



Contribution ID: 58

Type: **talk**

## **The cooling scenario of the KAGRA test mass without condensation on the surface toward to O4**

*Wednesday, 19 May 2021 23:00 (20 minutes)*

Condensation on the surface of the main mirror and the viewport for oplev of the radiation shield is a serious problem at the cryogenic gravitational wave telescopes, KAGRA. In order to find a way to cool the main mirror down to the required temperature ( $\sim 20$  K) while preventing condensation, cryo-group of KAGRA conducted a cooling experiment of the main mirror using the a KAGRA cryostat.

In this experiment, we succeeded in preventing condensation on the main mirror and the viewport.

The key is that the radiation shields and cryo-ducts which surround the main mirror are cooled down at first. During the cooling period of the cryostat, we measured the residual gas components of partial pressure inside the cryostat, which causes surface condensation, and confirmed that residual gas components are adsorbed on the surface of the radiation shield and cryo-ducts according to their surface temperature.

We also confirmed that the condensation can be defrosted by using the heating heater installed on the radiation shield and in the cryo-payload which suspend main sapphire mirror.

In this talk, the results of the cryostat cooling experiments will be reported.

**Primary author:** Prof. KIMURA, Nobuhiro (ICRR)

**Presenter:** Prof. KIMURA, Nobuhiro (ICRR)

**Session Classification:** Cryogenics workshop

**Track Classification:** Workshops: Cryogenics workshop