Newsletter From AONSA

The Asia-Oceania Neutron Scattering Association

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At The 2nd AONSA Executive Committee Meeting (Taiwan, Feb 22-25, 2009)

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President's comment

By Prof. Mahn Won Kim,
President and Professor
AONSA and KAIST

Right Time and Place with Good colleagues

As President of the Asia-Oceania Neutron Scattering Association (AONSA), I am very pleased to write the presidential comment on the newly starting AONSA newsletter.

The title of this comment is the one we need for achieving goals in the AONSA Article 2, Aims. AONSA represents neutron scattering communities in Asia and Oceania which covers more than two thirds of population and more than one thirds of land on earth. It is not a simple job to bring this huge diverse community together. A lot of hurdles and problems should be overcome to accomplish the goal of our society.

The AONSA goals include: identification of the needs of the neutron scattering community and to promote optimized use of present and future neutron sources in the region; stimulation and promotion of neutron activities and training, particularly opening opportunities for young scientists and engineers in the region. The Society provides the software for these goals. One of most important software is a good communication among members. I hope that this newsletter provides timely and a space to accommodate this need.

I would like to express my sincere appreciation to the editor and the people (colleagues) contributing articles on the AONSA current and future Newsletter.

SIKA-the Taiwan contract cold triple-axis spectrometer at the ANSTO OPAL reactor

Wen-Hsien Li, Peter Voderwisch, and Chun-Ming Wu
Center for Neutron Beam Applications, National Central University, Jhong-li, Taiwan

This project is based on an Arrangement signed in 2005 between the representative organizations of Taiwan and Australia governments, in which Taiwan will construct a high-performance cold triple-axis spectrometer (TAS) at the OPAL reactor, send 4 scientists to operate the cold-TAS, and obtain 70% of one instrument time for NSC (National Science Council) related scientists that may be distributed over the full set of instruments at OPAL reactor. The project is indeed a follow-up solution to the cancellation of the TRR-II project to build a reactor-based neutron scattering facility for the community.

The project started in December 2005, and is targeted to complete within 4 years. The cold-TAS to be constructed is named SIKA, after the native Taiwanese deer termed "Formosan sika deer". The sika deer is commonly known as "plum blossom deer" to reflect the symbolic figures appear on its skin. A beautiful picture of these deer may be found in Taiwanese 500-dollar bill. The selection of plum-blossom sika deer to appear in the Taiwanese bill speaks itself on its uniqueness and native.

It is known that a triple-axis spectrometer is mainly for performing inelastic scattering and obtaining information in K-space. The scientific term for SIKA is then "Spin-polarized Inelastic K-space Analyzer". There is a plan, in the second phase of construction, to incorporate spin-echo devices available before and after the samples. SIKA is the "Spin-echo Inelastic K-space Analyzer".

SIKA locates at the Reactor Beam Hall and directly attaches to the OPAL reactor face, receiving neutrons from the CG4 beam tube that extracts neutrons from the cold source. This position at the Beam Hall has the advantage to receive all neutrons from the CG4 beam tube, but at the expense of higher background count-rates in comparison to a Guide Hall position.

SIKA equips with double focusing PG and Si monochromators of size 230×252 mm^2. The PG monochromator consists of 11×11 ZYA quality HOPG(002) crystals each covers a 20×22 mm^2 reflection face, as shown in Fig. 1. The Si monochromator consists of 13 Si(111) crystals each having a reflection face of 17×210 mm^2.

The take-off angle of the monochromator covers 30 to 120^0, giving a useful wavelength range of 1.74 to 5.8 Å or an energy range of 2.4 to 27 meV for the incident beam, when employing the HOPG mono. It shifts to a slightly higher energy, when Si mono is used. The distance between the monochromator and sample is 2100 mm long to ensure enough space for polarization or spin-echo devices.

SIKA equips with 13 HOPG(002) analyzer crystals, each of size 20×150 mm^2, as shown in Fig. 2. A PSD with pixel size at 0.75° of arc is coupled to the analyzers. These analyzer-detector systems may be operated in horizontal focusing mode or work independently. In addition, a single detector group and a diffraction detector group are also available. All these components are arranged in a compact housing, as shown in Fig. 3. Neutron polarization will become available for the incident and scattered beams through ^{3}He polarizers, when such devices become accessible at ANSTO.

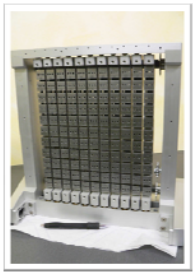


Fig. 1. HOPG mono.

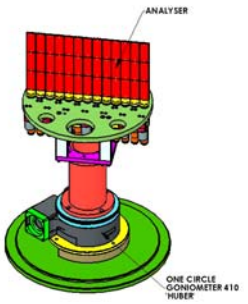


Fig.2. SIKA analyzers.

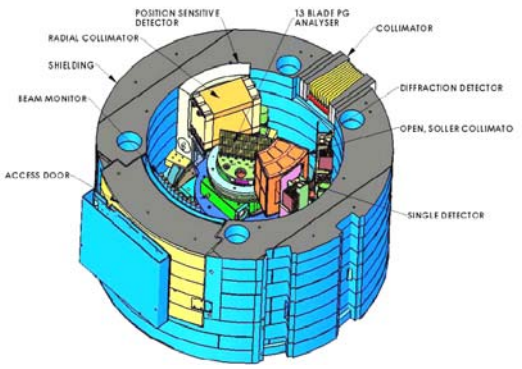


Fig. 3. Analyzer-detector system.

Activities of the Korean Neutron Beam Users' Association (KNBUA)

KNBUA was founded in 2003 as the neutron beam users began to swell in Korea. There is a surprisingly long history of neutron scattering in Korea which dates back to early 1960's, but the scattering technique was reserved to a privileged few since the research reactors of the time were not powerful enough to attract users. The construction of the modern research reactor, HANARO, in 1990's was a huge turn-around. The 30 MW-reactor is a multi-purpose reactor suitable for many applications such as irradiation tests, radioisotope production and neutron beam research. Most importantly, however, it boasts one of the highest neutron beam flux in the world. Many users began coming to HANARO to perform serious experiments since the reactor went critical in 1995. They formed a user group to communicate effectively with HANARO and among themselves, which later became KNBUA. KNBUA is now a formally incorporated organization.

The membership of KNBUA saw a significant growth after the Cold Neutron Research Facility (CNRF) project launched at HANARO. The project aims to bring a cold neutron capability to HANARO and build 6 cold neutron instruments by 2010. The membership more than tripled since 2003 and the total number of members now exceeds 220.

KNBUA, as a whole, is engaged in many activities that promote neutron science in the country. Firstly, as its academic activities, it organizes or sponsors neutron science related workshops. Mostly these workshops are organized through the 4 topical groups the association is made of: the elastic group, the inelastic group, the low-Q group and the radiography group. Some of the examples of those workshops are the annual Workshop on X-ray and Neutron Scattering Techniques for Surface Nano-Characterization, the annual Meeting on Inelastic Neutron Scattering and many other occasional workshops members host.

Secondly, KNBUA advises HANARO management on various operational and user-related issues. Now that the completion of the Cold Neutron Facility Project (CNRF) is approaching, one of the most important issues at HANARO these days is to find the best way to operate the facility for maximum output. In this regard, the KNBUA-HANARO joint brainstorming was held in 2007. As a result, the two parties confirmed that the HANARO neutron beam facility is a national user facility and to ask the government to fund it adequately.

Thirdly, it promotes neutron science to the government and the industry by using various channels. After the brainstorming mentioned above, KNBUA discussed with the government to launch a policy study on how to operate and use the facility properly once the CNRF project is finished. The project is near its end, and it is expected that the recommendations made in the final report is followed through by the government and HANARO.

Fourthly, KNBUA promotes education of users by organizing tutorials, helping the HANARO user education program and sponsoring student training. Several students, annually, are sponsored to attend overseas neutron scattering training courses.

Lastly, KNBUA is actively engaged in international collaborations by organizing the international meetings and by communicating with the other societies. The annual Japan-Korea (or Korea-Japan) meeting is a good example. Recently the 9th Japan-Korea Meeting on Neutron Science was held in Busan from February 9 to 10. It was co-organized with the Japanese Society for Neutron Science and was hosted by the Pusan National University and the Korea Atomic Energy Research Institute. The meeting was attended by more than 60 participants. The next meeting will be held in Sendai, Japan in January, 2010.

For a long time, Korean science has benefited greatly from generosities of those colleagues in advanced countries. As a result, Korea has not only become an economic powerhouse but also a scientific one. KNBUA believes now is the time to return those generosities by contributing to the world community, hence the active engagement in the formation of the AONSA and the hosting of the 1st AONSA Summer School in Korea last year. KNBUA will continue to work closely with AONSA to promote neutron science in the Asia-Oceania region.

Australian Neutron Beam Users Group (ANBUG)

The ANBUG annual general meeting was held in December 2008 at ANSTO as part of the Annual user meeting and symposium. As in previous years the user meeting received considerable support from the Australian Institute of Nuclear Science and Technology (AINSE). At the end of the 2008 we had ~353 members, with a diverse range of scientific interest and country of origin.
Highlights during the year were:

1. After a 10 month shutdown OPAL returned to full power in May.

2. Awarding of operating licenses to six of the instruments. Already a number of scientific publications have resulted from experiments undertaken at the instruments.

3. Award of a 5 year grant (Aus$1,000,000) by the Australian Research Council that gives Australian researchers access to specialized instruments at ISIS in the UK. This grant was successfully obtained by a consortium of Universities, AINSE and ANSTO.

Neutron School. ANBUG together with ANSTO run an extremely successful neutron school that was attended by 23 participants from Australia and overseas. In addition to a full social program all of the participants were able to perform real experiments on the instruments, which aided greatly their understanding. It is planned to run another neutron school in August 2009 under the auspices of AONSA.

ANBUG Awards. The 2008 award for Lifetime Contribution to Neutron Science was awarded to Dr Margaret Elcombe, who has given over 40 years of service to the Australian neutron scattering community. As noted in her citation Margaret has been a mentor and teacher to generations of Australian Neutron Scatters. Although she has now "retired" from ANSTO she remains a common site around the OPAL reactor.

Dr Margarte Elcombe receiving her award from ANBUG president Professor Craig Buckley at the ANBUG AGM.

ANBUG Committee 2009-2010.

At the conclusion of the AGM the results of the electron for ANBUG office bearers was announced the in-coming Committee is.

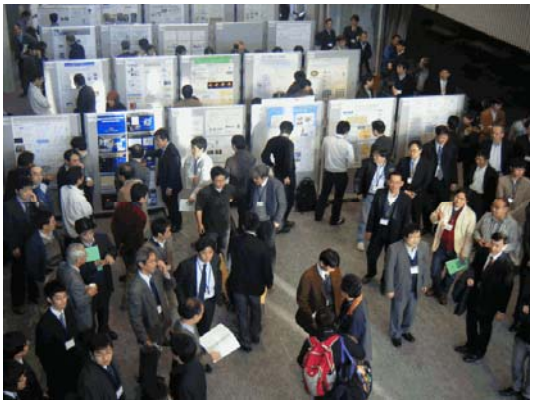
President: Brendan Kennedy (Sydney)
Vice President:Chris Ling (Sydney)
Past President:Craig Buckley (Curtin)
General Members:
Darren Goossens (ANU);
James Hester (ANSTO);
Duncan McGillivray (Auckland);
Annemieke Mulders (Curtin);
Andrew Nelson (ANSTO).

Introduction to The Japanese Society for Neutron Science "JSNS"

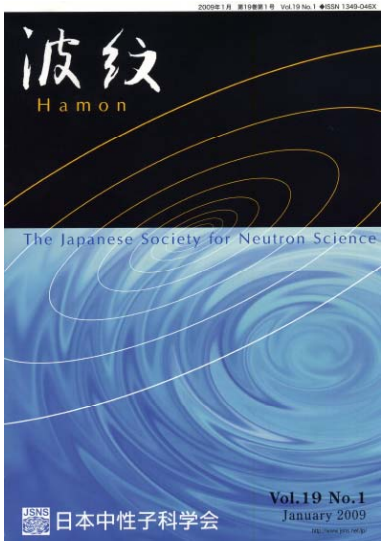
First of all, we would like to express congratulations for the establishment of AONSA. All the members of the Japanese Society for Neutron Science (JSNS) are pleasure to participate in the association. In this first AONSA newsletter, we would like to introduce our JSNS and the current status of the neutron science in Japan.

The first Japanese research reactor JRR-1 was built at 1957 in Japan Atomic Energy Research Agency (JAERI, reorganized at 2005 into Japan Atomic Energy Agency), and JRR-2 and JRR-3 opened the step for common usage of neutron for research use. The power of JRR-3 was increased to 20 MW at 1990, and it has been one of the world leading neutron source reactors. In addition, we have used the research reactor KUR of Kyoto University (Kumatori, Osaka) from 1964, and the pioneering pulsed neutron facility KENS at KEK (High Energy Accelerator Research Organization, Tsukuba, Ibaraki) from 1980 to 2006. The user programs of these neutron sources have been operated by JAEA, Institute for Solid State Physics (Univ. of Tokyo), Kyoto University, Tohoku University, and KEK. During the discussion of the plan to build a next generation pulsed neutron facility, the forerunner association for the Japanese neutron users were founded at 1993, which was reorganized into JSNS on April 2001. On December 2008, the operation of strong pulsed-neutron source at MLF of J-PARC was started (It is positioned as a public property that belongs to the international community, and you are now getting a chance to access there!). The construction of MLF is a result of the activity of neutron science community, and then the role of JSNS will be more important in determination of the direction of neutron science not only in Japan but also in Asia and Oceania, in order to extend the field of neutron science and to exchange the research and technical information.

The present number of members joining in JSNS is around 530, and more than 30 companies and associations are supporting members. The annual meeting of JSNS has been held to present the current researches of various scientific subjects covering materials science, neutron instrumental development, optics, sources, and so on. The attached photograph shows the scene of session on the last annual meeting held at Nagoya University (December 1 and 2, 2008).



In addition, for exchanging information of science, status of the neutron facilities etc., we distribute the bulletin "Hamon" (the cover shown in the following figure) four times a year, the mailing list to the members, and the web site. The neutron school has also been held for educating young researchers and students as well as for public relations. Based on these activities, JSNS will play roles in the activities of AONSA.



From now on JSNS would like to be a good partner in AONSA.

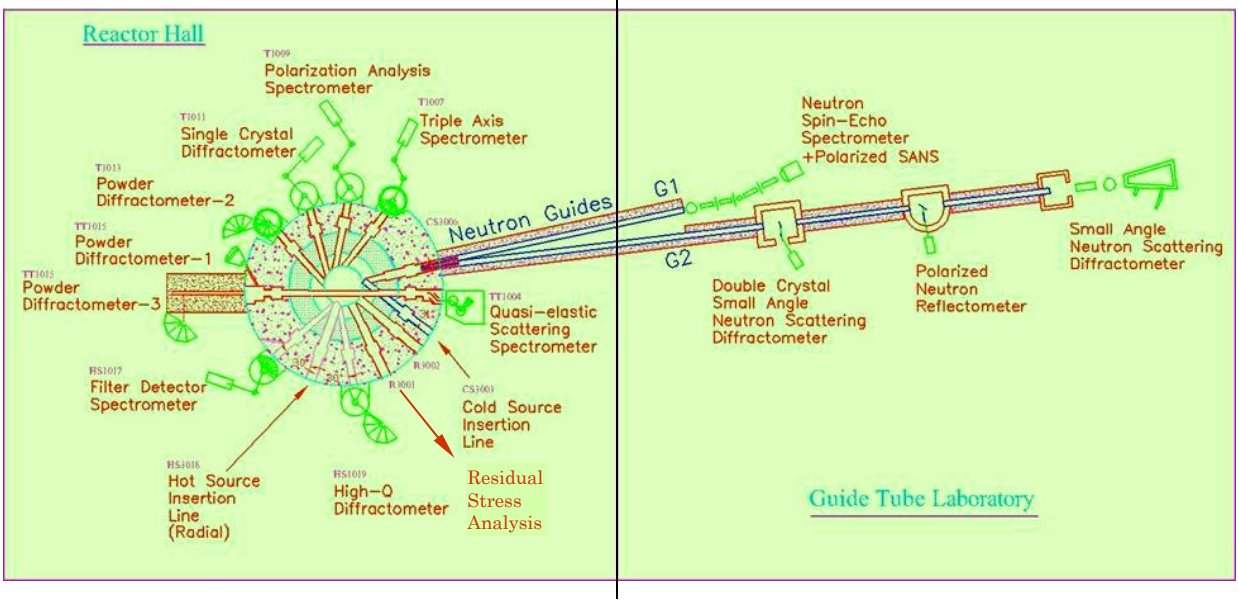
(by Kazuaki Iwasa, Committee chairman for promotion of intercommunication in JSNS)

Indian Neutron Scattering Society*

The Indian Neutron Scattering Society (INSS) was formed on 11 June 2008 during a meeting of neutron users at Mumbai with an objective to promote the research and development activities of neutron-scattering science and applications. The Society would have members from both academic institutions and industry. A managing committee of INSS has been formed with members from several universities (at Varanasi, Chandigarh, Goa and Delhi) and national institutions (BARC, TIFR, IITM, and UGC-DAE-CSR) representing various users and the spectrum of neutron scattering activities. At present INSS consists of more than 60 members from universities and institutions spread all over the country. Two members of INSS are now in the executive committee of the *Asia-Oceania Neutron Scattering Association* (AONSA), and one member is an observer.

A *National Facility for Neutron Beam Research* (NFNBR) has been operating for nearly two decades at Bhabha Atomic Research Centre for basic and applied research in condensed matter science. The present-day facilities include, single-crystal and powder diffractometers, polarization analysis spectrometer, Hi-Q diffractometer, triple-axis & filter-detector spectrometers, quasi-elastic scattering spectrometer (all installed in the reactor hall), and two small-angle scattering instruments, spin-echo spectrometer and reflectometer (in the guide-tube laboratory). An instrument for residual stress analysis is under development.AA

The National Facility is regularly utilized in collaboration with about 200 users from various universities and other academic institutions. Support for the collaborations is available from University Grants Commission- Department of Atomic Energy-Consortium for Scientific Research (UGC-DAE-CSR), Board of Research in Nuclear Sciences (BRNS) and other agencies in India. BARC and UGC-DAE-CSR have jointly organized many Workshops on *Neutrons as Probes of Condensed Matter*. The Society is planning to contribute towards similar activities in future. Recently UGC-DAE-CSR organized an "Awareness workshop" at Charotar Institute of Applied Sciences, Changa, Anand, Gujarat, during Jan 8-9, 2009. Among others, topics like 1) basics of neutron scattering, 2) neutron diffraction, 3) Rietveld refinement, 4) neutron



Instrument layout at NFNBR, Dhruva, BARC, Trombay, INDIA

scattering facilities in India and abroad were covered. About 40 teachers from various universities/institutions of the Gujarat state of India attended the workshop.

The International symposium on neutron scattering (with a three-day workshop preceding it) held at Mumbai, during Jan 15-18, 2008 was a great success. This symposium was attended by more than 200 participants from 15 countries including several world leaders from laboratories in Australia, Canada, France, Germany, Japan, Russia, Switzerland, UK, USA, and others. Many dignitaries including some pioneers of the neutron scattering activity in India graced the occasion and participated in the deliberations. A visit was organized to the neutron scattering facility at the Dhruva reactor. The proceedings of the symposium are now published (Pramana-J. Phys., October & November issues of 2008) and available at :

http://www.ias.ac.in/pramana/v71/v71no4.htm & http://www.ias.ac.in/pramana/v71/v71no5.htm.

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Many thanks to the writers and editors of this issue

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