



## 50 Years of Swiss Neutron Diffraction Instrumentation

Fischer, P.; Schefer, J.; Keller, L.; Zaharko, O.; Pomjakushin, V.; Aliouane, N.; Frontzek, M.; Holm, Sonja Lindahl; Lefmann, Kim; Christensen, M.

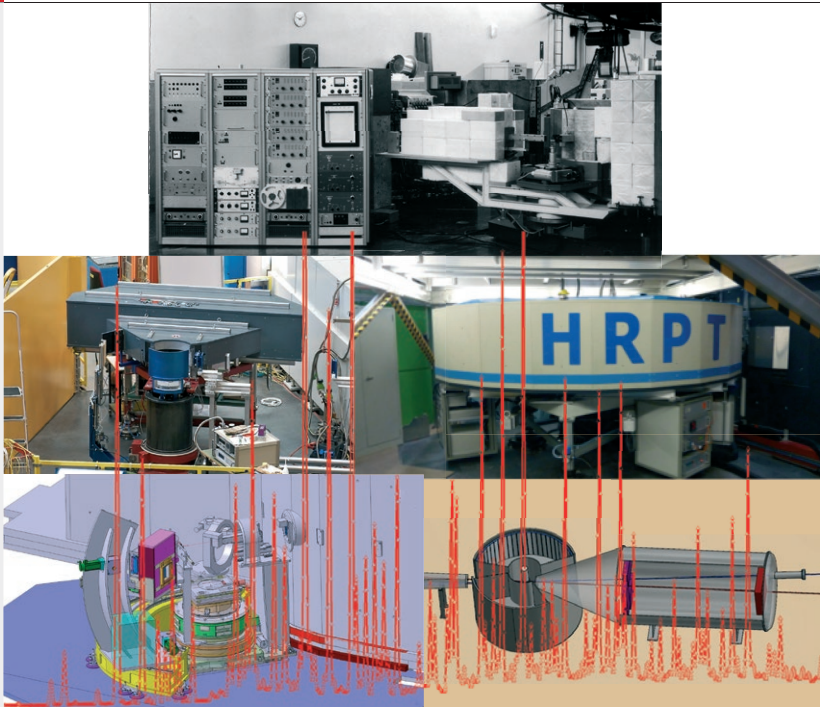
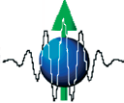
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## ON THE COVER:

Old and new neutron diffractometers, see related article by P. Fischer et al.

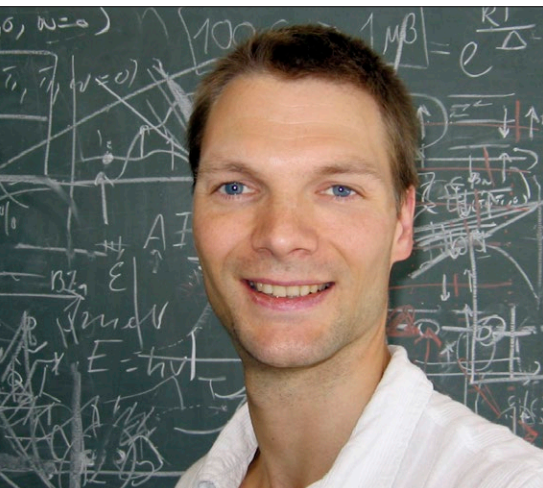
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## The President's Page



### DEAR MEMBERS

Welcome to this issue of neutron news. I would like to start by congratulating Dr. Johan Chang as this year's recipient of the Lewy-Bertaut Prize, which is awarded by the European Neutron Scattering Association (ENSA) and the European Crystallographic Association to a young scientist in recognition of notable contributions to science using crystallographic and neutron scattering methods. Johan performed his PhD at PSI using both the neutron source and the Swiss Light Source to unravel respectively the competing magnetic orders and the details of electronic structure in the cuprates. A topic which he continued to pursue with transport measurements in the group of Louis Taillefer in Japan, before returning to Switzerland focusing on ARPES and advanced X-ray experiments. He is a prime example of Switzerland's strength in advanced spectroscopic techniques at large scale facilities and in correlated electron research.

For the last 12 years Swiss research in electronically advanced materials was boosted by the national center for competence in research MaNEP (Materials with Novel Electronic Properties). The intensity of excellent science presented at the recent final MaNEP workshop in Diablerets was impressive. Swiss

neutron scattering played an active part in the success of MaNEP and likewise benefitted from the increased activity in this field. It was therefore a great pleasure to see the birth of a new scientific association: MaNEP Switzerland, which aims to continue the networking activities beyond the end of the NCCR. I recommend those of our members active in the field of MaNEP activities to join this new

association and look forward to opportunities for collaborating towards common goals.

Finally, I wish everyone an enjoyable summer – be it at the ICNS in Edinburgh, on holiday, or at your favorite beamline.

Cordially

Henrik M. Ronnow

# 50 Years of Swiss Neutron Diffraction Instrumentation

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## 1. INTRODUCTION <sup>a, b</sup>

Referring to the obituary for Prof. Walter Halg (1917–2011) as Swiss neutron scattering pioneer [1], it may be worthwhile to look at the development of Swiss neutron diffraction instrumentation in the corresponding period of about 50 years.

It depended primarily on the neutron sources, their neutron beam channels, available space for the instruments and on the source operation modes and related political decisions.

First the light-water research reactor SAPHIR (Fig. 1) became critical in 1957 with a power of 1 MW. Depending on the experimental needs, the power had been increased

in 1970 and 1983 to maximum values of 5 MW and 10 MW, respectively. In December 1993 occurred its final shutdown.

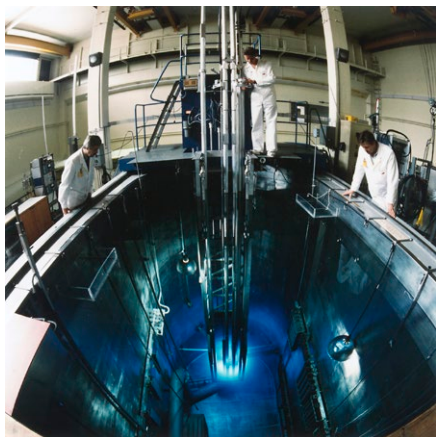
In the year 1960 the Swiss heavy water reactor DIORIT I became critical. It reached maximum powers of 20 MW (neutron flux  $3.5 \times 10^{13} \text{ ncm}^{-2}\text{s}^{-1}$ ) and 30 MW in the years 1961 and 1966, respectively. In a long shutdown from 1970 to 1972 a new heavy water tank had to be installed.

Then DIORIT II operated until the final shutdown in 1977 with a maximum power of about 24 MW.

From 1988 on Switzerland has officially access to the neutron scattering instrumentation around the high flux reactor of the Institut Laue-Langevin (ILL) in Grenoble.

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‡ Article posthumously dedicated to the Swiss neutron scattering pioneer Prof. Walter Halg (1917–2011).



**Figure 1:** Characteristic Tscherenkow light of reactor SAPHIR (from picture archive PSI).

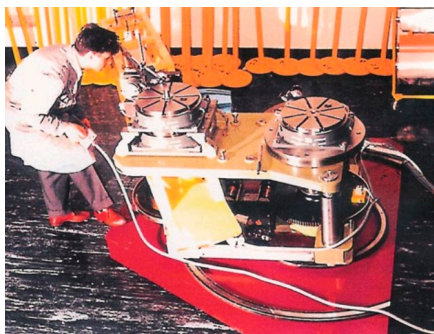
1994–1998 D1A at ILL could be also partially used in the CRG mode, see section 3.

In the year 1996 the continuous Swiss spallation neutron source SINQ started operation, a project based on ideas of Prof. W. Hälg and realized by a team under W. E. Fischer in cooperation with Prof. A. Furrer et al..

We shall restrict our review mainly on classical powder and single crystal neutron diffraction.

## 2. NEUTRON DIFFRACTOMETERS AT REACTORS SAPHIR AND DIORIT <sup>a b</sup>

During his stay 1952–1953 in Norway Prof. W. Hälg came at the reactor JEEP at Kjeller into contact with neutron scattering. Trained in optical spectroscopy, particle physics as well as in electronics from the University at Basel, he initiated at the swimming pool type reactor SAPHIR the construction of a first two-axes neutron diffractometer (Fig. 2).



**Figure 2:** Main mechanical parts of the first neutron diffractometer at reactor SAPHIR, supervised by the mechanics expert M. Koch.

As at that time electronic controls and computers were only in their beginnings, mechanical 2:1 coupling of the two axes could be used as option, based on the geometrical relations of the central and peripheral angles of a circle.

Such a measurement on a lead crystal, performed manually and noted in 1960 by W. Hälg, is shown in Fig. 3.

Dr. Georg Maier, a cousin of the German neutron scattering pioneer Prof. H. Maier-Leibnitz and Peter Fischer as thesis student were the first neutron scattering collaborators of W. Hälg. Fig. 4 shows a corresponding picture at the Swiss Federal Institute for Reactor Research (EIR), Würenlingen.

Together with W. Hälg we first tested neutron monochromators and started optimization of the instrument shielding (Fig. 5) that originally consisted mainly of boron-paraffin blocks and lead.

As the heavy water reactor DIORIT operated at considerably higher power than reactor SAPHIR, the two-axes neutron diffractom-

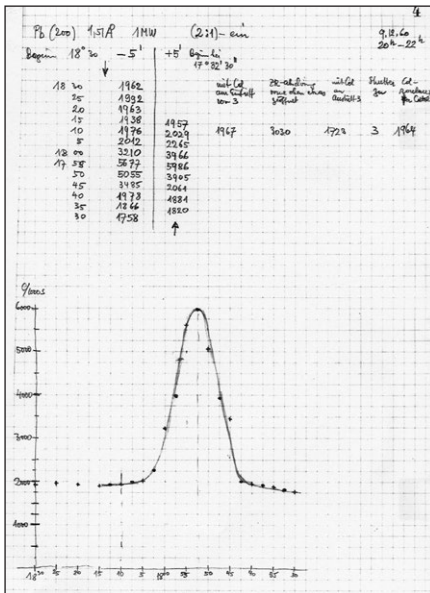


eter had been transferred to this reactor. Thus we got practical experience concerning the complementary aspects of thermal neutrons as particles and as waves and also tried to understand theoretically neutron reflectivity from monochromator crystals [2]. On the other hand G. Maier developed first programs to calculate neutron structure factors and for data evaluation at a Zuse computer of EIR.

Other necessary devices such as plugs, Soller collimators or crystal holders had been realized in collaboration with the workshop group under the supervision of W. Halg and the workshop chief E. Hardi from EIR.

With respect to long measuring times automation of data collection had been necessary. Due to his electronics experience W. Halg created soon a corresponding working group for this important project. A first result for the powder neutron diffractometer at reactor DIORIT is shown in Fig. 6.

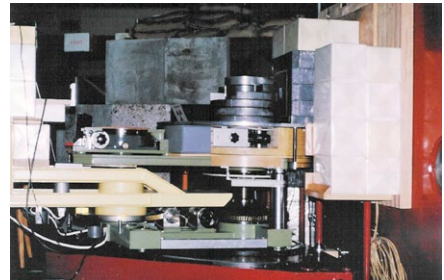
Concerning the detector shielding W. Halg proposed to test the possibility to position the detector accurately and to let the heavy shielding follow the detector movement. As for focusing the detector has to turn towards the monochromator shielding, later a more compact detector shielding such as shown in Fig. 7,



**Figure 3:** 1.5 Å neutron (200) intensity versus Bragg angle  $\theta$  of a Pb crystal, measured by W. Halg in the  $\theta$ -2 $\theta$  mode at reactor SAPHIR at a power of 1 MW.



**Figure 4:** Research team of Prof. Halg's Delegation AF, approximately 1962: from left W. Halg, guest G. Ehret from Karlsruhe, P. Fischer, G. Maier, chemist F. Brandt and reactor engineer F. Ferroni.



**Figure 5:** Installation of the two-axes neutron diffractometer at reactor DIORIT.

combined with good monochromator shielding, resulted in considerably improved experimental conditions.

Such efforts yielded 1964 a first neutron powder diffraction publication, see Fig. 8.

Occasionally also Prof. Paul Scherrer (Fig. 9) passed by at the neutron diffractometer and checked whether the powder sample was properly rotating at room temperature according to the Debye-Scherrer method.

Fig. 10 illustrates the enlarged team of W. Hälgl 1970 contributing to neutron scattering. Willi Bührer developed also with Swiss mechanical precision single and double focusing monochromator systems, in particular when suitable pyrolytic graphite became available.

Fig. 11 is an aerial view of both institutes EIR and SIN (Swiss Institute for Nuclear Research) in 1971. The large building left of the high chimney is the one of reactor DIORIT. And left, almost hidden by trees, one can see the building of reactor SAPHIR.

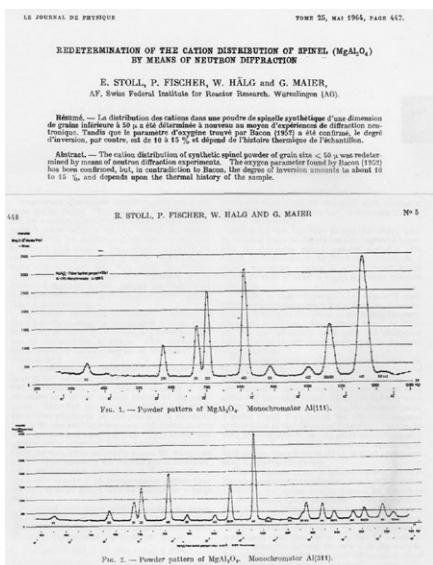
Because of the upgrading period 1970–1972 from reactor DIORIT I to II, reactor SAPHIR's power had been increased in the year 1970 to 5 MW. And a part of the neutron



**Figure 6:** Powder neutron diffractometer with automatic data collection by means of paper tape input and output at DIORIT I.



**Figure 7:** Optimized detector shielding at DIORIT I with optional counter tilting for single crystals.



**Figure 8:** Improved neutron powder diffraction resolution due to increase of the scattering angle of the monochromator.



**Figure 9:** Monument plate for Walter Boveri and Paul Scherrer stating the successful start of the first Swiss reactor DIORIT.

instrumentation including two-axis diffractometers had been installed there. Because of the space limitations with at maximum three beam tubes this had been a difficult time for the Swiss neutron community.

Fig. 12 shows the final neutron scattering instrumentation at reactor DIORIT II in the years 1972–1977, characterized by movement of heavy loads on air cushions.

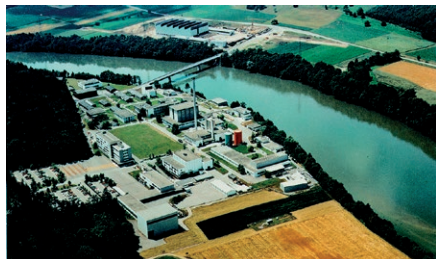
At the right side of the central triple-axes neutron spectrometer one may recognize the two-axis neutron diffractometer, used for single crystal studies of magnetic phase diagrams in external magnetic fields up to 60kG. With a vertically focusing pyrolytic graphite monochromator since 1974 remarkable intensity gains had been obtained.

On the left side in the front K. Tichy had installed together with Prof. J. Benes a first four-circle neutron diffractometer for single crystals, see e.g. ref. [3].



**Figure 10:** Group photo 1970 of the collaborators of W. Hälg (left) and EIR contributing to neutron scattering. Note the Swiss

pioneers W. Bührer and A. Furrer for inelastic neutron scattering in the front row from right.



**Figure 11:** EIR and SIN 1971.

The data collection had been done by means of a central CDC 8090 computer.

Both at DIORIT and at SAPHIR helium gas recovery systems had reduced the costs for liquid helium essentially.

Due to the final shutdown of reactor DIORIT (to reduce costs) neutron instrumentation had been again transferred to reactor SAPHIR in an increased experimental hall, see Fig. 13. To improve the background conditions, also BeO elements had been installed in the reactor. In 1983 SAPHIR reached the maximum power of 10 MW. Thus the neutron intensity became approximately comparable to the one of DIORIT II with 24 MW.

Since 1975 to his retirement in 1984 W. Hälg had been the head of the neutron scattering group within his Institute for Reactor Technics (IRT) at ETHZ. He always made the neutron instrumentation available to a broad national and international user community and introduced a fair user system to distribute the beam time.



**Figure 12:** Neutron scattering instrumentation at reactor DIORIT II 1972–1977.

In addition he organized national discussion meetings in 1973, together with Prof. H. Gränicher as director of EIR. In 1978 he also presented in another discussion meeting with B. Sigg first ideas for a SINQ spallation neutron source.

At SAPHIR with H. Heer as coordinator each instrument had been controlled by means of a PDP 11 and later LSI 11 computer, thus permitting online data evaluation.

In order to increase with medium neutron flux substantially the performance of the powder diffractometer, W. Hälgl et al. started as successful teamwork the realization of the double-axis multicounter neutron powder diffractometer DMC [4,5]. It is illustrated in Fig. 14. This project had been financially supported by several Swiss institutes. And after now almost 30 years of operation this instrument is still well demanded at SINQ, using cold neutrons, see section 4.

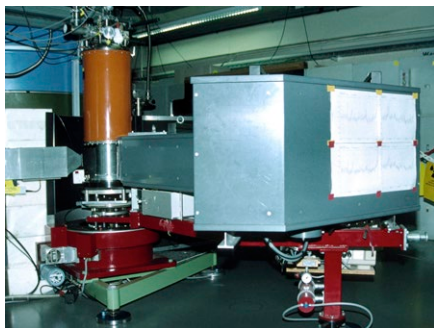
Also Prof. A. Furrer – succeeding Prof. W. Hälgl in 1984 – actively promoted instrumental development as head of the Laboratory for Neutron Scattering, ETH Zurich. In particular he looked for important auxiliary equipment, such as a dilution refrigerator reaching 7 mK (Fig. 15).



**Figure 13:** Neutron instrumentation at reactor SAPHIR 1983 with two-axis neutron diffractometers visible in the center of the pictures a) and b).

Fig. 16 illustrates the neutron scattering group at that time.

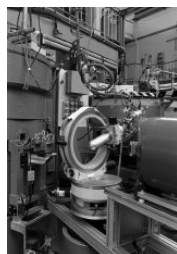
Finally in Fig. 17 the new 4-circle neutron diffractometer of J. Schefer with closed-cycle cooling machine and single detector is shown.



**Figure 14:** Final state 1993 of DMC with 400 BF3 detectors covering a scattering angle range of 79.8 degrees, radial collimator, optional 10' mylar type primary collimator, vertically focussing pyrolythic graphite and Ge monochromators at the 10 MW reactor SAPHIR.



**Figure 15:** 7 mK refrigerator used 1988 on the two-axis neutron diffractometer P2AX@SAPHIR.



**Figure 17:** New four-circle neutron diffractometer 4C 1992 at reactor SAPHIR.



**Figure 16:** Neutron scattering group 1988.

### 3. D1A AS 'HALF SWISS' CRG INSTRUMENT <sup>a</sup>

From 1994 to 1998 Swiss users had between the shutdown of reactor SAPHIR and the startup of SINQ the opportunity to use up to 25 % of the D1A beam time at ILL in the CRG ('collaborative research group') mode for their research and for training of thesis students. In this period this first high-resolution powder neutron diffractometer of ILL [6] had 25 mylar type Soller collimators and <sup>3</sup>He detectors. And F. Fauth operated the instrument as local contact very well.

### 4. COLD NEUTRON POWDER DIFFRACTOMETER DMC AT SINQ <sup>c h</sup>

For the start of the Swiss Spallation Neutron Source SINQ in 1996 DMC was moved and adapted to the SINQ guide hall and has been operated since then as a cold neutron diffractometer. Located at an  $m = 2$  supermirror neutron guide (Fig. 18), it is used without primary collimation and with optional secondary collimation providing maximum intensity. With the cold neutron spectrum ( $2.3 \text{ \AA} < \lambda < 5 \text{ \AA}$ ), the focusing pyrolytic graphite monochromator and the low background due to optimized shielding, DMC is designed for efficient diffraction studies in the fields of crystallography, solid state physics and material science, in particular for the determination of weak intensities. Although its momentum transfer range  $Q$  is limited, its resolution exceeds the one of HRPT at smaller  $Q$  values. Special features are the linear position sensi-

tive detector ( $\text{BF}_3$ , angular coverage  $79.8^\circ$ ), the oscillating radial collimator system to suppress scattering from the sample environment and a large diversity of available sample environment devices, cf.

<http://www.psi.ch/sinq/dmc/>.

A high-resolution option is provided by the optional vertically focusing Ge monochromator.

Designed complementary to the thermal instrument HRPT, typical experiments on DMC are the determination of magnetic structures, the efficient measurement of magnetic or crystallographic phase transitions, and the analysis of large unit cell structures.



**Figure 18:** High-intensity multidetector powder diffractometer DMC@SINQ for cold neutrons at SINQ.

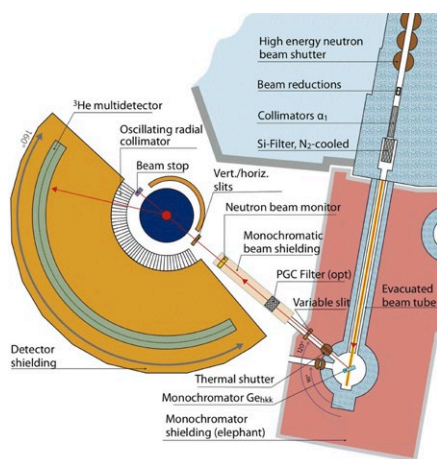
Planned upgrades of the instrument include the replacement of the aging detector electronics and the installation of a non-magnetic sample table to further broaden the range of applications for DMC, in particular for investigations in external magnetic fields.

Standard for the control of SINQ instruments is the SICS client server system [7]. With it the instrument is locally supervised from the instrument computer, but measurements may



be also controlled remotely. And for online data evaluation either PC-s with Linux software or Mac-s are available.

## 5. HIGH-RESOLUTION POWDER DIFFRACTOMETER HRPT FOR THERMAL NEUTRONS AT SINQ <sup>a e f</sup>



**Figure 19:** Layout of HRPT.

HRPT [8] is situated at the target station of SINQ (Figs. 19 and 20), using thermal neutrons from a water scatterer in a tangential beam-tube. Complementary to DMC it is designed as flexible instrument for both high-intensity and high-resolution investigations (see measured high-resolution functions shown in Fig. 21). In view of the medium neutron flux of SINQ and uncertainties at the beginning of SINQ operation concerning possible shielding problems due to the high energy spallation neutrons, this powder neutron diffractometer is based on a vertically focusing wafer-type

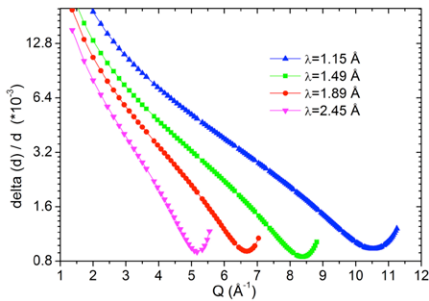
Ge(hkk) monochromator, a radial collimator of mylar-Gd-O type and a large multidetector with 1600 wires and angular separation of 0.1 degrees between adjacent wires. The fixed monochromator takeoff-angles of 90 and 120 degrees ensure short monochromator-sample distances.



**Figure 20:** High-resolution powder diffractometer HRPT@SINQ for thermal neutrons with multidetector and electronics.

HRPT is designed as flexible instrument for efficient neutron powder diffraction studies in novel materials concerning chemical structures and magnetic ordering for large ranges of parameters such as temperature and pressure – also for small sample sizes. By means of a set of primary collimators, a secondary slit system and by appropriate choice of the sample diameter, resolution and intensity can be adapted to the needs, see <http://www.psi.ch/sinq/hrpt/>. The multidetector can be accurately positioned on air cushions.

The data transfer from the fast frontend field-programmable gate array FPGA, designed and programmed at PSI, to the user interface and histogram memory is made via a central data exchange system and optical cables.



**Figure 21:** Measured high-resolution functions  $\delta d/d$  ( $\alpha_1=6'$ ,  $\alpha_2=12'$ , radial collimator 2, sample diameter 6 mm) of HRPT for  $2\theta_M=120$  degrees as functions of available neutron wavelengths and momentum transfer  $Q$ .  $d$  is the lattice spacing.

The high number of channels and high electrical voltage ( $\sim 7$  kV) provoke continuous occurrence of sporadic discharges that can lead to the appearance of false counts (“spikes”). Several hardware and software filters are implemented. A blocking trigger installed in FPGA filters these “discharges” by making use of their synchronous appearance in several non-neighbouring wires. The critical high voltage sockets are now continuously flushed with nitrogen gas. The detector is very well shielded also from the fast SINQ neutrons. As a result of all the above efforts the background conditions are very good, allowing measurements of rather small samples.

In the last decade important new auxiliary devices/possibilities such as a platform for convenient sample handling, cooling liquids etc., were added. It is illustrated in Figs. 22a) and b).

One may now choose between two oscillating radial collimators (FWHM = 7 mm and 14 mm) to suppress Bragg peaks from the



**Figure 22:** Platform on top of HRPT.

sample environment such as from cryostats, furnaces, magnets or high pressure cells ( $< 14$  kbar) and ( $< 100$  kbar).

For the fine sample positioning in the scattering plane, there is a motorized xy-table controlled by computer. The accuracy of the sample positioning with respect to the detector center of about 0.5 mm is achieved by a special measurement of the standard sample and quick automatic refinement by a script. The positioning is very important for accurate determination of atomic displacement parameters ADPs.

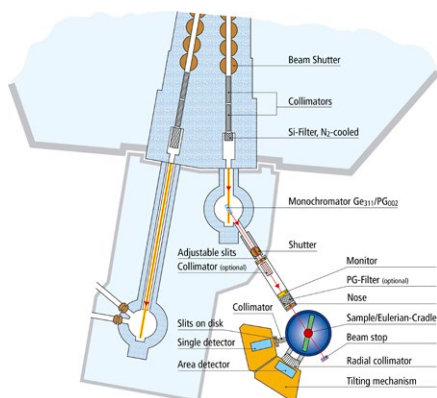
HRPT is also equipped with computer controlled sample changers for either eight samples at room temperature or for four samples for the temperature range of (1.5–315) K.

A very small leak in the detector results in a slow continuous decrease in the gas mixture pressure and worsening of the detector PHS

spectrum. Therefore a special cleaning/ presurizing system has been designed at PSI and manufactured by the MESSER Schweiz company. The system allows for effective cleaning of the gas mixture and removes the impurities such as  $O_2$ ,  $N_2$ ,  $H_2O$ , etc. by a circulation of the gas mixture through appropriate filters without a need for pumping out the detector.

The instrument is controlled via the SICS and SEA softwares developed by LDM/PSI for a UNIX workstation, permitting fully automatic computer controlled measurements, data reduction and rapid online refinements.

The HRPT instrument is not only used for academic science in the frame of the SINQ user policy program, but also a limited amount of HRPT beam time is available to interested industrial companies. Certain companies cannot disclose the details of their research for confidentiality reasons, and in this case HRPT beam time can be purchased according to the PSI rules.



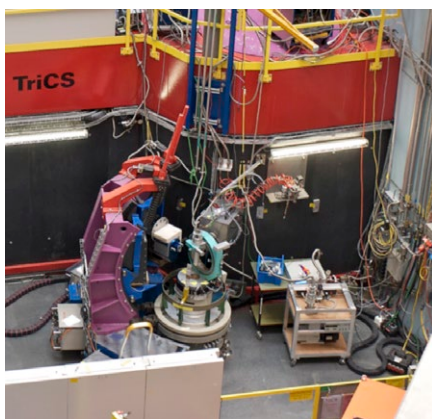
**Figure 23:** Present layout of the single crystal neutron diffractometer TriCS@SINQ.

A further improvement of HRPT would be a second monochromator such as Ge, optimized for 2.45 Å.

## 6. SINGLE-CRYSTAL NEUTRON DIFFRACTOMETER TRICS AT SINQ <sup>b d g</sup>

The single crystal neutron diffractometer TriCS [9] (Figs. 23, 24), see also <http://www.psi.ch/sinq/trics/>, has been designed for solving structural problems in chemistry ( $\lambda=1.18$  Å, Ge(311), maximum  $\sin(\theta/\lambda) = 0.7$  Å<sup>-1</sup>) as well as in magnetism ( $\lambda=2.31$  Å, PG(002)). It has been successfully operated for 15 years on a thermal beam tube at SINQ.

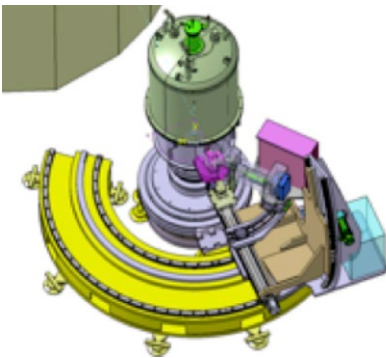
Unique features are the tilting option allowing bulky equipment such as magnets and the possibility to switch within minutes from a single tube <sup>3</sup>He detector to a two-dimensional area detector (160 mm by 160 mm, radial collimator, time-delay readout).



**Figure 24:** Present layout of the single crystal neutron diffractometer TriCS@SINQ.



Future developments in progress will not only increase the flux by an improved primary optics and the new vertically focusing PG monochromator (SwissNeutronics), to be installed in 2013, but also dramatically reduce the background as a result of improved shielding, based on state-of-the-art absorption calculations. A key issue in this new instrument ZEBRA (Fig. 25) – presently in the pre-design phase – will be the optional analyser in front of the single detector. ZEBRA will also yield much faster data collection by removing air cushions. The complete unmagnetic construction will allow higher magnetic fields up to 12 Tesla. ZEBRA also will be suitable for smaller crystal volumes as required by investigations of novel materials, for example in the field of multiferroics.



**Figure 25:** ZEBRA, the new single crystal neutron diffractometer at SINQ (design phase), replacing TriCS.

New software developments will assist less experienced users to benefit from all the options available. We continue here improvements such as possibilities to create 3D-cuts in  $q$ -space for TriCS data collected with the 2D-detector.

In summary, the new ZEBRA will focus on investigation of magnetic structures with the possibility to use external magnetic fields up to 12 Tesla, but also will improve crystallographic investigations on dedicated systems as presently covered by TriCS, with lower data collection times.

## 7. HEIMDAL HYBRID NEUTRON SPECTROMETER PROJECT AT THE EUROPEAN SPALLATION NEUTRON SOURCE: PROBING MULTIPLE LENGTH SCALES IN ONE INSTRUMENT <sup>g i k b j</sup>

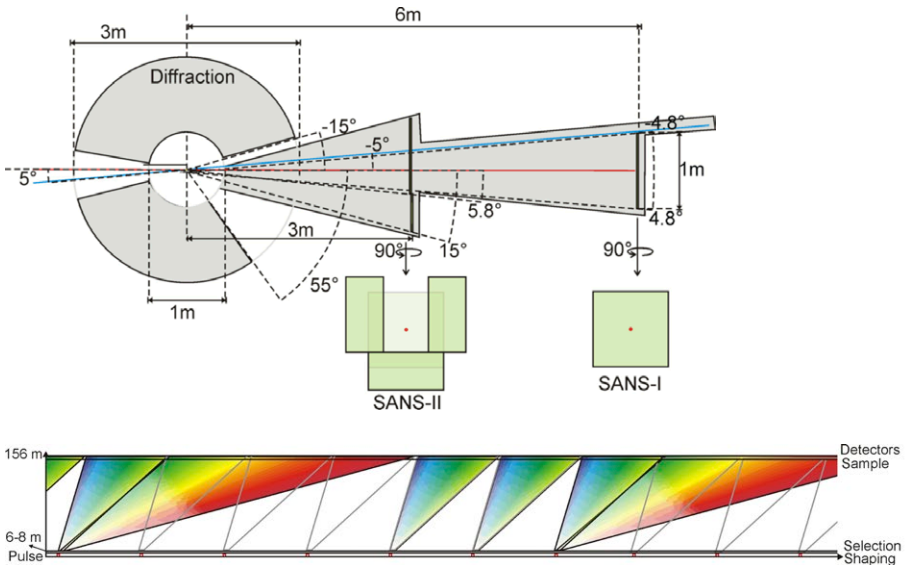
Ongoing improvements in material performances are reached for example by the incorporation of advanced ceramics and polymers into heterogeneous systems. Their performances usually depend on the interplay between properties defined by the atomic, nano/mesoscopic and microscopic structure. Traditionally such structural information is collected in separated experiments such as wide angle diffraction (probing the atomic scale,  $0.3 \text{ \AA}^{-1} \leq Q \leq 50 \text{ \AA}^{-1}$ ), small angle scattering (nano/meso scale,  $0.002 \text{ \AA}^{-1} \leq Q \leq 0.1 \text{ \AA}^{-1}$ ) and direct space imaging techniques (sub-millimeter to millimeter scale).

The hybrid instrument HEIMDAL [10] (Fig. 26), is proposed by a collaboration of the universities of Aarhus and Copenhagen as well as the LNS, to be built at the European Spallation Neutron Source ESS (Lund, Sweden).

The instrument is designed to obtain a coherent multi-length scale picture of these materials. The idea is to merge neutron pow-

der diffraction (probed length  $\xi \sim 0.01\text{--}5\text{ nm}$ ), small angle neutron scattering ( $\xi \sim 1\text{--}500\text{ nm}$ ) and neutron imaging ( $\xi \sim 0.01\text{--}100\text{ mm}$ ), giving a huge advantage, especially for in situ

measurements. To fit these needs, the instrument will have two guide systems looking on different parts of the source (thermal and cold) through a single beam port.



**Figure 26:** A schematic illustration of the combined powder diffraction and SANS setup. Below is the pulse train, where three diffraction pulses are skipped to allow a longer SANS pulse. Other operations modes are possible depending on the used choppers sequence. The short wavelength pulse and the long wavelength pass are transported through different guides due to different needs for the neutron optics.

- [1] P. Fischer, A. Furrer and J. Schefer, *Swiss Neutron News* 40 (2012) 9 and *Neutron News* 23 (2012) 38.
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# Winner of the Sixth Erwin Félix Lewy-Bertaut Prize (June 2013)



**European Neutron Scattering Association**



**European Crystallographic Association**

The Sixth Erwin Felix Lewy Bertaut Prize of the European Crystallographic Association (ECA) and European Neutron Scattering Association (ENSA) is awarded to Dr. Johan Chang from École Polytechnique Fédérale de Lausanne, in recognition of his outstanding contributions to the quest for understanding cuprate superconductors. His ingenious use of the complementarity of neutron- and X-ray scattering on the so called stripe phases (spin and charge density waves) is worth a special mentioning. The prize has been set up in honour of the late Erwin Felix Lewy Bertaut, and in memory of his scientific achievements and cornerstones in crystallography and in neutron scattering. It is awarded to a young European scientist (up to 5–8 years after finishing the PhD-thesis) in recognition of notable experi-

mental theoretical or methodological contributions in the field of investigation of matter using crystallographic or neutron scattering methods..



Dr. Johan Chang

# Winner of the Walter Halg Prize (June 2013)



## European Neutron Scattering Association

The nominations received for the 2013 Walter Halg Prize were examined by an international selection committee consisting of authorities representing the major scientific disciplines, both within and beyond the field of neutron scattering. After considerable deliberations it is a great pleasure to announce that the winner of the 2013 Walter Halg prize is Prof. Joe Zaccai. The committee has awarded Prof. Joe Zaccai the prize in recognition of his pioneering contributions to the application of neutron scattering to a range of biophysical and biochemical problems in biology, which has provided important insights in the debate on the relationship between molecular structure and dynamics and biological function, and for his leading advocacy of the role of neutron scattering in biological research.



Dr. Joe Zaccai

# Announcements

## **SGN/SSDN MEMBERS**

Presently the SGN has 198 members. Online registration for new members of our society is available from the SGN website: <http://sgn.web.psi.ch>

## **SGN/SSDN ANNUAL MEMBER FEE**

The SGN/SSDN members are kindly asked to pay their annual member fees. The fee is **CHF 10.–** and can be paid either by bank transfer or in cash during your next visit at PSI. The bank account of the society is accessible for both Swiss national and international bank transfers. The coordinates are as follows: Postfinance: 50-70723-6 (BIC: POFICHBE), IBAN: CH39 0900 0000 5007 0723 6

## **PSI FACILITY NEWS**

TPSI launched a **quarterly electronic newsletter** featuring recent news, events and scientific highlights of the three major PSI user facilities SLS, SINQ and S $\mu$ S. The online version of the recent edition is available here: <http://www.psi.ch/info/facility-news>

## **SINQ CALL FOR PROPOSALS**

The next **deadline** for the submission of beam time requests for the Swiss spallation neutron source 'SINQ' (<http://sinq.web.psi.ch>) will be: **November 15, 2013**

## **JOINT USERS' MEETING AT PSI: JUM@P 2013**

The Joint Users' Meeting @ PSI (JUM@P) of the three user communities of SLS, SINQ, and S $\mu$ S will take place September 18–20, 2013, at PSI. The JUM@P meeting takes place every other year and its goal is to generate new synergies among the scientists driven by common scientific rather than technical interests.

## **SGN/SSDN GENERAL ASSEMBLY**

This year's SGN/SSDN general assembly will take place at PSI on: **November 13, 2013, 17:00**

## **NEUTRON BEAM TIME AT SNS FOR THE SWISS NEUTRON COMMUNITY**

An actively shielded 16 Tesla magnet has been realized at the Spallation Neutron Source SNS in Oak Ridge, USA, as a collaboration of the

Swiss neutron community and SNS. In return, beam time is available at SNS for Swiss users. Swiss neutron scatterers are therefore encouraged to apply for beamtime at SNS.

### **REGISTRATION OF PUBLICATIONS**

Please remember to **register all publications either based on data taken at SINQ, SLS, SpS or having a PSI co-author** to the Digital User Office: <https://duo.psi.ch>. Please follow the link 'Publications' from your DUO main menu.

### **OPEN POSITIONS AT ILL**

To check the open positions at ILL please have a look at the following ILL-Webpage:  
<http://www.ill.eu/careers>

### **PHD POSITIONS AT ILL**

The PhD program of the Institut Laue-Langevin, ILL, is open to researchers in Switzerland. The contact person at ILL is Anne-Claire Dupuis (PhD@ill.eu). The Swiss agreement with the ILL includes that ILL funds and hosts one PhD student from Switzerland.

# Conferences and Workshops 2013–2014

(an updated list with online links can be found here: <http://www.psi.ch/useroffice/conference-calendar>)

## SEPTEMBER 2013

- 17<sup>th</sup> Laboratory Course Neutron Scattering September 2–13, 2013, Jülich and Garching, Germany
- 13<sup>th</sup> Oxford School of Neutron Scattering September 2–13, 2013, Clarendon Laboratory, Oxford, UK
- ALBA User Meeting 2013 and VI AUSE Conference September 3–6, 2013, ALBA, Cerdanyola del Vallès, Spain
- 11<sup>th</sup> International Conference on Biological Synchrotron Radiation September 8–11, 2013, Hamburg, Germany
- XVII. International Conference on Recent Progress in Many-Body Theories September 8–13, 2013, Rostock, Germany
- Euromat 2013 September 8–13, 2013, Sevilla, Spain
- PSI2013: Physics of Fundamental Symmetries and Interactions at low energies and the precision frontier September 9–12, 2013, PSI Villigen, Switzerland
- MISSCA 2013: Joint Annual Meeting of the Italian, Spanish and Swiss Crystallographic Associations September 9–12, 2013, Como, Italy
- NINMACH 2013: Neutron Imaging and Neutron Methods in Archaeology and Cultural Heritage Research September 9–12, 2013, Garching, Germany
- ICSS-15: 15<sup>th</sup> International Conference on Solid Surfaces September 9–13, 2013, Paris, France
- International Soft Matter Conference September 15–19, 2013, Rome, Italy
- SLOPOS13: 13<sup>th</sup> International Workshop on Slow Positron Beam Techniques and Applications September 15–20, 2013, Garching, Germany
- DPG Physics School on Free-electron X-ray Laser Physics September 15–20, 2013, Bad Honnef, Germany
- X-FEL2013: X-ray Free Electron Laser School and symposium September 16–20, 2013, Dinard, France
- 12<sup>th</sup> School on Synchrotron Radiation: Fundamentals, Methods and Applications September 16–27, 2013, Grado, Italy
- 3rd Joint User Meeting at PSI: JUM@P 2013 September 18–20, 2013, PSI Villigen, Switzerland
- Eco MaTech: European Conference on Materials and Technologies for Sustainable Growth September 19–21, 2013, Bled, Slovenia
- SISN Summer School 2013 on Inelastic Neutron Scattering September 22–27, 2013, S. Giovanni, Valle Aurina (BZ), Italy
- BioValley Life Sciences Week September 24–26, 2013, Basel, Switzerland

- SCM 2013: Fifth Seeheim Conference on Magnetism September 29–October 3, 2013, Frankfurt, Germany
- Intermetallics 2013 September 30 – October 4, 2013, Banz, Germany

### **OCTOBER 2013**

- GISAXS 2013: Workshop on Grazing Incidence Small Angle X-Ray Scattering October 7–9, 2013, Hamburg, Germany
- JCMS 2013 workshop: Trends and Perspectives in Neutron Scattering: Magnetism and Correlated Electron Systems October 7–10, 2013, Tutzing, Germany
- HZG Autumn School 2013: Application of Neutrons and Synchrotron Radiation in Engineering Materials Science October 7–11, 2013, Ammersbek, Germany
- JCMS 2013 satellite workshop: Single Crystal Spectroscopy: Multi-TAS or TOF? October 10–11, 2013, Murnau, Germany
- SoXRES-2013: International workshop on Soft X-ray Resonant Elastic Scattering October 14–16, 2013, Synchrotron SOLEIL, France
- COM 2013 incl session on Applied Neutron Scattering in Engineering and Materials Science Research October 27–31, 2013, Montreal, Canada
- ISIEM 2013: International Symposium on Inorganic and Environmental Materials October 27–31, 2013, Rennes, France
- AVS-60: 60<sup>th</sup> International Symposium & Exhibition October 27 – November 1, 2013, Long Beach, CA, USA
- International symposium on crystal physics October 28 – November 2, 2013, Moscow, Russia

### **NOVEMBER 2013**

- 6<sup>th</sup> Annual School on Advanced Neutron Diffraction Data Treatment using the FULL-PROF suite November 18–22, 2013, Grenoble, France
- PSDI 2013: Protein Structure Determination in Industry November 21–22, 2013, Luzern, Switzerland
- SCNAT Annual Congress 2013: The Quantum Atom at 100 – Niels Bohr's Legacy November 21–22, 2013, Winterthur, Switzerland

### **DECEMBER 2013**

- Symposium on Neutron Scattering Studies of Advanced Materials (MRS Fall Meeting) December 1–6, 2013, Boston, USA
- Neutron Scattering and X-Ray Studies for the Advancement of Materials at Thermec 2013 December 2–6, 2013, Las Vegas, USA

### **APRIL 2014**

- 2014 MRS Spring Meeting and Exhibit April 21–25, 2014, San Francisco, CA, USA

### **MAY 2014**

- QENS 2014: 11<sup>th</sup> International Conference on Quasielastic Neutron Scattering May 11–16, 2014, Autrans, France
- WINS 2014: 6<sup>th</sup> International Workshop on Inelastic Neutron Spectrometers May 11–16, 2014, Autrans, France



**Swiss Neutron Scattering Society**

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