Contribution ID: **498** Type: **Poster**

Wave Front Sensing demodulated with the difference frequency of two phase modulated sidebands in a gravitational wave detector

Wednesday 27 August 2025 18:00 (2 hours)

In a laser interferometer-type gravitational wave telescope, it is necessary to observe by three or more detectors to determine the direction of source of gravitational waves with high accuracy. In the fourth observational run, KAGRA is constructed with PRFPMI consisting of a Michelson interferometer with 3 km Fabry-Perot cavity in both arms, and Power Recycled Cavity.
Wave Front Sensing (WFS) control maintains the optical axis alignment of the interferometer by compensating for relative misalignment with the resonator axis and the incident optical axis. However, many optical axis alignment signals are easily buried in the arm cavity axis signals.
This study proposes a new WFS(PMPM WFS) with the beat signals of two phase-modulated (PM) sidebands that are not injected into the arm cavity. I will present the theoretical validity of PMPM WFS and the measurement results of the PMPM WFS signal at the PRFPMI in KAGRA.

Collaboration you are representing

Author: HIROSE, CHIAKI (Niigata university)

Presenter: HIROSE, CHIAKI (Niigata university)

Session Classification: Poster session

Track Classification: Underground Laboratories – Technology