

Long-baseline laser strainmeter in Kamioka

TAKAMORI, Akiteru^{1*} ; ARAYA, Akito¹ ; MORII, Wataru² ; UCHIYAMA, Takashi³ ; OHASHI, Masatake³ ; TELADA, Souichi⁴

¹Earthquake Research Institute, University of Tokyo, ²Disaster Prevention Research Institute, Kyoto University, ³Institute for Cosmic Ray Research, University of Tokyo, ⁴National Institute for Advanced Industrial Science and Technology

In order to facilitate the gravitational-wave astronomy, ' KAGRA project ' has been proceeding under international collaboration hosted by the Institute for Cosmic Ray Research of University of Tokyo. The authors are constructing a long-baseline laser strainmeter with a 1.5 km long baseline in the Kamioka underground site as the part of the project (left figure). It will be the longest baseline laser strainmeter in Japan, and one of the largest instruments worldwide. The longer baseline was opted to achieve the superior sensitivity for the ground strain, more than 10 times better than the currently available 100 m strainmeter. The better sensitivity is anticipated to enable more detailed studies in the ground deformation caused by the fault activities and the Earth ' s free oscillations.

The basic design of the long-baseline strainmeter is adopted from the 100 m strainmeter, consists of the highly asymmetric Michelson interferometer using the Iodine-stabilized laser as the standard of length (right figure). Nevertheless, there are some technical challenges required due to the gigantic scale of the new instrument. The outline of the instrument and the status of R&D will be reported in this presentation.

Keywords: laser interferometer, strainmeter, Kamioka

