interferometer, developed for tests of the Weak Equivalence Principle. Two test bodies are put in free fall and their differential displacements during the free fall are monitored by a laser interferometer. Unlike the tests of the Equivalence Principle, the centres of mass of the test bodies are separated along the vertical direction before free falls. This separation allows us to obtain the vertical difference in the gravitational fields. Because of the differential measurements, the obtained gravity gradients are, in principle, insensitive to the motion of the vehicles on which the measurements are carried out.

We will introduce the concept of the gradiometer and present the current status of the development.

Keywords: Gravity gradiometer