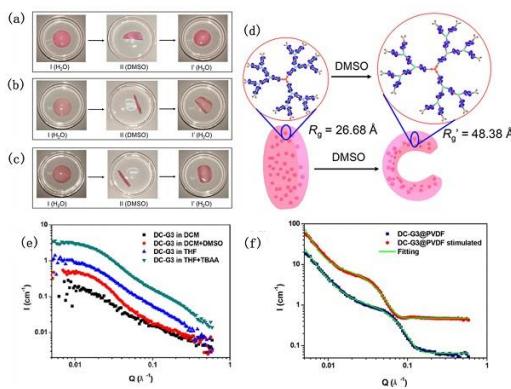


THE NEWSLETTER OF ASIA OCEANIA NEUTRON SCATTERING ASSOCIATION

Vol. 11, No. 3 (August 2020)

Contents

President's Message.....	2
Report on the 24 th AONSA Executive Committee Meeting	3
Report on the 19th Asia-Oceania Facility Directors Meeting	4
Call for AONSA Prize Nominations 2021.....	6
AONSA Young Research Fellows 2021	6
Update on the AONSA Neutron School	7
Reports from neutron associations.....	8
Report from the Australian Neutron Beam User Group (ANBUG).....	8
Report from the Neutron Scattering Society of India (NSSI)	9
Report from the Korean Neutron Beam Users Association (KNBUA)	9
Report from Taiwan Neutron Science Society (TWNSS).....	10
Report from China Neutron Scattering Society (CNSS)	11
Report from JSNS	13
Reports from neutron facilities	15
Report from JRR-3	15
Report from the Australian Nuclear Science and Technology Organisation	16
Report from China Advanced Research Reactor	17
Report from the China Spallation Neutron Source	19
Report for National Facility for Neutron Beam Research (India)	21
Report from J-PARC	23



Research highlight from our members: Neutron small-angle scattering data of daisy-chain dendrimer DC-G3 collected at the Chinese Neutron Spallation Source using small angle neutron scattering.

President's Message

AONSA has been very successful providing an active collaborative platform to promote the development and progress of neutron science and technology in the Asia-Oceania region for 12 years. It is my distinct pleasure to now serve as the President of the AONSA. Please allow me to express my sincere gratitude to my predecessor, Professor Brendan Kennedy for his outstanding guidance in the past two years. I would also like to thank all AONSA colleagues for their devoting contributions to the development of AONSA platform.

The year 2020, with the ongoing global pandemic, has brought monumental changes to our lives, including communication and travel restrictions. Faced with all the difficulties, we have not stopped. We moved meetings online and found new ways to serve. 24th AONSA EC and 19th AONSA FDM meetings were held online via ZOOM. One major agenda for us in 24th EC meeting was the election of the host for AOCNS-2023. Three Neutron Scattering Societies participated in the run for AOCNS-2023: the Chinese Neutron Scattering Society (CNSS) in Dongguan, the Neutron Scattering Society of India in Mumbai, and the Russian Neutron Scattering Society in Vladivostok. The AONSA EC delegates have voted Dongguan, China as the host city for the AOCNS-2023. Moreover, the 25th EC meeting and 20th FDM will also be held via ZOOM once again in the second half of 2020. The 12th AONSA Neutron School in this year has been postponed to 2021 for the impact of COVID-19. Provided that the international travel is back to normal next year, the 12th AONSA Neutron School will continue to be held in Dongguan of China. And 26th EC meeting and 21st FDM will be held in Indonesia during the first half of 2021. The 27th EC meeting, the 22nd FDM, and the 12th AONSA Neutron School will be held in Dongguan of China in October/November 2021. I am so proud that we were able to come up with so many unprecedented decisions with supports from all of our attendees, which will better serve the AONSA.

I am also pleased to report all the good news that we have acquired from the EC and FDM meeting. Dr. Vyacheslav Em from ROSNEUTRO has been approved to be an observer of the AONSA EC meeting at the 24th AONSA EC meeting. AONSA has been working with our counterparts in Europe (ENSA) and North America (NSSA) for worldwide cooperation and will be continued in the future. HANARO got restart permission of NSSC on 29 May 2019, and they will begin to accept general user proposal in November this year and the reactor is expected to restart at the end of February 2021. JRR-3 is scheduled to restart on February 2021. Although COVID-19 has had great impact on international travel worldwide, our scientists tried their best to overcome the difficulties, and to carry out neutron scattering experiments. The mail-in service was adopted for enabling users to carry out neutron scattering experiment by just sending their samples during the period of pandemic in ANSTO, J-PARC and others.

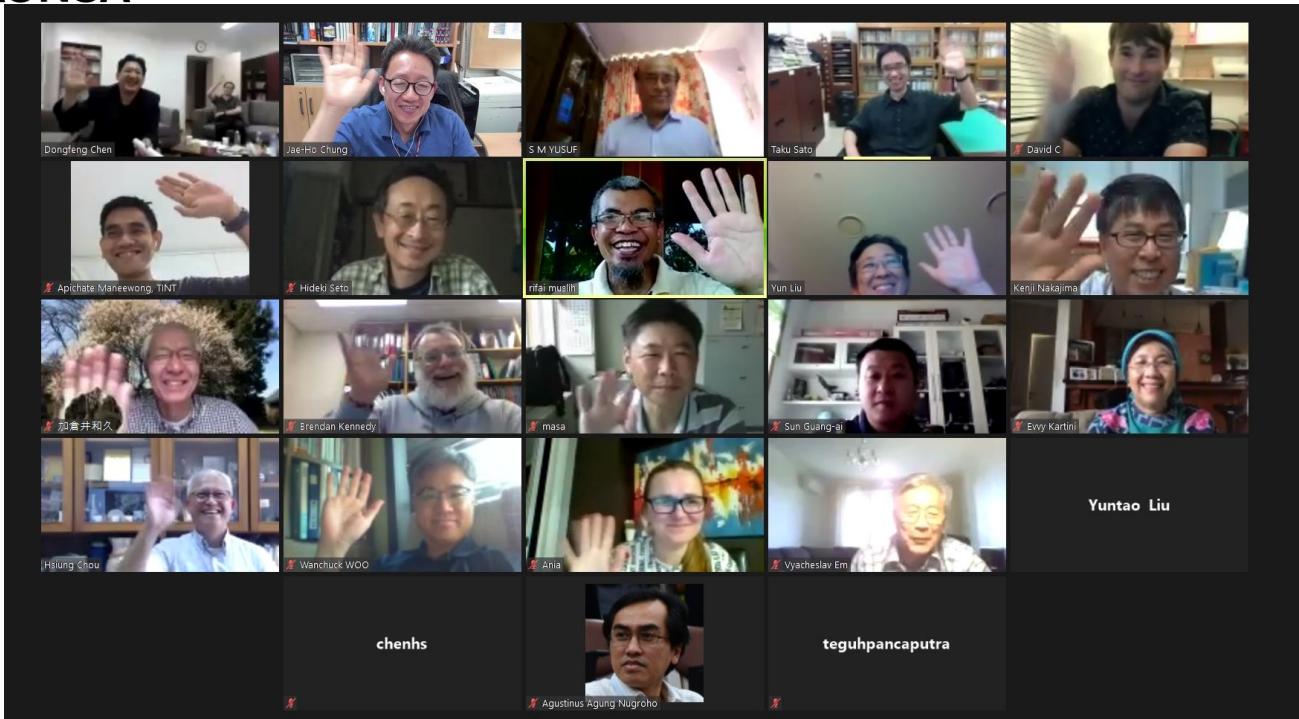
On behalf of all of us, it is a great honor to have Professor Taku J Sato, Professor Jae-Ho Chung, Prof. Hsiung Chou, Prof. David Cortie and Prof. S. M. Yusuf join in the AONSA Board. I look forward to working with you all and taking AONSA to next stage.

Prof. Dongfeng Chen



Professor Dongfeng Chen graduated in Jilin University for his BS (1991) and received his MS (1995) and PhD (1998) in China Institute of Atomic Energy (CIAE). Then he came back to CIAE after finishing two-year post-doctoral research in Argonne National Laboratory, USA, (1998-2000). He has been senior Professor of

Department of Nuclear Physics (DNP), CIAE since 2001 and Director of DNP from 2011 to now. He is served as the chief scientist of national 973 project, "The Key Technology of Neutron Beam on CARR" and invited professor in both Peking University and Jilin University. Moreover, he also served as Vice-President of CNSS (2012-present), Co-Chair of Gordon Research Conference (2019-present), AONSA Treasurer (2016-2017) and AONSA Vice-President (2018-2019). His main research areas are neutron scattering instrumentation and condensed matter physics. He is primarily responsible for the construction of 12 neutron instruments on CARR, and all of them have successfully collected original neutron data and part of results have been published on highly impactful journals.



Screen capture of the 24th AONSA Executive Committee Meeting held on ZOOM, June 20th, 2020

Report on the 24th AONSA Executive Committee Meeting

Public Relations Officer.

Brendan Kennedy as the Past President kindly hosted the ZOOM meeting.

The 24th AONSA Executive Committee Meeting was held on June 20th, Saturday, 2020, using the ZOOM hosted by Brendan Kennedy at the University of Sydney. This meeting was originally supposed to be held in Indonesia, which became unfeasible due to the on-going worldwide outbreak of the coronavirus and the resultant travel restrictions. The AONSA board members had held an online board meeting in May and decided to try the ZOOM program for the EC meeting. Although the members and observers are spread over different time zones, the ZOOM allowed twenty-seven participants to join the meeting which is the record-high number attending an EC meeting. It was the first EC meeting since the new board has formed with Dongfeng Chen (CIAE) as the President of AONSA. Taku Sato (Tohoku U) was promoted as the Vice President while Jae-Ho Chung (Korea U), Hsiung Chou (National Sun Yat-Sen U), and S. M. Yusuf (BARC) continued to serve as the Secretary, the Treasurer, and the Member-at-Large, respectively, in their second terms. David Cortie (U. Wollongong) joined the board as the new

Dongfeng Chen opened the meeting by welcoming all the participants and expressing gratitude to Brendan Kennedy. After the approvals of the agenda and the past minutes, the observer status of the Russian Neutron Scattering Society, or ROSNEUTRO, was discussed. Prior to the EC meeting, the ROSNEUTRO had contacted the AONSA board expressing their interest in hosting the AOCNS2023. Vyacheslav Em (Kurchatov Institute) joined the EC meeting as the representative of the ROSNEUTRO. After exchanging questions and answers, the observer status of the ROSNEUTRO was unanimously approved by the EC members. Vyacheslav Em will be the delegate of the ROSNEUTRO.

One of the most important decisions made during the 24th EC meeting is the host and venue of the AOCNS2023. Three applications were submitted prior to the meeting, in which the proposed

venues and the hosts were Dongguan in China, Mumbai in India, and Vladivostok in Russia, respectively. Given the nature of the ZOOM meeting, the bidding presentations with audio recording had been requested prior to the meeting and circulated among the EC members and observers. After a short session of questions and answers, the voting took place by taking advantage of the anonymous voting facility of the ZOOM. Out of fourteen eligible votes in total, Dongguan received 10 votes at the first round and was determined to be the venue of the next AOCNS in November 2023.

Taku Sato reported on the formations of the AONSA Prize 2021 and Young Research Fellow 2021 selection committees. Fangwei Wang, in reporting the 19th Facility Director's Meeting, proposed a postponement of the 12th AONSA Neutron School from 2020 to 2021 based on the ongoing travel restriction which is expected to continue in the second half of the year. The proposal of the postponement was approved by the EC members. Evvy Kartini suggested an idea of holding an online neutron school in place of the postponed school. Jae-Ho Chung, myself, said that, although it is a good idea, an online neutron school should be prepared from scratch and time is not enough for the second half of this year. I suppose the AONSA can look for two possibilities: making the AONSA Neutron School lectures available on the web, and designing lecture courses on the AONSA webpage. Either of

the two should be worth pursuing in the long run. David Cortie suggested opening a social networking service account of AONSA. Out of many possible choices, it was mentioned that only LinkedIn is allowed in China.

Since the 12th AONSA Neutron School has been postponed, the ZOOM program will be used once again for the 25th EC meeting. The exact date is to be determined, and most likely to be in November 2020. Assuming that international travels will be normalized in 2021, the 26th EC meeting will be hosted in Indonesia. After the society activities were reported, Dongfeng Chen thanked everybody for the successful online EC meeting.

Jae-Ho Chung
(Secretary of AONSA)



Jae-Ho Chung
(Secretary of AONSA)

Takeda(JRR-3), Jamie Schulz(OPAL), Kai Sun(CARR), P. U. Sastry(DHRUVA) and Rifai Muslih(G. A. Siwabessy). Furthermore, Dongfeng Chen (CIAE), Taku J. Sato (Tohoku Univ.), Jae-Ho Chung (Korea U), Hsiung Chou (National Sun Yat-Sen U), Brendan Kennedy (U. Sydney), Hesheng Chen (IHEP), Kazuhisa Kakurai (CROSS), Liu Yun (Australian National U), Tracy Rushmer (Macquarie U), Chun-Chuen Yang (CYCU), Evvy Kartini (BATAN), Apichate Maneewong (TINT), Sungil Park (HANARO), Anna Paradowska (OPAL), Yuntao Liu (CARR), Hideki Seto (J-PARC/KEK) attended as observers. Fangwei Wang chaired the meeting.

Report on the 19th Asia-Oceania Facility Directors Meeting

The 19th Facility Directors Meeting (FDM) was held on Friday 19 June 2020. The meeting took place through the ZOOM conference system (<https://uni-sydney.zoom.us/j/92268673966>) due to the epidemic of COVID-19, while this meeting was originally planned to be held in Indonesia.

Attendees: Fangwei Wang (CSNS), Wanchuck Woo (KAERI), Toshiya Otomo (J-PARC/KEK), Kenji Nakajima(J-PARC/JAEA), Masayasu

Facility Reports

Because the directors of JRR-3 and MLF/J-PARC had another virtual meeting in this duration,

the facility reports were started from JRR-3, not from CSNS as usual, in the following order: Masayasu Takeda on JRR-3, Toshiya Otomo on J-PARC MLF, Fangwei Wang on CSNS, Wanchuck Woo on HANARO, Jamie Schulz on OPAL, Kai Sun on CARR, Fangwei Wang on CMRR on behalf of Jian Gong, P. U. Sastry on DHRUVA, and Refai Muslih on G. A. Siwabessy. Overall, the facilities showed a healthy growth, with more and more new state-of-the-art neutron instruments recently built or currently under construction. JRR-3, HANARO will come back soon, OPAL operated in milestone 312 days in 2019, CSNS conducted stable operations at its design goal of 100 kW, J-PARC was ramped up to 600 kW. CARR overhauled two in-pile shutters (H-2 and H-4) and upgraded three instruments: residual stress, texture and HIPD. CMRR ran 203 days to support more than 100 users in 2019. DHRUVA were operated 140 days as schedule in Jan-June, 2020, and a time-of-flight (TOF) inelastic machine has been developed with some salient features. BATAN was operated in 150 days in 2019.

While a few facilities, for example CSNS and CMRR, ran as scheduled with user experiments on mail-in samples in the first half year of 2020, others did not serve to the user groups due to the COVID-19 pandemic, and will reopen to users recently, starting from mail-in mode.

AONSA businesses

Due to the effect of COVID-19, ANSTO postponed its acceptance of 2020 Young Research Fellows for one year. Dr. Chi-Hung Lee interrupted his stay at J-PARC, and J-PARC can accept his stay when he will be able to come to Japan. The visiting plan of the 2020 fellow (Dr. Taisen Zou) is under discussion. CSNS is in contact with Dr. Tingting Song, the 2020 fellow, to carry out her international trip. ANSTO, CARR, CSNS and J-PARC also expressed their willingness to accept one 2021 YRF respectively.

Regarding the AONSA Neutron School, the next AONSA Neutron School is currently scheduled in October 26-31, 2020 at CSNS. Due to the COVID-19 pandemic, CSNS is considering to postpone it to 2021, the directors supported this decision. The arrangement for the neutron school for 2022 will be discussed at a later stage.

Discussion on challenges, opportunities, and cooperation between facilities

Collaboration in this COVID-19 pandemic duration was heavily discussed. Mail-in services will provide robust opportunities for users to carry out neutron scattering experiments, just by sending their samples. However, such a remote access may cause overworking of instrumental staff. To overcome this problem, the technology in hardware and software must be improved. Even in ANSTO and J-PARC, the challenges with remote access may be less severe, since domestic users are coming back to these facilities. However, some of the beam lines, at which international users are dominant, will be seriously affected. Obviously, users will lose the opportunities of experiencing neutron scattering experiments. This issue is serious to not only current users but also to the next generation of researchers. Offering seminars and schools on the Web might be helpful to solve this problem. One idea is to organize a workshop with users, beamline staff, and management staff together to discuss this issue. Building a robust community, especially communication between facilities and users might be important.

Experience in building/upgrading state-of-the-art neutron instruments was discussed. All FDM members are positive in such collaboration. Short stay in the facility (exchange of staff) to learn instrumentation and user supports are suggested to promote such collaboration.

The venue of the next FDM will depend on the situation of the COVID-19 epidemic, and the FDM will follow the decision of the EC meeting. Kenji Nakajima will be the chair of the FDM meeting next year. The directors thank Brendan Kennedy and Jae-Ho Park for introducing the ZOOM virtual conference system to make the FDM successful.

Fangwei Wang (CSNS)



Mahn Won Kim Department of Physics Korea was the most recent recipient of the AONSA prize in 2019 for “his seminal contributions in building Asia-Oceania Neutron Scattering Association and the establishing of the neutron scattering community and facility in Korea, for his successful application of second harmonic generation (SHG) to investigate the air/liquid interface, and for his devoted mentoring of young scientists in the community of neutron scientists.”

Call for AONSA Prize Nominations 2021

The AONSA Prize was established in 2010 and is awarded every two years. The first four prizes were awarded to Prof. Noboru Watanabe (KEK) in 2011, Prof. Balebail Anantha Dasannacharya (BARC) in 2013, Prof. John William White (Australian National Univ.) in 2015, Prof. Nobuo Niimura (Ibaraki Univ.) in 2017, and Prof. Mahn Won Kim (KAIST) in 2019.

The AONSA is inviting nominations for the AONSA Prize to recognize an outstanding research career with a significant impact or contribution to the use or development of neutron science or technology in the Asia Oceania Region.

Anyone may submit one nomination or a seconding letter for the AONSA Prize 2021 by following the rules as described below by August 31, 2020. Please send nominations electronically to the Chair of the Selection Committee (taku@tohoku.ac.jp).

The Prize winner(s) for 2021 will be announced in November 2020. The Prize Ceremony will take place and the Prize winner(s) will deliver the Prize Lecture during ICNS, July 04-08, 2021, Buenos Aires, Argentina.

The selection committee for the AONSA Prize 2021 are:

A. Paradowska (ANBUG)
F. Wang (CNSS),
D. Darminto (INSS)
T. J. Sato (Chair, JSNS)
S.-M. Choi (KNBUA)
D. Pandey (NSSI),
W.-H. Li (TWNSS)

AONSA Young Research Fellows 2021

The AONSA Young Research Fellowship Program has been established in 2014 to support exceptionally talented young scientists in the Asia-Oceania region and help them to develop their expertise and career in neutron science and



AONSA

technology. The Program will provide financial support for Fellows to visit major neutron facilities in the region for collaborative research using neutrons. Any young scientist in the Asia-Oceania region within 8 years of the completion of his/her PhD and who wishes to perform neutron research at major neutron facilities in the region (but not in his/her home country) can apply by following the Rules as described below. The hosting Neutron Facilities in 2021 are J-PARC (Japan), OPAL at ANSTO (Australia), CSNS (China), and CARR(China). A total of three Fellowship positions are available in this application round (maximum one for each hosting Facility) and the possible duration of each Fellowship visit is 3 to 12 months. Please send your applications electronically to the AONSA Office (fujii.misono@jaea.go.jp) with c.c. to taku@tohoku.ac.jp by August 31, 2020. The results will be communicated to applicants in November 2020 and the Fellowship visits will start in 2021. An application should include

- A standard application form (provided by AONSA) with all required information completed including a scientific plan for collaborative neutron research. (The application form can be downloaded from <http://www.aonsa.org>)
- A curriculum vitae including a full list of publications.
- One recommendation letter from a supervisor at the home institute.
- One letter of support from the President of the home neutron society or a representative of the home neutron community.

For more information about neutron scattering instruments available and possible opportunities at the Facilities, please contact the following persons:

J-PARC: Prof. Toshiya Otomo Email:

toshiya.otomo@kek.jp

OPAL at ANSTO: Dr. Jamie Schulz Email: Jamie.Schulz@ansto.gov.au

CSNS: Dr. Lin Li Email: lilin2009@ihep.ac.cn

CARR: Dr. Ruoyu Bai Email: ruoyub@163.com

Selection Committee for the AONSA Young Research Fellowship 2021:

K. Rule (ANBUG)

K. Sun (CNSS)

E. G. Putra (INSS)

T. J. Sato (Chair, JSNS)

K.-Y. Kim (KNBUA)

K. G. Suresh (NSSI)

W.-H. Li (TWNSS)

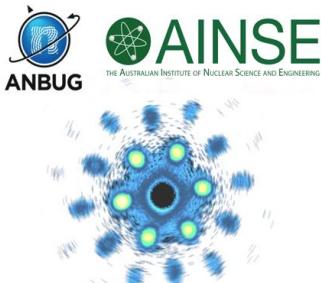
Update on the AONSA Neutron School

The AONSA Neutron Schools provide training for newcomers to neutron scattering across the fields of physics, chemistry, biology, materials science and more. As well as lectures, they include practical sessions with hands-on experiments and data analysis. All neutron techniques are generally covered, notably powder diffraction, single-crystal diffraction, strain scanning, small-angle scattering, reflectometry, inelastic and quasielastic scattering.

The AONSA Neutron School was originally scheduled in October 26-31, 2020 at CSNS. Due to the COVID-19 pandemic, CSNS has postponed the school until 2021, and the directors supported this decision. The arrangements for the neutron school-2022 will be discussed at a later stage.

Reports from neutron associations

Report from the Australian Neutron Beam User Group (ANBUG)



The ANBUG AINSE Neutron Scattering Symposium 2020

Online : November 13-15

ANBUG is run for the benefit of members and all profits from our User conferences are used to offer student prizes and travel bursaries. We promote neutron scattering to the community, especially to students and early career researchers.

In early 2020, we focused on updating and renewing our website and membership system. We adopted the open-source CIVICRM (<https://civicrm.org/>) platform for managing the membership database, mailing list and automated renewals. This has led to a revitalized membership list with over 200 members and still growing fast.

ANBUG welcomes all interested parties to join. As we are phasing out the old membership list, we are encouraging everyone to switch over to our new membership system by joining at anbug.net/.

The ANBUG website also contains up-to-date information on the situation regarding the ongoing access to the ANSTO site and the impacts of COVID19 on the neutron scattering user program.

During the COVID-19 slowdown in New South Wales Australia, many of our members have had to work from home. To keep in contact, the Australian Centre for Neutron Scattering has been running a series of online seminars and this has been made freely available to ANBUG members. The list of upcoming seminars is [here](#).

Last year, ANBUG partnered with the Australian Synchrotron User Group to run the Joint User Group Meeting (AUM 2019). It was held at Macquarie University, Sydney Australia on December 2-3rd, 2019. We had 128 abstracts (75 oral and 53 posters). We were gender-balanced for our Plenary presentations.

Also last year, the ANBUG executive committee voted unanimously to adopt a statement of conduct and diversity. The statements can now be found online: <http://anbug.net/equity-policy/> and <http://anbug.net/code-of-conduct/>.

In other neutron news, the Australian Institute of Physics (AIP) ran an exciting seminar on the quest for controlling quantum physics. ANBUG member and ANSTO scientist Kirrily Rule gave a presentation on quantum magnetism, along with the foremost experts in quantum computing and superconducting technologies.



The Australian Institute of Physics highlighted the field of neutron scattering in quantum magnets explored by Dr Kirrily Rule (ANSTO)

Finally, ANBUG is committed to running our annual user meeting (the ANBUG AINSE Neutron Scattering Symposium) in an online format for 2020. The dates selected are November 2020 and will be announced soon on the website. Details are available here: <http://anbug.net/aanss2020/>

Report from the Neutron Scattering Society of India (NSSI)



NSSI has been actively involved in popularizing neutron scattering techniques in India. As a part of this, in the recent meeting of its managing committee members at BARC, Mumbai, the following was decided:

1) To hold one or two special lectures annually on neutron scattering under the NSSI banner. Eminent scientists from India or abroad will be invited to deliver these lectures. The lecture series is proposed to be named as “NSSI Lecture on Neutron Scattering”.

2) To organize a Neutron School, “Neutron as Probes of Condensed Matter” (XIX in the series) at BARC in 2020-21. Nearly 60 participants, mostly from various Indian universities and institutes, are expected to attend the school. The School, which is likely to be spread over five days, will comprise lectures on the basic principles, and applications of neutron scattering techniques as well as hands-on experiments using the neutron scattering facilities at BARC, Mumbai.

S. M. Yusuf, President,
(Neutron Scattering Society of India)

Report from the Korean Neutron Beam Users Association (KNBUA)

The members of the KNBUA received the 3-year research grant which is designed to pay for travel expenses to neutron scattering facilities around the world. This funding, which is available until the

end of 2022, can support not only the scientists currently listed as team members of the grant but also any students in Korea.

This research grant is provided by the National Science Foundation of Korea under the title of “Program to Support Researches Using Large Overseas Research Facilities”. The team applied to the grant as “Center for Materials Research using Neutron Beams”, and successfully received the grant of USD 165,000 annually (some reduction is expected in 2021 due to the coronavirus-inflicted travel restrictions). The principal investigator is Jae-Ho Chung (Korea University), and the team members include Sungkyun Park (Pusan NU), Soo-Hyung Choi (Hongik U), Tae-Hwan Kim (Cheonbuk NU), Su-Yeol Lee (Chungnam NU), Eun-Soo Park (Seoul NU), Seungwook Lee (Pusan NU), Hyeyon-Cheol Oh (Kyeongnam STU), Minyoung Yoon (Kyeongbuk NU).

The funding will be spent almost exclusively as expenses travelling to neutron beam time experiments and/or neutron schools overseas. Limited amounts may be available for travelling to muon beam time experiments and/or neutron scattering conferences. Previously, the team had received a similar three-year grant between 2017 and 2019. To promote neutron scattering science in Korea, the new Center will reserve up to 5 % of funding to support students who are not members of the original grant proposal in case he/she needs to travel for neutron scattering beamtime experiments. This is available to students who are formally affiliated with universities or institutions in Korea, regardless of nationalities, at the time of experiments. To receive supports, students need to join the Center before travelling to the facilities. We are cordially asking those at neutron beam facilities to encourage their student users from Korea in advance to contact Jae-Ho Chung via e-mail: jachc@korea.ac.kr.

Jae-Ho Chung (President)

Report from Taiwan Neutron Science Society (TWNSS)

The TWNSS 2020 1st committee meeting was held in Windsor Hotel, Taichung on Jan. 17, 2020. The purpose of the meeting was (1) to thank the contribution of the TWNSS committee members to the AOCNS 2019 and (2) to discuss the annual activities, such as 2020 TWNSS annual conference and/or workshop to promote more Taiwanese users to access neutron facilities in Asia-Oceania regions. The group photo is shown in Figure 1.



Fig. 1. 2020 TWNSS 1st committee meeting group photo.

Another event that occurred before the COVID-19 pandemic was the “Triple axis SIKA training workshop” which was held in NSRRC, Hsinchu during Jan. 8-10, 2020. This offered 3 days of intensive training about the principles of SIKA instrumentation and applications. Students and researchers gained valuable insights for operating the SIKA facility located in ACNS, ANSTO, Australia. This will speed up the process of doing on-site experiments and data analysis in the near future. The workshop group photo is shown in Figure 2.



Fig. 2. Triple axis SIKA training workshop group photo.

Some other news include:

- (1) **Journal special issue editor:** Professor E-Wen Huang will be one of the special issue editors of Quantum Beam Science Journal. Some selected papers related to “Asia-Oceania Neutron and Advanced Photon Source for Industrial Applications” from AOCNS 2019 will be peer-reviewed and published in this special issue.
- (2) **Book chapter contribution in Solid State Physics vol. 71:** Professor Ko-Wei Lin and other co-authors (David Cortie, Univ. of Wollongong, Australia; Sara Callori, CSUSB, USA; and Thomas Saerbeck, ILL, France) will contribute a book chapter (entitled: Using polarized neutron reflectometry to resolve effects of light elements and ion exposure on magnetization). The book will be published by Elsevier in Nov. 2020.

Ko-Wei Lin (President, TWNSS)

Report from China Neutron Scattering Society (CNSS)

The 7th Chinese Conference on Neutron Scattering, jointly organized by CNSS, CARR, Peking University, CSNS and CMRR, was held in Beijing, on Nov. 11-14, 2019. More than 160 attendees from 50 universities and research institutes attended the meeting. 50 speakers shared their latest research achievements in 6 themes: the progress of neutron instruments, large-scale neutron scattering, industrial applications of neutrons, neutron inelastic scattering, development of neutron technology, and neutron diffraction. And, four young scholars were rewarded for Young Outstanding Paper Awards during this meeting. Professor Hesheng Chen awarded them certificates.



Moreover, the 8th Plenary Meeting of CNSS was held in Beijing on Nov. 12, 2019 during the 7th Chinese Conference on Neutron Scattering. Presidents of the neutron scattering society of America (NSAA), Europe Neutron Scattering Association (ENSA) and Asia-Oceania Neutron Scattering Association (AONSA) also attended the meeting. International exchanges and cooperation were discussed during this meeting.





In 2020, many workshops were held in small-scale discussion or on-line for the COVID-19 epidemic. On May 22, 2020 Public Science Day was held on-line at CSNS. There are 3 popular talks, and more than 300,000 people listened to these talks on-line.

Hesheng Chen





Report from the Japanese Society Neutron Science (JSNS)

As of April 1, 2020, the number of the JSNS members is 548 including 29 students. In addition, there are 31 senior members. The number of the supporting members is 32.

The new council members have been now elected and the council members for the Japanese Fiscal Year (JFY) 2020 (April 1, 2020 – March 31, 2021) are listed below.

Council Members:

Term: 2019-2020 JFY

Hitoshi Endo (KEK)
Masaaki Fujita (Tohoku Univ.)
Hazuki Furukawa (Ochanomizu Univ.)
Michiro Furusaka (AIST)
Hiromichi Kishimoto (Sumitomo Rubber Ind.)
Kenji Ohyama (Ibaraki Univ.)
Hiroyuki Shimizu (Nagoya Univ.)
Masayasu Takeda (JAEA)

Term: 2020-2021 JFY

Masahiro Hino (Kyoto Univ.)
Yoshiaki Kiyanagi (Nagoya Univ.)
Kenji Nakajima (J-PARC)
Yoshie Otake (RIKEN)
Taku Sato (Tohoku Univ.)
Hideki Seto (KEK)
Masaaki Sugiyama (Kyoto Univ.)
Naoya Torikai (Mie Univ.)

There have been also member changes in the Board of Administration as follows:

Board of Administration

Secretary

Seiko Kawamura (J-PARC)
Taro Nakajima (Univ. Tokyo)

Treasurer

Kazutaka Ikeda (KEK)
Yohei Onodera (Kyoto Univ.)

Events Coordination

Ryoji Kiyanagi (J-PARC)
Go Matsuba (Yamagata Univ.)
Toshiyuki Chatake (Kyoto Univ.)

Communication

Yusuke Nambu (Tohoku Univ.)
Daisuke Okuyama (Tohoku Univ.)

Public-Relations

Nobuhiro Sato (Kyoto Univ.)
Xiang Li (Univ. Tokyo)

Publication

Taturo Oda (Kyoto Univ.)
Kazuya Kamazawa (CROSS)

COVID-19 pandemic related measure: As there are many students impacted by the coronavirus outbreak in Japan, the JSNS has decided to waive the FY2020 student membership fee.

Neutron Science Instruments Capacity in Japan

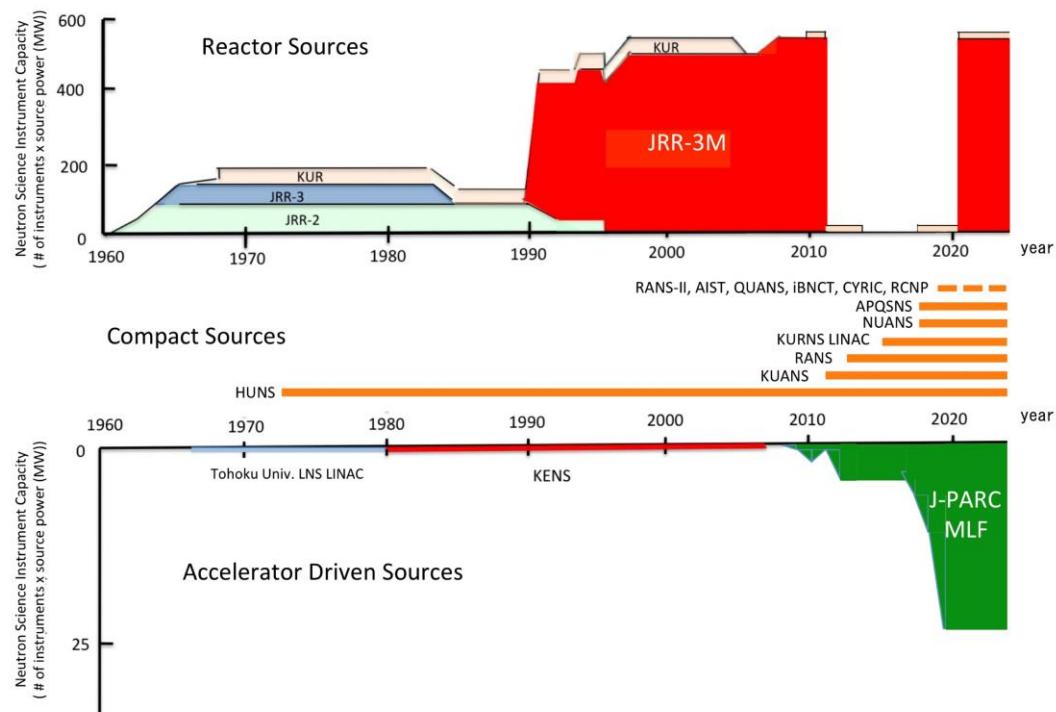


Fig. 1: Yearly development of the neutron science instruments capacity (number of instruments x source power (MW)) in Japan

JSNS Activities

Working Group on Neutron Facilities Coordination

The meeting of the working group chaired by Prof. Kiyanagi, the former President of JSNS, was held on March 30, 2020.

Besides the large-scale neutron sources at J-PARC MLF, JRR-3 and KURR, numerous accelerator-based compact neutron sources are operating and are under construction in Japan (see Figure). The coordination of the neutron science activities at all these neutron sources is very important to further promote the neutron science in Japan. The working group is thus proposing the Neutron Facilities Coordination Program to be included in the ‘Roadmap for the Promotion of Large Scale Project’ by the Ministry for Education, Culture, Sports, Science & Technology (MEXT) – Japan.

Neutron Science Promotion Committee

The Neutron Science Promotion Committee (NSPC) has been established, following the approval in the JSNS General Assembly Meeting at AOCNS2019. The NSPC will discuss the long-term vision for the neutron science promotion in Japan and report to the president of JSNS.

Committee Members

Chair: Taka-hisa Arima (Univ. of Tokyo & RIKEN)

Masaki Fujita (IMR, Tohoku University), Takanori Fukushima (TIT), Masahiro Hino (Kyoto University), Hiroyuki Kagi (Univ. of Tokyo), Yoshie Otake (RIKEN), Toshiya Otomo (KEK), Toshiyuki Shimizu (Univ. of Tokyo), Jun-ichi Suzuki (CROSS), Yasunori Tabira (MITSUI MINING & SMELTING CO.,LTD)

Online Sendai Annual Meeting 2020

The 20th Annual Meeting of the Japanese Society for Neutron Science will be held in an online format as ‘Online Sendai Annual Meeting 2020’ from Nov. 9 to 11, 2020. This anniversary meeting was originally planned to be held on the Tohoku University campus in Sendai, which became infeasible due to the on-going

coronavirus pandemic. The meeting program comprises a joint session with the Society of Muon and Meson Science of Japan (JMMS) and a JRR-3 Symposium.

The 5th Neutron and Muon School at J-PARC MLF

The organizing committee is currently discussing the mode and schedule of the school.

Reports from neutron facilities

Report from JRR-3

JAEA (Department of Research Reactor and Tandem Accelerator)

We are now working hard to restart JRR-3 at the end of next February. Anti-seismic reinforcement works for the reactor building are in progress. Construction of a new roof of the reactor building has been just started in June (seen in photos in the following section). The general user proposals will be called for in this November. However, it has not been decided exactly when users can start their experiments. Both operating time and power will be increased step by step. We now suppose at least four months before stable operation with the full power are necessary. The schedule of the general user program will be announced as soon as it is determined.

JAEA (Materials Sciences Research Center):

Most of the motion control and DAQ systems of instruments have been used for more than twenty years. We replaced these old systems with the latest ones. New He-free refrigerators and a superconducting magnet are also employed triggered by the He-gas crisis. We will have a JRR-

3 symposium in the annual meeting of JSNS in this November in cooperation with JSNS and Tohoku University. This symposium will be held just after we start to call for general user proposals for experiments using JRR-3. We would like to make this symposium a good occasion to draw the attention of previous and potential users of JRR-3 to the restart of JRR-3 scheduled for few months later.



Photographs of the reinforcement work of JRR-3

ISSP:

The Neutron Science Laboratory (NSL) of ISSP has been running the Overseas-Experiment

Program since 2012. Travel expenses for two scientists per proposal were supported under the program. 47 persons were sent abroad in JFY2018, and 30 persons in JFY 2019, namely, OPAL, NIST, ILL, ORNL, etc. Table 1 on the following page shows the statistics of the program. 106 papers have been published in refereed journals since JFY 2011. See,
<http://www.issp.u-tokyo.ac.jp/labs/neutron/download/OverseasPubList.htm>

The NSL continues to make a call-for-proposals

Facility			Number of users								
			FY2011	FY2012	FY2013	FY2014	FY2015	FY2016	FY2017	FY2018	FY2019
HFR	ILL	France	3	9	0	4	3	1	0	3	0
OPAL	ANSTO	Australia	7	7	6	18	22	34	22	19	21
HANARO	KAERI	Korea	2	7	12	0	0	0	0	0	0
FRM- II	MLZ (Munich)	Germany		4	1	0	8	1	7	2	2
ISIS	Rutherford Appleton Laboratory	UK		4	4	4	4	0	4	3	1
SINQ	PSI	Switzerland		1	4	5	6	1	3	4	0
NBSR	NIST	USA			7	13	5	2	11	6	4
BER II	HZB (Berlin)	Germany			2	0	7	3	2	2	2
HFIR	ORNL	USA	13		1	1	1	6	4	7	0
SNS	ORNL	USA			4	2	1	5	6	1	0
ORPHEE	LLB	France			2	1	1	1	2	0	0
Total			25	32	43	48	58	54	61	47	30

Table 1. Numbers of scientists sent to overseas facilities since 2011 under Overseas-Experiment program of NSL-ISSP.

Report from the Australian Nuclear Science and Technology Organisation

Australia's Open Pool Australian Light-water (OPAL) reactor is a state-of-the-art 20 Megawatt reactor that uses low enriched uranium (LEU) fuel to achieve a range of nuclear medicine, research, scientific, industrial and production goals.

The Australian Centre for Neutron Scattering

every year to keep neutron users in Japan. For JFY 2019, 83 general user proposals and 14 Instrument and Research Team (IRT) proposals were approved. Some proposals will be supported by the Overseas-Experiment Program.

In order to re-activate the User Program effectively, NSL has started to examine university-owned instruments for upgrading/abolishment.

Osamu Yamamuro (ISSP, U. Tokyo),
Yoji Murayama (JAEA),
and **Masayasu Takeda** (JAEA)

(ACNS) operates the suite of neutron beam instruments at the OPAL reactor and leads Australia in the use of neutron scattering and X-ray techniques to solve complex research and industrial problems in many important fields. There are currently 15 operating neutron beam instruments available for users.

Open competitive access to the neutron beam instruments is available through the ACNS User Portal (<http://neutron.ansto.gov.au>). Calls occur biannually and close in 15th September and 15th March.

On 23rd March in response to the COVID-19 pandemic ANSTO moved to an essential and critical operations mode with all scientific research infrastructure including the ACNS being shutdown unless they provide supporting functions for essential and critical operations (reactor operation, radiopharmaceutical production, site maintenance etc) or are undertaking COVID-19 related research.

ACNS has an open call for COVID-19 related research using our neutron scattering instruments. Since then the OPAL reactor continued to operate whilst the neutron scattering instruments were shut down and ACNS staff worked remotely.

We commenced the return to the ANSTO site on Monday 25th May and undertook maintenance, upgrades and commissioning activities to ensure the number of days available for our users is maximised later in the year as travel restrictions ease. The ACNS user program recommenced after the scheduled OPAL reactor shutdown on the 23rd June. We initially started user operations with the

backlog of proposals that could not be run due to COVID-19 travel restrictions and the ANSTO shutdown, initially using mail-in and undertaking proposals with Sydney-basin users. We envision this will expand to interstate users, New Zealand users (if the Australia-New Zealand travel bubble is created) and finally international users as the travel restrictions ease.

A total of 330 proposals for cold- and thermal-neutron beam experiments were received for the 2020-2 proposal round with 135 proposals approved by the Australian Centre for Neutron Scattering & National Deuteration Facility Program Advisory Committee.

Jamie Schulz
(ANSTO)

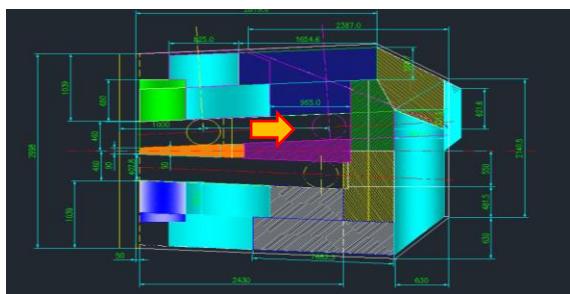


Report from China Advanced Research Reactor

At present, 12 neutron instruments have been built and 6 instruments are under construction at CARR. The annual operation schedule of CARR has been postponed due to the impact of COVID-19, so beam time was unavailable up to June 2020. However, CARR is planning to operate about 50 days at high power (over 30MW) in the second half of this year

Many of the following efforts have been focused on instruments development in the first half of 2020. Firstly, the shielding system of the High

Intensity Powder Diffractometer (HIPD) has been upgraded. The in-pile shutters have been inspected and the location of the monochromator has been re-planned to save more space for sample environment and to gain a larger accessible Q range. A figure of this is shown on the next page.



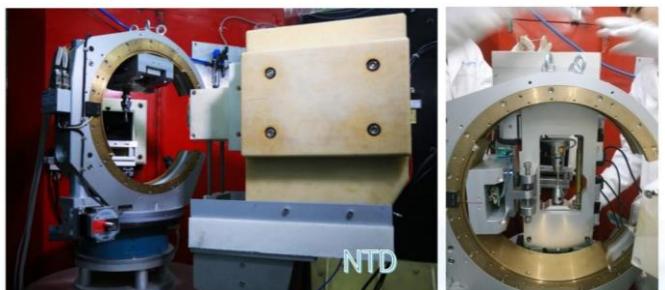
The upgrading of the shielding system of HIPD

To be able to test big/heavy samples, a new sample stage has been installed for the Residual Stress Diffractometer (RSD), which has higher loading capacity, better accuracy, and multiple orientations for sample movement.



A new sample stage for RSD

An in-situ tensile sample tester has been equipped for the Neutron Texture Diffractometer (NTD).



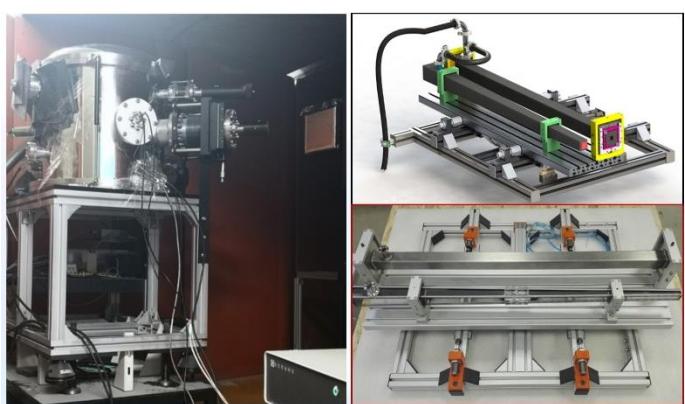
In-situ tensile testing environment for NTD

For the Small-Angle Neutron Scattering (SANS) instrument, the Cd shielding inside the detector tube has been strengthened by adding aluminum supporters, and the instrument control software is also being upgraded.



The Cd shielding strengthening and software upgrading in SANS

The sample changer and the neutron focusing system of the Neutron Depth Profiling (NDP) instrument have been upgraded. And a new area detector has been installed for investigating the 3D Li-ion distribution and transport in lithium ion batteries.



The upgrading of NDP

Communication and cooperation with users and other institutes are still ongoing. It is worth mentioning that the coronavirus protein (nsp13) structure is being investigated by our team using nondestructive contrast variation SANS technique,

in collaboration with the Chinese Academy of Medical Sciences/Peking Union Medical College, Oak Ridge National Lab and the Shanghai Synchrotron Radiation Facility to fight against COVID-19.

Kai Sun (CARR)



Report from the China Spallation Neutron Source

In 2019, CSNS had completed user tasks as planned with quite stable operation. More than 4500 hours were actually opened to users, and the beam supply efficiency reached 92.6%. CSNS called two rounds of user proposals, 112 proposals were selected from 276 received after peer-review with the acceptance rate of 41%. Those accepted proposals included 2 from overseas and 12 from Hong Kong and Macao. Meanwhile, CSNS received 22 applications from rapid access, and 18 were accepted. In total, CSNS had completed 130 experiments, covering the structure of new lithium-ion battery materials, the topological magnetism of Skyrmionic phases, the spin Hall effect in magnetic thin films, the nano phases of high-strength alloy, the structure of solar cells, the neutron single particle effect on chips, and so on so forth. Users came from more than 70 domestic and foreign research institutes and universities. At present,

more than 30 papers with CSNS neutron data have been published in Science, Nature Communication, Advanced Material and other journals.

CSNS began the commissioning of 100 kW, the design goal, on February 3, 2020, while there existed some difficulties caused by the COVID-9 epidemic. The beam power of 100kW was transferred successfully to the neutron target on February 28, one and a half years ahead of the schedule. After that, the CSNS has been running in 100 kW, the uncontrollable beam loss is better than that in the previous 80 kW operation. Three neutron instruments, GPPD, SANS and MR, carried out a new round of calibration, then started the users experiments in mail-in mode. The first user from the University of Science & Technology of China carried out his on-site experiment on March 15. In order to ensure the health and safety of users, a special reception process, body-temperature check and epidemic prevention procedure have been formulated.

The first Science paper, entitled "Making ultra

steel gauge by grain boundary deletion" (DOI: 10.1126/science.aba9413), was published online by Dr. Mingxin Huang of University of Hong Kong with CSNS GPPD data. Huang's team, effectively collaborated with the GPPD team, and obtained the phase volume ratio and dislocation density in the low-cost D & P steel through neutron diffraction patterns (Figure 1), and proposed a novel toughening mechanism of grain boundary delamination induced by high yield strength, which breaks the traditional understanding that the strength enhancement reduces the fracture toughness of materials.

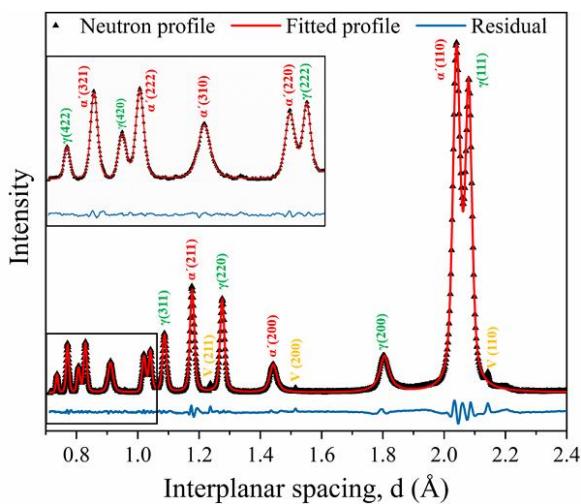


Figure 1. Neutron diffraction pattern of D&P super-fort steel recorded by CSNS GPPD

CSNS SANS has achieved a wider Q value range of 0.005-0.6 Å⁻¹ after further optimization, which can detect the structure in a real space scale of 1-125 nm. Prof. Haibo Yang of East China Normal University conducted the SANS experiments on the solution and solid composite membrane samples which imitate new artificial muscles, and confirmed that the conformation of each branch of daisy chain dendrimer folded after stimulating, which results in the overall controllable and reversible size change (Figure 2). Those results were published on Journal of the American Chemical Society (<https://pubs.acs.org/doi/abs/10.1021/jacs.0c02475>). This research is of great significance for the construction of new artificial muscles and the development of dynamic intelligent materials.

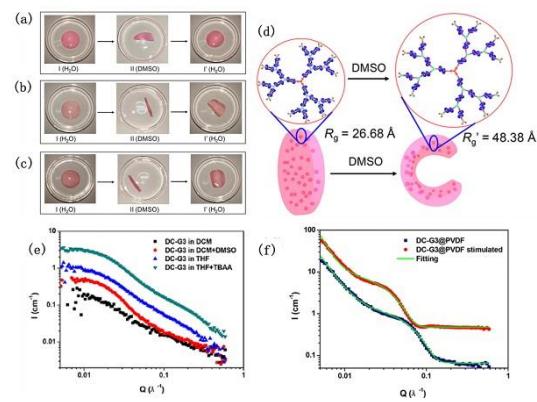


Figure 2. Neutron small-angle scattering data of daisy chain dendrimer DC-G3 collected by CSNS SANS

The team running the Multipurpose Physics Instrument (MPI), in collaboration with Dongguan University of Technology and City University of Hong Kong, has installed its shielding blocks. Engineering Materials Diffractometer, collaborated with Center of Advanced Engineering Materials of Dongguan and started the construction of its scattering room out of the scattering hall on June 6.

CSNS held an online public science day with the theme of "micro eye helps the bay area" on May 22, 2020, in place of the usual on-site tour due to the COVID-19 pandemic. The live broadcast connected three interesting science lectures:

- Particles and accelerators (by Weiling Huang)
- Neutron scattering to "see" atoms (by Ping Miao).
- Explore the mysterious micro world by photons, neutrons and muons (by Yu Bao).

This virtual tour collected more than 300000 hits, and was broadcast in primary and secondary schools in surrounding towns of Dongguan.

The annual work meeting of the Joint Laboratory of Neutron Scattering Science & Technology of Guangdong, Hong Kong and Macao was held on June 8. The laboratory constitution, academic committee, open projects and management were discussed in detail. Prof. Hesheng Chen is the first director of the joint laboratory.

CSNS won the "24th China 5.4 Youth Medal (Group)". More than 70% of the CSNS team are under 35 years old, this award is in recognition of their contributions in the CSNS construction and operation.

Report from the National Facility for Neutron Beam Research (India)



Neutron time of flight facility for inelastic neutron scattering experiments

Neutron scattering in India is part of a wider development program aimed at utilizing research reactors for peaceful uses. As part of development and improvement of these programs, at Dhruva reactor in Bhabha Atomic Research Centre (BARC), Mumbai, a neutron time of flight facility was developed. Some photographs are shown in Fig. 1. The neutron beam from the reactor is monochromated (wavelength = 1.2 Å) employing a focusing Cu (111) assembly which hits the sample after being pulsed by a neutron Fermi chopper. The scattered neutrons pass through a flight chamber and reach the detectors. An array of indigenously developed forty 1 metre long ^3He filled position sensitive detectors provides horizontal coverage of 40° to 114°. The detectors are arranged on a circle with radius 2 metres around the specimen to avoid flight path differences. The detector signal is stored in a multichannel time recording unit which starts synchronously with each pulse from the neutron Fermi chopper. Thus the spectrum of recorded neutron counts is built up as a function of neutron flight time. The energy resolution of the instrument is around 7-12% (Fig. 2/ Fig. 3). Efforts are now continuing to reduce radiation background around the sample with installation of evacuated sample chamber and enhanced shielding.



Fig. 1. Photographs of the neutron time of flight facility showing (above) Fermi chopper, radiation shielding and (below) arrangement of detectors.

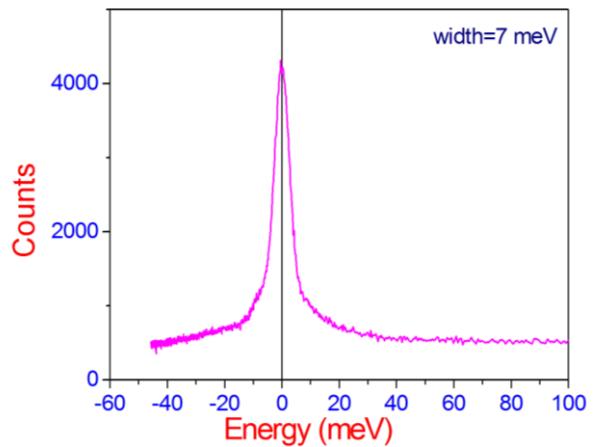


Fig. 2. Time of flight data showing the energy resolution measured using standard vanadium.

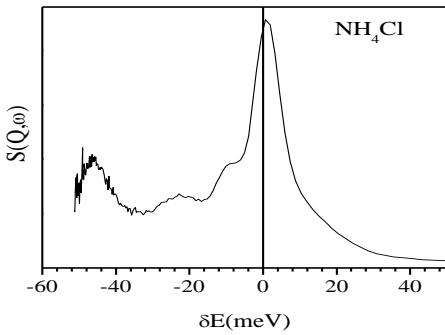


Fig 3. Peaks at energy transfers of 24 meV and 48 meV corresponding to the librational modes of NH_4 seen in the energy spectrum of ammonium chloride.

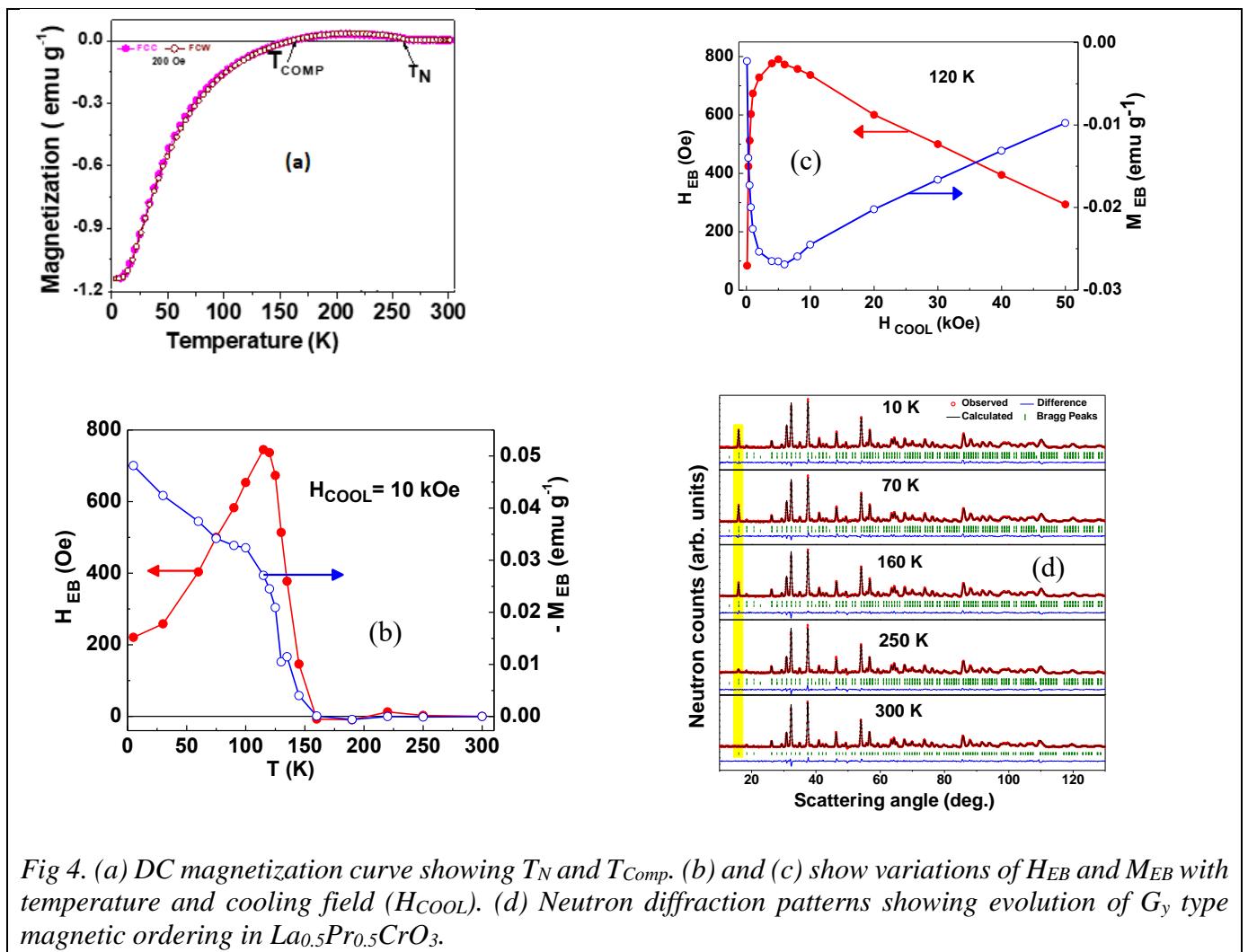


Fig 4. (a) DC magnetization curve showing T_N and T_{Comp} . (b) and (c) show variations of H_{EB} and M_{EB} with temperature and cooling field (H_{COOL}). (d) Neutron diffraction patterns showing evolution of G_y type magnetic ordering in $\text{La}_{0.5}\text{Pr}_{0.5}\text{CrO}_3$.

Investigation of Exchange-Bias and Negative Magnetization in $\text{La}_{0.5}\text{Pr}_{0.5}\text{CrO}_3$

The materials showing both negative magnetization (NM) and exchange-bias (EB) offer the possibility of making magnetic memory

and spintronics devices. However, coexistence of these two phenomena in a single system is rare. The perovskite compound, $\text{La}_{0.5}\text{Pr}_{0.5}\text{CrO}_3$ is one such system that shows both the NM and EB. We have investigated the correlation of the EB with the NM in $\text{La}_{0.5}\text{Pr}_{0.5}\text{CrO}_3$ system by carrying out dc magnetization and neutron diffraction studies

[1]. The compound shows a magnetic ordering at the Néel temperature, $T_N \sim 264$ K and negative magnetization below the compensation temperature ($T_{COMP} = 160$ K) [Fig. 4 (a)]. Interestingly, a positive EB [Fig. 4 (b)] also appears in this compound below the T_{COMP} . Both positive horizontal (H_{EB}) and negative vertical (M_{EB}) shifts of field - cooled hysteresis curves [Fig. 4 (c)] indicate a maximum for a cooling field of 5 kOe, which is also the maximum field for observing NM in $\text{La}_{0.5}\text{Pr}_{0.5}\text{CrO}_3$ indicating a correlation between the EB and NM. The neutron diffraction study at various temperatures [Fig. 4 (d)] has inferred a G_y type AFM ordering of Cr^{3+} moments below the T_N . It is concluded that antiferromagnetic exchange interactions between induced Pr^{3+} and weakly ferromagnetic Cr^{3+} moments are responsible for the observed NM and positive EB behaviours. The understanding may open up the possibility for making thermomagnetic switches, spintronic, and magnetic memory devices.

Reference:

- [1] Deepak, A Kumar, SM Yusuf, Journal of Applied Physics **127**, 213903 (2020)

Report from J-PARC

From April 8th, the user program of MLF was limited to in-house, mail-in and undertaking experiments in response to the COVID-19 pandemic. From April 20th, MLF beam operation was paused taking into consideration the request of the Japanese government for controlling spreading infection of COVID-19 (declaration of a state of emergency). The declaration was lifted on May 14th, and MLF decided to resume the beam operation on the next day 15th. We restarted limiting to in-house, mail-in and undertaking experiments, then opened for the users step by step. Until the end of May, MLF activities were almost fully opened for users living in Japan.

All the MLF user experiments scheduled on

the round 2019A, 2019B and 2020A which are yet to be carried out partly due to the delay of beam delivery after the long shut down in November 2019 and partly due to the COVID-19 pandemic can be postponed (carried over) but will expire in the end of fiscal 2020 (March 31, 2021) without further extension. The MLF proposal round 2020B and 2021A was combined due to the COVID-19 situation and called during June 17 to July 15. The call for proposals in October and November (for 2021A round) may not be held this year depending on the situation.

The daily availability of the beam operation of MLF was 93.7% on average since April 1, as of June 27th in 2020. The beam power was raised from 500 kW to 600 kW on May 18th and 1 MW beam operation with the duration time of 36.5 hours was held from June 25th to 27th which is much longer than the 1 MW operation of 10.5 hours last year. During the 1 MW operation, data for integrity diagnosis of target container were obtained and neutron scattering experiment were performed.

Almost of all symposium, conference and workshops have been cancelled in this period. MLF plans to organize two major international workshops, DENIM (the 9th Design and Engineering of Neutron Instruments Meeting) and ISSE Workshop (2020 International Sample Environment Workshop), they both are strongly important and related to neutron instrumentation and techniques. These two series of workshops are planning to be held in person in summer, 2021.

Prof. Toshiji Kanaya retired MLF division head on March 31st, 2020 and was succeeded by Prof. Toshiya Otomo on April 1. In line with this, the organization of MLF has been renewed.

Toshiya Otomo
(J-PARC center / KEK IMSS)

For questions, and submissions to the next issue of the AONSA newsletter, please contact the editor:

David Cortie
dcortie@uow.edu.au
Public Relations AONSA