ID de Contribution: **18** Type: **Contributed talk**

KAGRA calibration and waveform accuracy

jeudi 1 juin 2017 11:40 (15 minutes)

Accurate calibration of the output of the Gravitational Wave (GW) signal is crucial to determine the physics parameters of the sources.
Also in the situation of global detector network, a less relative biases between these detectors are important on the science of GW astronomy.
LIGO, Virgo and KAGRA employ the photon calibrator that can calibrate the absolute displacement of the test mass by pushing the mirror surface with photon pressure.

One of the serious systematic errors at high-frequency region is the elastic deformation of the mirror. We can mitigate the elastic deformation effect because of the high Young's module of the sapphire test mass. We estimated the elastic deformation and waveform accuracy of the kHz region.

The misestimate of the relative waveform between LIGO, Virgo and KAGRA makes the systematic error of localization.
We also calibrate the relative waveform by comparing the absolute power of photon calibrator. We will share the standard detector whose response is calibrated by laser power standard in NIST. We plan to make the scheme for crosschecking of photon calibrator.

In this talk, we report the progress of the KAGRA calibration in order to achieve the absolute accuracy of several % to meet the calibration requirements of second-generation GW detectors.
We would like to discuss the problems and the possible strategy on calibration with global detector network.

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Classification de Session: New Data Analysis Methods