KAGRA SCIENTIFIC CONGRESS: COLLABORATORS' INFORMATION EXCHANGE 2022/DEC 23

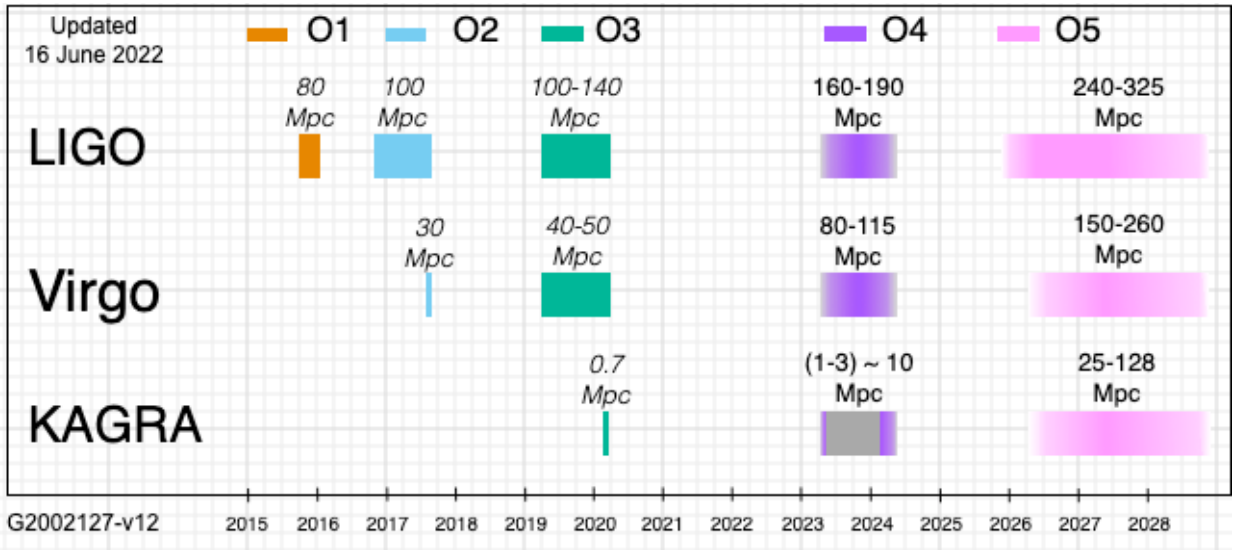
KSC Newsletter

Issue 9

Towards O4

We are now putting all the effort into preparing for the next joint observation (O4) with LIGO and Virgo, which will start in March 2023. KAGRA is scheduled to join O4a for one month in the beginning with an expected sensitivity of 1−3 Mpc in terms of the BNS range. Then we will take a long commissioning break to enhance the sensitivity to ∼10 Mpc and join O4b. We have been through hard times; faced many difficulties and challenges. But after all struggles, there's only one way left to go. Let us achieve the KAGRA's first detection of gravitational waves with all of us joining forces together!

LIGO-Virgo-KAGRA observation run schedule



Status of KAGRA

Most of the difficulties in the O3GK commissioning originated from unreliable subsystems in the interferometer due to strange behaviors of the vibration-isolation systems, frosting on the cryogenic optics, and large birefringence in the sapphire substrates. To solve the problem in the vibration-isolation systems, we have replaced the suspensions. Now the first thing to achieve towards O4a is to achieve the 1 Mpc sensitivity achieved in O3GK with the newly installed suspension. Then we can further expect a better sensitivity since the local control must have been improved by replacing the suspensions. Also, we have invented a method to avoid frosting when we cool down the vacuum chambers, which could help to improve the sensitivity.

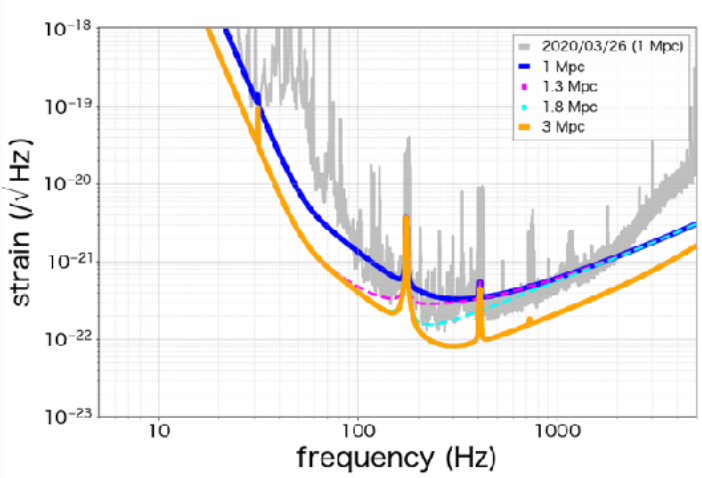
The milestone towards O4 is to make the Cryogenic kilometer-scale Fabry-Perot arm cavity in operation. Test mass mirrors will be cooled down to 80∼250 K in O4a (partial operation of cryocoolers) and at least < 100 K in O4b (20 K if the full operation of cryocoolers is achieved). This will be the first trial of full cryocoolers operation and is an important challenge for KAGRA. Currently, both input test masses in the X and Y directions (ITMX and ITMY) are at 250 K, and the end test mass in the X direction (ETMX) is at 81 K, which satisfies the O4b condition. Still, we plan to cool the end test mass in the Y direction (ETMY) to 81 K before O4a.

O3GK was performed with the power-recycled Fabry-Perot Michelson interferometer (PRFPMI) configuration at room temperature. The plan for O4 is to upgrade the sensitivity with higher laser power, angular sensing control, and new optical baffles. In September, we successfully controlled the Fabry-Perot Michelson Interferometer (FPMI). It was an important step for achieving the planned O4a sensitivity. We have recently succeeded in controlling the PRFPMI for a short duration, and we are working further to achieve a stable operation. We are on a good track towards O4a and getting ready for the challenges during the commissioning break to improve the sensitivity towards O4b.

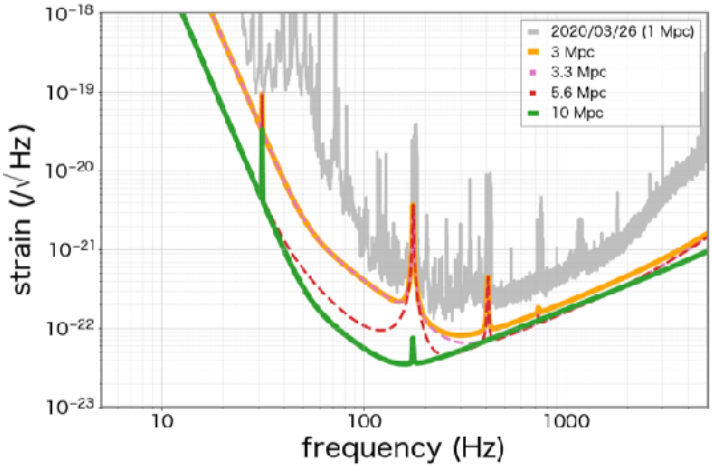
Prospect for O4

The figures below are KAGRA's expected sensitivity for O4a (left), and O4b (right) [1]. With these sensitivities, the most probable scenario for KAGRA's first detection of gravitational waves is the observation of a loud binary black hole (BBH) merger event. According to the estimation based on the inferred BBH population by O3, the expected number of BBH events detected by KAGRA during O4b (assuming 10Mpc BNS range, 3-month observation) with the signal-to-noise ratio (SNR) larger than 3 is less than one. However, if a strong BBH event like GW150914 occurs during the KAGRA O4b, it may be possible to find a signature of signal in the KAGRA data with the help of the detection information of LIGO and Virgo. In such a case, KAGRA might also be able to contribute to improving the source localization. For more details, there was a nice talk by Takashi Kato (ICRR) in the August F2F [2].

[1] https://gwdoc.icrr.u-tokyo.ac.jp/cgi-bin/private/DocDB/ShowDocument?docid=13627
[2] https://gwdoc.icrr.u-tokyo.ac.jp/cgi-bin/private/DocDB/ShowDocument?docid=14246



KAGRA O4a sensitivity with
- Improvement of suspension
- Suppressing stray light with baffles
- Replacement of SRM



KAGRA O4b sensitivity with
- Cool down the mirrors to <100K
- Improvement of low frequency region
- High power laser

Sachiko Kuroyanagi
with helps of Keiko Kokeyama, Hideyuki Tagoshi

Organization

New KSC board

Last year, we had the election of KSC board in August 2021. Four new members were appointed:

- Jun'ichi Yokoyama (RESCEU, University of Tokyo) [Chair]
- Matteo Leonardi (NAOJ) [Vice-chair]
- Keiko Kokeyama (Cardiff University)
- Sachiko Kuroyanagi (IFT Madrid)

Then we have three regional members from Korea, Taiwan, China:

- Hyung-Won Lee (Inje University)
- Ray-Kuang Lee (National Tsing Hua University)
- Xing-Jiang Zhu (Beijing Normal University)

Student and postdoc representatives (already changed to new representatives after one year) are

- Tatsuya Narikawa (ICRR) → Takahiro S. Yamamoto (Nagoya University)
- Surojit Saha (National Tsing Hua University) → Yuka Oshima (University of Tokyo)

and observer from EO

- Hideyuki Tagoshi (ICRR)

The practical works of the KSC board are to organize F2F meetings, make decisions related to the KSC activities, check and approve LVK papers, etc. The KSC board chair is also taking care of the communication with LIGO and Virgo (as KAGRA does not have a spokesperson). At the same time, we also discuss various issues that spontaneously appear in the collaboration. Our general task is to create a comfortable environment for the collaboration members. If you have any inquiries/need any help, please get in touch with us,
kscboard [at] icrr.u-tokyo.ac.jp.

News from the KSC board

The change of the authorship policy and a guide document for theorists

There is a new rule added to the authorship policy, "Long-term activities may count up to 15% of research time in total." The long-/short-term activities are defined based on the LVK white paper (https://gwdoc.icrr.u-tokyo.ac.jp/cgi-bin/private/DocDB/ShowDocument?docid=14589), in which you see many theoretical works would be categorized into long-term. Some of the theorists, especially new members, might find it difficult to contribute to short-term activities. The KSC board prepared a list of tasks that may help theorists to find a way to contribute. Please have a look if you are interested.
https://gwdoc.icrr.u-tokyo.ac.jp/cgi-bin/private/DocDB/ShowDocument?docid=14590

Sachiko Kuroyanagi

KAGRA site

New accommodation, SOGOTO Dormitory

Mihoko Okinaka (ICRR)

The new building, the Kamioka Research Complex (SOGOTO), introduced in the May 2021 Newsletter, was completed in November 2021, and the long-awaited KAGRA Observatory dormitory (SOGOTO Dormitory) started its operation in December. In this issue, we would like to introduce the dormitory to you in detail.

The SOGOTO Dormitory has 10 rooms on the 4th floor, the top floor of the SOGOTO building, which is located just off the Mozumi bus stop and about a 5-minute walk from the KAGRA Data Analysis Building. Previously, visitors coming to work at the KAGRA site stayed mainly in accommodations in Toyama City or Kamioka Town. Access to the site was quite a hassle as it was basically done by infrequent public transportation and sometimes cabs in the middle of the night for the 24-hour shifts. Now that we have the dormitory, we are finally free from commuting difficulties.

Although this dormitory is not very large, it has been designed with as much thought as possible so that you can relax and unwind after finishing your work. The entire area, including the corridors and doors, is unified in soothing colors and is a barrier-free space with no steps. The rooms have separate toilets and bathtubs, semi-double beds for a comfortable rest, and wooden furniture desks and chairs made by a local company in Hida for this dormitory. In addition, you can see the natural scenery of the four seasons from the windows. Although in Mozumi, the temperature can drop below zero in winter, the rooms are warm and comfortable due to the external insulation of the building. As you know, there are no stores around, but for meals, you can use the cafeteria on the same floor, or if you have a license, you can use the shared car to go out to eat or buy food.

To make reservations and check the availability of the dormitories and cafeteria, you will need to register for a Kamioka Facility account. If you already have a KAGRA ID card, you can link it to your Kamioka Facility account, and the card will become your room card key. If you do not have a Kamioka Facility account or KAGRA ID card and would like to stay at the dormitory, please contact the office at office-hida[at]icrr.u-tokyo.ac.jp. For more detailed information, please refer to the ICRR Dormitories Manual in the Site information section of the KAGRA wiki.

We have received some very positive feedback from users of our dormitories, such as "I feel so comfortable I could live here!" Please use it when you visit Kamioka. We hope to make your stay in Kamioka as comfortable as possible.

Paper

First joint observation with GEO 600 – O3GK –


PTEP

First joint observation by the underground gravitational-wave detector KAGRA with GEO 600

https://doi.org/10.1093/ptep/ptac073

Nami Uchikata (ICRR)

KAGRA conducted the first joint observation with GEO 600 (GEO) from April 7 to 21, 2020, called O3GK. During the run, the duty cycle was ~53% for KAGRA and ~47% for the joint operation. The sensitivity of KAGRA was ~0.6 Mpc as measured by the BNS inspiral range. Please also read articles in previous KSC Newsletters and LIGO magazine about the run from the Kamioka site [1,2,3].

We performed two all-sky searches: one for BNSs using the GstLAL pipeline and the other for generic short transient signals using the coherent WaveBurst pipeline. Unfortunately, we did not find any significant GW signals from both searches, which was expected from the sensitivities of KAGRA and GEO detectors.

We also performed two searches dedicated to GW signals associated with gamma-ray burst (GRB) events observed during the run. We searched for compact binary coalescence signals using the PyGRB pipeline for two short GRBs and generic transient signals using X-Pipeline for four GRBs: the same two short GRBs searched by the PyGRB pipeline and two long GRBs. Among the observed GRBs, GRB 200415A was considered to be the magnetar giant flare whose location overlapped with NGC 253 at a distance of ~ 3.5 Mpc. We did not find any significant GW signals from both searches. The detectors were only sensitive to neutron star binaries up to ~ 1.5 Mpc for the data around the time of GRB 200415A, which was insufficient to exclude the possibility of a neutron star binary merger as the origin of the GRB event.

Although we did not obtain any new astrophysical results, we have confirmed that several LVK search pipelines worked effectively for the KAGRA data, which showed the possibility of KAGRA as a member of the global GW observatory network. Many KAGRA members joined the analyses and paper writing, which was a very beneficial experience. The paper was published in PTEP in June this year.

[1] KSC Newsletter Issue 7 https://gwdoc.icrr.u-tokyo.ac.jp/cgi-bin/DocDB/ShowDocument?docid=11619

[2] KSC Newsletter Issue 8 https://gwdoc.icrr.u-tokyo.ac.jp/cgi-bin/DocDB/ShowDocument?docid=12871

[3] LIGO magazine Issue 21 https://www.ligo.org/magazine/LIGO-magazine-issue21.pdf

Paper

O3GK noise budget paper

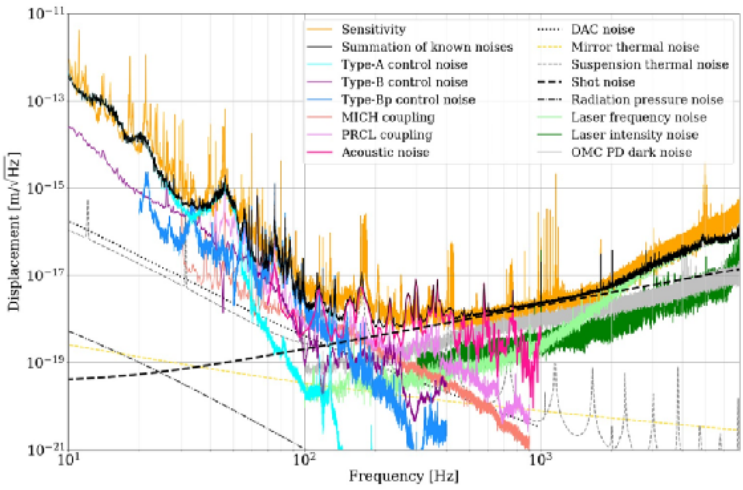

PTEP

Performance of the KAGRA detector during the first joint observation with GEO 600 (O3GK)

https://doi.org/10.1093/ptep/ptac093

Tatsuki Washimi (NAOJ)

The collaboration full author paper *"Performance of the KAGRA detector during the first joint observation with GEO 600 (O3GK)"*, the so-called "PTEP02: Noise budget paper," was published on 28 June 2022. "Noise budget (NB)" is the process and its result of explaining the noise spectrum of the GW detector by summing up the known noise components. The design sensitivity of a GW detector is essentially determined by the seismic noise, thermal noise, and quantum noise. In actual experiments, however, various other technical noises exist. NB is very important to consider strategies to improve detector sensitivity. NB is important not only from a technical but also from a scientific viewpoint: If KAGRA was a top-runner of the GW observations (unfortunately or fortunately, it is not real), the observed noise spectrum would exceed the sum of the known noise, which would give the illusion that it is detecting some GW signal (such as SGWB). This may seem like an exaggeration, but for example, cosmic microwave background (CMB) was discovered in such stories. In the field of particle and cosmic ray experiments, the measured and the estimated energy spectrums are required to be within an error.



This result of our O3GK NB succeeds in explaining almost the measured noise spectrum and shows significant progress compared to the same studies in past observations, such as bKAGRA phase-1, iKAGRA, and CLIO, which had very large unknown components. That being said, the estimated noise did not reach the measured one at 100-200 Hz, above 5 kHz, and many line noises. Other noises, such as beam jitter, acoustic coupling other than IMC/PRC, coupling from magnetic fields, and the electrical charge of test masses, coupling from magnetic fields, the electrical charge of test masses, *etc.*, could not be evaluated this time due to a lack of measurements. These components also should be evaluated in future observations. In addition, similar discrepancies between observed sensitivity and summation of the evaluated noises in the NB of LIGO [PhysRevD.102.062003] were found, around 10-100 Hz. It might be pointing out that there is something unknown noise mechanism in an interferometer.

The bad news is that before the NB study was performed, the rumor that "the sensitivity of KAGRA is limited by the birefringence of the sapphire mirrors and it is impossible to be improved without making new mirrors" had spread, not only among non-GW researchers but also among the mass media. While it is true that birefringence makes the interferometer control more difficult, in the context of NB, the effect of birefringence appeared only as frequency noise above 2 kHz at most. We need to actively disseminate the final version of NB, to recover the reputation of KAGRA, which was damaged by such misunderstandings.

Here I would like to explain our hardship story. The paper writing team (PWT) consisted of Kazuhiro Yamamoto (Toyama university), Keiko Kokeyama (who moved from ICRR to Cardiff university during the writing term), and me, Tatsuki Washimi (NAOJ). In many cases, even if it is a full-author paper, the PWT consists of members who actually performed the measurements. In the case of this paper, however, the PWT based our work on a lot of measurements made by many different people. So a great deal of work went into gathering information and checking for consistency. We started this work by preparing a Google spreadsheet and collecting information from the klog, JGWdoc, *etc*. For each measurement, we sorted out when and by whom it was done and scrutinized the data that should be used in the paper. This collection process was difficult because people's memories become fuzzier as time goes by. Some of the members who performed these measurements had already left KAGRA or academic fields, and this made our work more and more difficult. Some results were inadequate or contradictory, and we had to perform correction calculations to make them consistent with each other. Originally we had the plan to perform some follow-up measurements after O3GK, but unfortunately, it was not realized due to the frequent Earthquakes in the Hida region. Furthermore, because this paper is very content-intensive, a lot of time (longer than 1 year!) was also spent on the writing process itself, including reviews. NB studies will also be performed in further observations such as O4, and they should be done with a more systematic procedure reflecting the lessons of this O3GK.

Despite all these difficulties, we finally had achieved publishing this paper in a satisfying form. This is not only to the efforts of our PWT, but also thanks to the specialists (I apologize I could not list all your names here) who performed the measurements and checked each document, and thanks for checking the content throughout the paper by Prof. Mio, Prof. Ando, and Prof. Kawabe. We express our thanks to all of them here.

→ PWT party at *il gotti* in Toyama. From the left-hand side, Keiko Kokeyama, Kazuhiro Yamamoto, and Tatsuki Washimi.

EPO

Cosmic Ripples: Astronomy and Art Festival at National Tsing-Hua University (NTHU)

Albert Kong, Kuo-Chuan Pan, and Ray-Kuang Lee (National Tsing Hua University)

National Tsing-Hua University (NTHU) held an exhibition called "Cosmic Ripple: A Popular Science Activity Combining Science and Art" for about 5 months at the NTHU between April and August 2022, organized by our LIGO-Virgo-KAGRA EPO members: Albert Kong (NTHU), Kuo-Chuan Pan (NTHU), and Ray Li (NCKU). In this exhibition, we explore the significance of gravitational wave detection and research in Taiwan through display board designs, and interactive exhibits focused on engaging and enlightening the general public on the beauty of gravitational waves. The team members included experts from astronomy, science, and art.

The centerpiece of this Astronomy and Art Festival is an interactive exhibition titled Cosmic Ripples, see Fig.1, which makes a variety of astronomical phenomena—gravitational waves, space-time distortion, and the merging of black holes—readily accessible to the general public. Highlights of the exhibition include an interactive display created by the Research Center for Technology and Art at NTHU showing how gravitational waves are observed, Fig. 2.

Fig.1: Cosmic Ripples: Astronomy and Art Festival at National Tsing Hua University (NTHU)

Moreover, a cosmic table hockey game is also shown in Fig. 3, in which a joystick is used to catch an oncoming star and throw it to one's opponent, with an ink-spewing cosmic squid appearing now and then to make the game more interesting. Our LIGO colleagues also provided the software for this cosmic table hockey game.

To illustrate the concept of different gravitational wave sources, a miniature of the KAGRA interferometer was also demonstrated, see Fig. 4. This home-made 1:10,000 KAGRA interferometer has one arm of 30 cm, with a PZT controller attached to one end-mirror. By programming the PZT driving voltage, we provide three modes to see the interference patterns from Burst, CBC, and Continuous (waves).

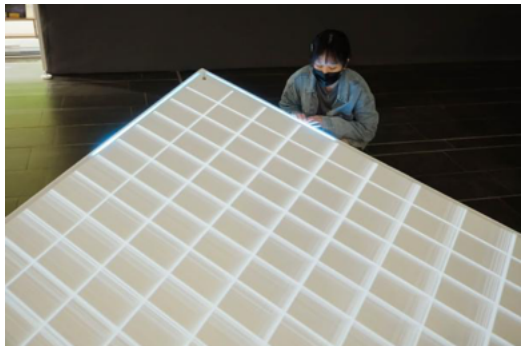


Fig.2: An interactive display created by the Research Center for Technology and Art at NTHU showing how gravitational waves are observed.

In May 2022, part of the exhibition, including the miniature of the KAGRA interferometer, was shipped from Hsinchu to Tainan for another one-month exhibition entitled "Cosmic Ripples: Relativity between Art and Science" organized by the Art Center at the National Cheng-Kung University (NCKU).

The virtual tour for this exhibition is here (multiple languages can be chosen):

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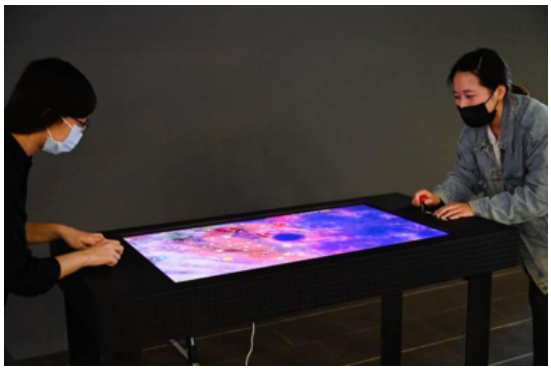
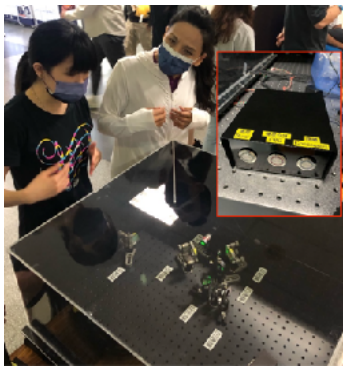




(Left) Fig.3: Visitors playing a game of cosmic table hockey.

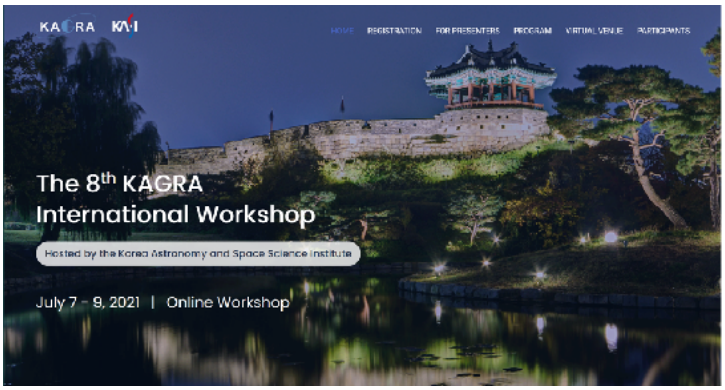
(Right) Fig.4: A miniature of KAGRA interferometer (1:10,000) with one arm of 30 cm. There are three modes to see the interference patterns: Burst, CBC, Continuous.

KIW 8

The 8th KAGRA International Workshop

Sungho Lee (KASI)

The 8th KAGRA International Workshop (KIW8) was held from July 7 to 9, 2021. This workshop was hosted by the Korea Astronomy and Space Science Institute (KASI). KIW8 was open to all scientists who were interested in contributing to the KAGRA project, with a mission of promoting more active international collaboration on KAGRA. This was the third KIW hosted by Korean gravitational wave community, after KIW1 in 2016 at KISTI, Daejeon, and KIW4 in 2018 at Ewha Womans University in Seoul.



In the middle of the COVID-19 era, this workshop was held fully online. Even under such a stressful situation of the pandemic, significant scientific progress kept being made, and expectation was high towards the fourth observing run (O4) in which KAGRA was planned to join the global efforts for hunting gravitational wave events. Thus the main theme of KIW8 was O4 under the subtitle “Toward the 4th Observing Run of the Detector Network: From Physics to Astronomy”.

The range of topics at KIW8 was wide; LVK status, gravitational wave science, multi-messenger astronomy, instrument R&D, data analysis, and future detectors. Detector characterization, for which a number of Korean members were involved, was arranged as a special session. Also, as a satellite program, a public talk was provided to attract more attention of the Korean community of astronomy and space science.

The total number of participants in KIW8 was 338, including 37 speakers and 11 poster presenters. Each poster was summarized by a short talk in the poster session, which was followed by Q&A and discussion at each dedicated Slack channel. KIW8 was a virtual-only meeting. The oral presentations were run in separate Zoom meeting rooms. In order to promote vibrant discussion during the workshop, Slack discussion channels for individual sessions were kept open to all participants. All Zoom sessions and Slack channels were hosted and monitored by the LOC members in a control room at KASI, to be ready for immediate responses to any unexpected incidences or requests.

All presentations of KIW8 were audio and video recorded, and the recordings (as well as the abstracts and presentation slides) were available under the consent of the presenters, as linked to the workshop program on the KIW8 website. The contents of the website have been archived at https://data.kasi.re.kr/confluence/display/KIW8

KIW 9

The 9th KAGRA International Workshop

Hong-Bo Jin (NAOC)

The 9th KAGRA International Workshop (KIW9) was held online during June 6-8, 2022. This workshop was organized by the National Astronomical Observatories of the Chinese Academy of Sciences (NAOC) and co-organized by Beijing Normal University and the Institute of Theoretical Physics, Chinese Academy of Sciences(ITP, CAS). The topics are LVK Status, Instrument R&D, Gravitational Wave Science, Toward O4, Data Analysis, and Multi-messenger. There are 208 participants. 25 invited talks and 11 contributed talks were presented with Zoom. Some posters were presented too. The presentation and video files of some talks have been uploaded to the website of KIW9: https://indico.itp.ac.cn/event/123/timetable/.

KAGRA F2F

The 29th and 30th KAGRA F2F meeting

After two and half years, we finally managed to have an in-person face-to-face meeting (hybrid style) on 1-3 August 2022 at the Hongo campus of the University of Tokyo, hosted by RESCEU. It was so nice to meet collaborators in person after a long time! Then, recently, we again had a face-to-face meeting in hybrid style on 30 November - 1 December at the Kashiwa campus of the University of Tokyo, hosted by ICRR. Since the Covid-19 related regulations are not completely resolved, we still have to restrict the number of onsite participants. But we are recovering little by little. Let us hope that more collaborators can attend onsite meetings next year. There are many meetings planned!

KAGRA MEETING SCHEDULE

LVK collaboration meeting, 13-16 March, 2023. Hybrid style, Hosted by Northwestern University, USA. Only for collaborators.

The 10th KAGRA International Workshop, 29-30 May, 2023. Hybrid style. Hosted by National Tsing Hua University, Taiwan. Open to all.

LVK collaboration meeting, 11-14 September 2023; the first LVK meeting hosted by KAGRA! Toyama International Conference Center. Hybrid style. Only for collaborators.

The 31th KAGRA Face-to-Face meeting, September, 2023. Combined with the LVK meeting in Toyama. Hybrid style. Only for collaborators

LVK meeting

September LVK meeting in Cardiff

LVK meeting was held at Cardiff University, 12-15 September 2022. There were ~300 onsite participants, and ~300 people attended online. The current status of KAGRA was summarized by the KSC board chair, Jun'ichi Yokoyama.

LAAC events at the Cardiff LVK meeting

Daiki Watarai (RESCEU)

Hi! My name is Daiki Watarai, an M2 student at the University of Tokyo. Here is a brief report about events held by LAAC (LSC Academic Advisory Committee). I joined two events among them.

One is a party for young researchers held at the first day, 9/12. At this gathering, participants enjoyed burgers, drinks, chatting, and the board games provided. I shared fun with my colleagues also from Japan and a senior member of our group who I met at the first time.

The other is a poster session at 9/14. Actually, this attendance was the first time of the in-person conference for me and I was really looking forward to having discussions at this session. The most impressive event was that a man, who I have given a comment, visited me as soon as this session began. He had already checked my poster in advance and gave me some questions and comments. Besides him, several people come and saw my poster, and I could obtain connections to many people.

The next-to-next F2F meeting is going to be held at Toyama. I am really looking to introducing Japanese things to my friends made at this meeting.

Delicious beef burgers and a complicated board game (we spend almost one hours for understanding the rule.)

The night scenery at Cardiff. Very beautiful!

Newly Joined

Tomohiro FUJITA and Ippei OBATA

We are very pleased to join the KAGRA collaboration. We are excited to tackle the mysteries of the universe as KAGRA members. We also look forward to meeting other members of the KAGRA collaboration in the near future.

Tomohiro Fujita **Ippei Obata**

Tomohiro Fujita is a researcher at the Waseda Institute for Advanced Study, a unique institute with diversity which hosts not only natural scientists but also researchers in social science and the humanities together. His main research interest is primordial gravitational waves produced in the early universe. It has been known for many years that gravitational waves are spontaneously generated from quantum fluctuations due to inflation, but he is also investigating other mechanisms by which matter in the early universe emits gravitational waves.

Ippei Obata is a researcher at the Kavli IPMU at the University of Tokyo, a very international institute with researchers related to the universe from mathematics to astronomy. Obata previously worked for the Max Planck Institute for astrophysics in Germany until September 2022, where he enjoyed lots of good German food and beer. His main research interest is to investigate the potential role of Axion, an undiscovered elementary particle, in the universe. For example, he found that two very light Axions acting as dark energy and dark matter can successfully explain an isotropic birefringence angle measured in recent CMB polarization data.

Fujita and Obata are working to explore dark matter with KAGRA. Dark matter accounts for about 80% of all matter in the universe, but its nature is unknown. According to cosmology, ultralight Axion and U(1) gauge field are known to be good candidates for dark matter. Axion may interact with photon to produce birefringence of the laser in KAGRA, or U(1) gauge field pushes mirrors to produce a signal when it couples to matter. KAGRA has already been equipped with optics to search for Axion dark matter, and we expect KAGRA will make a great contribution to the search for dark matter as well as gravitational waves astronomy in future observations, including O4.

Tomohiro Fujita, Ippei Obata

WE HEAR THAT . . .

Marcus C. Werner moved from Kyoto University to Duke Kunshan University as an associate professor, April 2020
Yutaro Enomoto moved from to Department of Applied Physics, the University of Tokyo as an assistant professor, April 2020
Eleonora Capocasa moved from NAOJ to APC Paris as maître de conférences, September 2020
Lucia Trozzo moved from ICRR to INFN Naples as a research engineer, November 2020
Yutaka Shikano moved from Keio University to Gunma University as an associate professor, April 2021
Tomohiro Yamada moved from ICRR to KEK as a JSPS research fellow, April 2021
Satoshi Tanioka moved from ICRR to Syracuse University as a postdoc, July 2021
Alessandro Parisi moved from Tamkang University to Scuola Normale Superiore di Pisa as a postdoc, 2021
Jishnu Suresh moved from ICRR to Université catholique de Louvain as a postdoc, October 2021
Long Wang moved from the University of Tokyo to Sun Yat-sen University as an associate professor, December 2021
Yuta Michimura moved from the University of Tokyo to Caltech as a research scientist, April 2022
Satoshi Tsuchida moved from Osaka City University to National Institute of Technology, Fukui College as an assistant professor, April 2022
Kentaro Komori moved from JAXA/ISAS to the University of Tokyo as an assistant professor, June 2022
Soichiro Morisaki moved from Wisconsin University to ICRR as an assistant professor, September 2022
Matteo Leonardi moved from NAOJ to University of Trento as a tenure track associate professor, December 2022

Congratulations! If you have other news, please notify the editors.

RECENT KAGRA STATUS TALKS

meeting/conferences		speaker	JGWdoc
JPS meeting	Sep. 2021	Takahiro Sawada	[JGW-G2112964]
ASJ meeting	Sep. 2021	Shoichi Oshino	[JGW-G2112988]
LVK meeting	Mar. 2022	Takashi Uchiyama	[JGW-G2112964]
KIW 9	Jun. 2022	Osamu Miyakawa	[JGW-G2014113]
ASJ meeting	Sep. 2022	Takahiro Sawada	[JGW-G2014083]
JPS meeting	Sep. 2022	Hirotaka Yuzurihara	[JGW-G2014092]
LVK meeting	Sep. 2022	Jun'ichi Yokoyama	[JGW-G2114410]
JGWG31	Oct. 2022	Takahiro Sawada	[JGW-G2014421]
GWDVac22	Oct 2022	Kazuhiro Yamamoto	[JGW-G2014427]
EDSU2022	Nov. 2022	Takafumi Ushiba	[JGW-G2014503]
MMAG4	Nov. 2022	Matteo Leonardi	[JGW-G2014520]

KAGRA COLLABORATION ARTICLES

Radiative Cooling of the Thermally Isolated System in KAGRA Gravitational Wave Telescope
J. Phys. Conf. Ser. 1857 (2021) 1, 012002
https://doi.org/10.1088/1742-6596/1857/1/012002

Performance of the KAGRA detector during the first joint observation with GEO 600 (O3GK)
Prog. Theor. Exp. Phys. (2022) ptaa 73 [arXiv:2203.07011]
https://doi.org/10.1093/ptep/ptac093

The Current Status and Future Prospects of KAGRA, the Large-Scale Cryogenic Gravitational Wave Telescope Built in the Kamioka Underground
Galaxies 10 (2022) 3, 63
https://doi.org/10.3390/galaxies10030063

Noise subtraction from KAGRA O3GK data using Independent Component Analysis
Prog. Theor. Exp. Phys. (2022) ptaa 93 [arXiv:2206.05785]
https://doi.org/10.1093/ptep/ptac093

Input optics systems of the KAGRA detector during O3GK
https://doi.org/10.48550/arXiv.2210.05934 [arXiv:2210.05934]

FROM EDITOR

Hi everyone, I am a new editor, Sachiko Kuroyanagi, taking over the editorial work from the previous editor, Hisaaki Shinkai. First of all, I would like to thank Shinkai-san and the previous editorial members for the long effort (8 issues since 2018!). I am very sorry for having such a long interval since the previous issue. I don't know if I can do the editorial work as much as Shinkai-san, but I will try my best. Currently, I am seeking new editorial members, so please let me know if you can volunteer!

KAGRA is now in the challenging phase working towards O4. I would like to show my greatest gratitude to the people who kindly agreed to contribute to the articles in such a busy time.

Sachiko Kuroyanagi
If you have any inquiry, please contact: sachiko.kuroyanagi [at] csic.es

If your affiliation address (or email) changes: Contact to kagraros [at] icrr.u-tokyo.ac.jp
If your group has new members: Contact to kagraros [at] icrr.u-tokyo.ac.jp
If you have news / nice photos to share: Let the KSC Newsletter editorial team know.

If your neighbor is planning to join KAGRA collaboration: Please suggest to check out our wiki FAQ
http://gwwiki.icrr.u-tokyo.ac.jp/JGWwiki/KAGRA/KSC/FAQ

KSC Newsletter

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No. 9 (2022/12) [**JGW-L2214624**] https://gwdoc.icrr.u-tokyo.ac.jp/cgi-bin/DocDB/ShowDocument?docid=14624

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No. 7 (2020/04) [**JGW-L1911619**] https://gwdoc.icrr.u-tokyo.ac.jp/cgi-bin/DocDB/ShowDocument?docid=11619
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No. 3 (2018/12) [**JGW-M1809350**] https://gwdoc.icrr.u-tokyo.ac.jp/cgi-bin/DocDB/ShowDocument?docid=9350
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No. 1 (2018/4) [**JGW-L1808122**] https://gwdoc.icrr.u-tokyo.ac.jp/cgi-bin/DocDB/ShowDocument?docid=8122