

Research Report
ICRR Inter-University Research Program 2023

Research Subject:

Filter cavity experiments for the frequency dependent squeezed light for KAGRA

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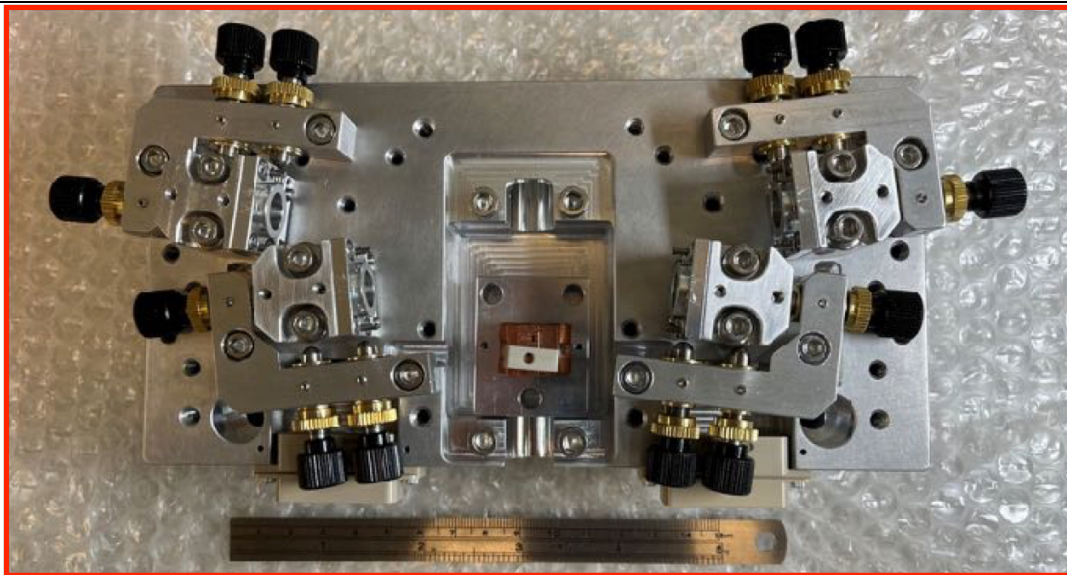
Summary of Research Result :

With ICRR and NAOJ, in this ICRR Inter-University Research Program 2022, entitled “Filter cavity experiments for the frequency dependent squeezed light for KAGRA,” we worked with the KAGRA Filter Cavity (KFC) working group. The target is to implement this FDSQZ to upgrade the sensitivity of KAGRA.

In addition to the bi-weekly telecoms with the working group on the KAGRA Filter Cavity, in September 2023 and December 2023, our visits to the KAGRA F2F meeting in Toyama and U. Tokyo in Hongo were both supported by this project.

Currently, we take the responsibility for the Interface Optics in the KFC working group, as well as the OPO design for the squeezer. In addition, we also received the Vanguard Project (for 4 years), entitled “Development on the Instrumentations and Data Analyses for Advanced Gravitational Wave Detectors,” from the Ministry of Science and Technology (MOST), Taiwan.

At the same time, we have implemented the vacuum OPO (vOPO) and plan to deliver it to NAOJ for the performance test.



Replacement of the SHG for TAMA-300 is finished, and applications on the ML to frequency dependent squeezing (FDS) is also in progress. As listed below, we reported our research in the annual meeting of the ICRR Inter-University Research Program FY2022, and published 2 papers with ICRR acknowledged.

- Yi-Ru Chen, Hsien-Yi Hsieh, Jingyu Ning, Hsun-Chung Wu, Hua Li Chen, You-Lin Chuang, Popo Yang, Ole Steuernagel, Chien-Ming Wu, and RKL, "Experimental reconstruction of Wigner phase-space current," Phys. Rev. A 108, 023729 (2023).
- Ole Steuernagel, Popo Yang, and RKL, "On the Formation of Lines in Quantum Phase Space," J. Phys. A 56, 015306 (2023).

In papers listed above, we added the supports by “The collaborative research program of the Institute for Cosmic Ray Research (ICRR), the University of Tokyo.” in the Acknowledgement.

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