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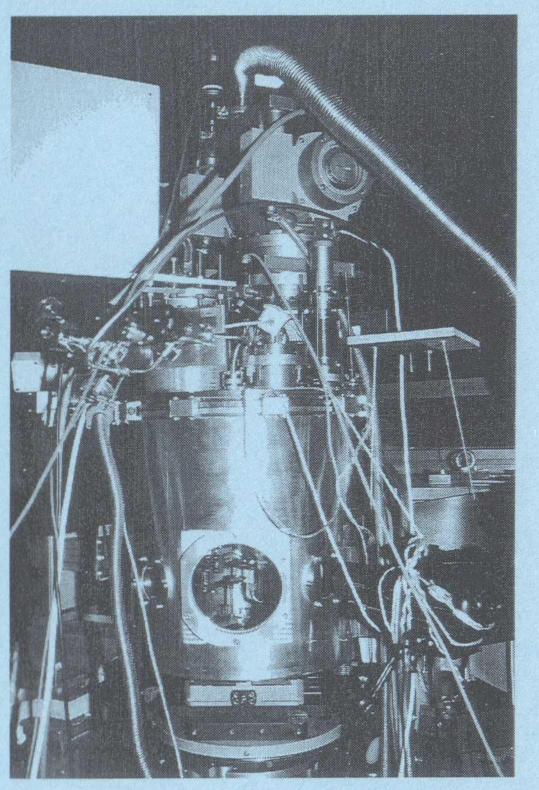

Schweizerische Gesellschaft für Neutronenstreuung
Société Suisse pour la Diffusion des Neutrons
SGN / SSDN

Cover illustration:
Neutron scattering from a freely suspended droplet of paramagnetic $Co_{80}Pd_{20}$ performed on the DMC diffractometer at SINQ. Undercooling conditions were established in an electromagnetic levitation apparatus under high-purity environmental conditions. For first results from this difficult experiment see the contribution by Lukas Keller.

Impressum:

Herausgeber: Schweizerische Gesellschaft für Neutronenstreuung

Vorstand für die Amtsperiode Januar 1998 - Januar 2001:

Präsident: Prof. Dr. K. Yvon, klaus.yvon@cryst.unige.ch
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Prof. Dr. P. Schurtenberger, schurtenberger@ifp.mat.ethz.ch
Sekretär: Dr. P. Böni, boni@psi.ch

Ehrenmitglieder: Prof. Dr. W. Hälg, ETH Zürich
Prof. Dr. K.A. Müller, IBM Rüschlikon und Univ. Zürich

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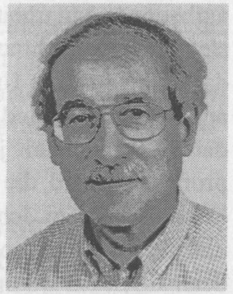


Liebe Mitglieder,

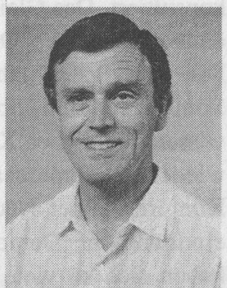
Nach sechsjähriger Amtszeit werde ich auf Ende 1997 als Präsident der SGN zurücktreten. Wir haben in den vergangenen Jahren mit der SGN als multidisziplinärem Verein viel erreicht und fast ein Optimum für die schweizerische Neutronenstreuung herausgeholt. Wir haben in der Schweiz - gemessen an der Einwohnerzahl - eine der stärksten Gemeinschaften von aktiven Neutronenstreuern im weltweiten Vergleich. Wir waren eine der treibenden Kräfte bei der Schaffung der europäischen Dachorganisation ENSA - neue Projekte (z.B. ESS) können nicht mehr auf nationaler Ebene realisiert werden. Wir werden vom zuständigen Bundesamt für Bildung und Wissenschaft ernst genommen. Bevor Entscheide gefällt werden, welche die Neutronenstreuung betreffen, wird die SGN orientiert und konsultiert. Das Gleiche gilt auch für den Schweiz. Nationalfonds. Dafür danke ich beiden Organisationen der nationalen Forschungsförderung. Die seit 1993 jährlich gemeinsam mit dem PSI veranstalteten Sommerschulen über Neutronenstreuung in Zuoz sind aus dem wissenschaftlichen Kalender nicht mehr wegzudenken. Die im Jahre 1996 wiederum gemeinsam mit dem PSI durchgeführte 1. Europäische Konferenz über Neutronenstreuung (ECNS'96) in Interlaken war eine eindrückliche Demonstration der Neutronenstreuung; noch nie zuvor haben sich so viele Neutronenstreuer zu einer internationalen Tagung zusammengefunden. Der Höhepunkt war aber zweifellos die erfolgreiche Inbetriebnahme der Spallationsneutronenquelle SINQ am PSI, welche die Arbeiten schweizerischer Forschungsgruppen auf dem Gebiet der Neutronenstreuung in Zukunft prägen wird.

Negativpunkte waren die Verhandlungen mit der Schweiz. Akademie der Naturwissenschaften (SANW), welche den Antrag der SGN auf Mitgliedschaft zurückgewiesen hatte. Die damalige Leitung der SANW verschanzte sich hinter verkrustete Reglemente statt sich zu öffnen. Bei der Evaluation der Physik durch den Schweiz. Wissenschaftsrat wurde die Expertise der SGN nicht gesucht. Wir haben darüber in den *Swiss Neutron News* ausführlich berichtet. Diese "Misserfolge" haben die SGN in ihrer Arbeit allerdings nie behindert.

So möchte ich Ihnen abschliessend danken für die aktive und aufbauende Mitarbeit und das Vertrauen, das Sie mir und dem Vorstand stets entgegengebracht haben. Meinen Kollegen im Vorstand der SGN danke ich für ihre Unterstützung und ihr Engagement, auf das ich so oft angewiesen war und immer grosszügig beanspruchen durfte. Die Arbeit der SGN hatte seit jeher eine vorwiegend langfristige Perspektive, und profitieren wird die heutige Generation von jungen, hoch motivierten Wissenschaftlern. Ich wünsche der SGN und dem neu gewählten Vorstand unter der Leitung von Klaus Yvon, dass sie diese Haltung weiter pflegt, denn sie ist ein wesentlicher Leitgedanke unserer Charta.

Albert Furrer, Präsident (bis 1997)

La page du président de la SSDN



Chers membres,

j'aimerais remercier ici notre président sortant au nom de nous tous. Il a non seulement joué un rôle essentiel lors de la création de notre société, mais il l'a aussi dirigé pendant six ans avec succès. Il n'est pas exagéré de dire qu'*Albert Furrer* en a fait l'une des sociétés les plus dynamiques de la scène scientifique suisse. La SGN/SSDN défend notre cause et nos intérêts comme aucune autre association scientifique suisse ne le fait actuellement. Sans l'engagement énergique d'*Albert Furrer*, sa justesse d'appréciation et sa clairvoyance à long terme, le paysage neutronique helvétique serait aujourd'hui plus terne. Nous aurons besoin de ses conseils avisés aussi à l'avenir.

Un grand merci également à *Hans-Ueli Güdel*, membre sortant du comité. Son engagement infatigable en matière de diffusion neutronique aussi bien dans le pays qu'à l'extérieur a considérablement contribué au

bon développement de notre société. Nous espérons pouvoir également compter sur son conseil ces prochaines années.

C'est avec plaisir que j'accueille les nouveaux membres élus du comité *Silvio Decurtins, Gernot Kostorz et Peter Schurtenberger*. Tous trois sont des 'dompteurs' de neutrons chevronnées, et ont déjà représenté avec succès les intérêts de la diffusion neutronique suisse par le passé. Je compte sur leur appui pour conduire notre société dans le troisième millénaire. Le travail ne manque pas :

26/27 février 1998:	**Symposium commun SPG/SGN,** intitulé **'SINQ/Neutronenstreuung'** dans le cadre de la réunion de printemps de la Société Suisse de Physique à Berne
février 1998:	**SINQ, call for proposals**
juin 1998:	**SINQ, start of user programme**
8-14 août 1998:	***6th* PSI Summer School on Neutron scattering,*'Complementarity between Neutron and Synchrotron X-Ray scattering'*,** Lyceum Alpinum, Zuoz
automne 1998:	**Réunion des utilisateurs de SINQ, et assemblé générale de la SGN/SSDN**

Finalement, j'aimerais encore remercier *Peter Böni* de bien vouloir continuer à se charger du secrétariat et à assumer le fardeau de la rédaction du bulletin *Swiss Neutron News*.

Je vous souhaite, à toutes et à tous, une excellente nouvelle année riche en succès et en neutrons.

Klaus Yvon, président (dès 1998)

Zum Gedenken an Dr. Willi Bührer

19. Juli 1938 - 4. November 1997

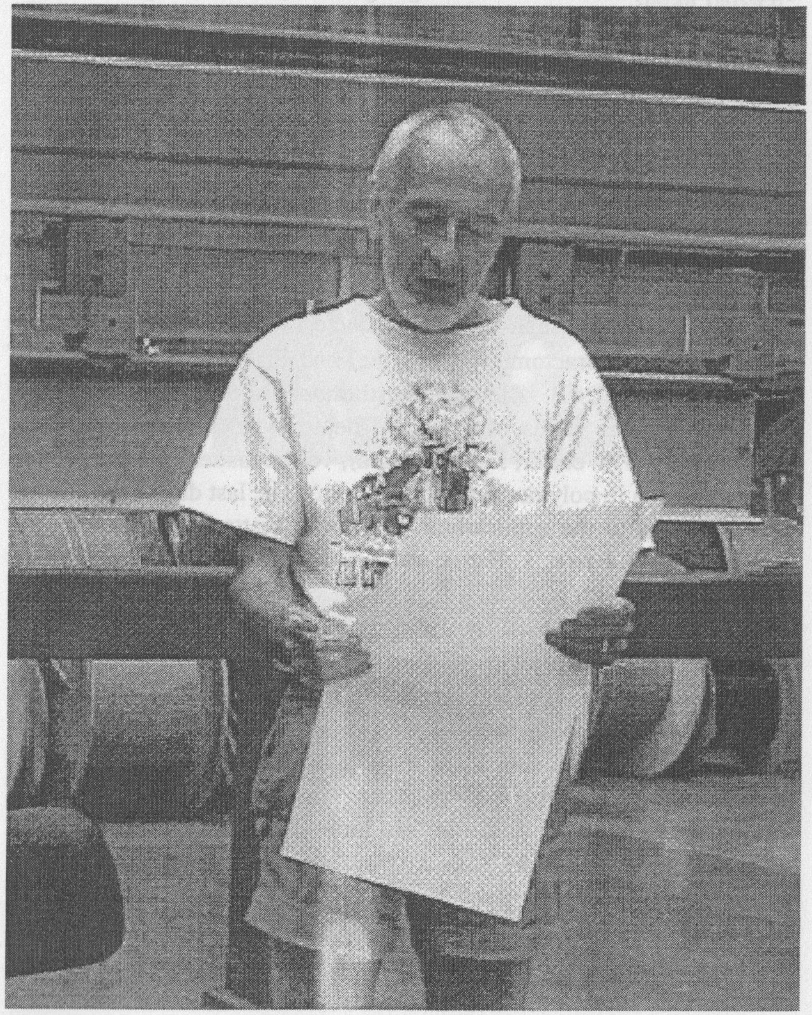
Am 4. November 1997 ist unser Mitglied Dr. Willi Bührer von uns gegangen. Er verstarb unerwartet während einer Dienstreise nach Grenoble, im Zenith seiner beruflichen Tätigkeit.

Willi Bührer hat seine Jugendzeit in Zürich verbracht. Nach Abschluss seiner Lehre als Feinmechaniker erwarb er sich die Maturität und begann 1959 seine Studien an der ETH Zürich, die er 1964 mit dem Diplom als Physiker abschloss. Anschliessend trat er in die Delegation für Ausbildung und Hochschulforschung am damaligen EIR in Würenlingen ein und arbeitete an seiner Dissertation unter der Leitung unseres Ehrenmitglieds Prof. W. Hälg. Im Jahre 1970 wurde ihm von der ETH Zürich die Doktorwürde verliehen. Seither wirkte er in Würenlingen und Villigen mit Leib und Seele als Neutronenstreuer. Dabei kamen ihm sein umfassendes Wissen und seine Kreativität für wegweisende Arbeiten in der Gitterdynamik und in der instrumentellen Entwicklung voll zum Tragen. Bei der Gründung des Laboratoriums für Neutronenstreuung (LNS) im Jahre 1984 wurde er dessen stellvertretender Leiter. Er hat massgebend dazu beigetragen, aus dem LNS das zu machen, was es heute ist: Ein international viel beachtetes Zentrum der Neutronenstreuung, das schon Hunderte von Gastwissenschaftlern angezogen hat. Sie alle kamen ans LNS nicht nur wegen der exzellenten Experimentiermöglichkeiten, sondern vor allem, weil sie den Kontakt mit Willi Bührer suchten. Es war für alle stets ein Erlebnis, mit ihm zusammen zu experimentieren und dabei von seiner grossen Erfahrung und seiner sprichwörtlichen Intuition profitieren zu dürfen.

Ganz besonders lag ihm die Ausbildung der Doktoranden, Diplomanden und Praktikanten am Herzen. Er hat Dutzende von ihnen in seiner ganz persönlichen Art in die Geheimnisse der Neutronenstreuung eingeführt, um sie zu kritischen und verantwortungsbewussten Nachwuchsforschern zu erziehen. Seine Vorträge waren stets ein Leckerbissen. Er hat es wie kein zweiter verstanden, die physikalischen Phänomene aus den komplizierten Formalismen ihrer mathematischen Beschreibung herauszuschälen und anschaulich darzustellen, gepaart mit humorvollen Einlagen und Überraschungseffekten. Denn er wusste, Physik ist eine trockene Materie, und er hat sie uns auf seine Weise verständlich gemacht.

Wir haben mit Willi Bührer nicht nur einen hervorragenden Neutronenstreuer von internationaler Ausstrahlung und Anerkennung verloren, sondern vor allem einen stets hilfsbereiten, lieben Kollegen und Freund, der sich immer auch sehr aktiv für die Interessen unserer Gesellschaft eingesetzt hat. Er hat bei der Entwicklung der Neutronenstreuung nicht nur Spuren hinterlassen, sondern sie mit seiner Persönlichkeit geprägt und Akzente gesetzt, die in seinem Sinne bestehen bleiben werden. Dafür danken wir ihm von ganzem Herzen. Wir werden ihn stets in bester Erinnerung behalten.

Albert Furrer



5th Summer School on Neutron Scattering at Zuoz

Meanwhile for the 5th time more than eighty participants from ten European countries (and even one from Africa) gathered at Zuoz in the upper Engadine Valley, Switzerland, for the '97 Summer School on Neutron Scattering' held from August 9-15. The traditional school was again organized by the Paul Scherrer Institute (PSI) whose spallation neutron source SINQ went into operation a few months ago. The sponsorship by the PSI, the Swiss National Science Foundation, and the Swiss Society for Neutron Scattering is gratefully acknowledged.

The aim of the school was to emphasize the particular possibilities for neutron scattering experiments at SINQ, hence the programme was addressed to the topic 'Cold Neutrons: Large Scales - High Resolution'. After the two indroductory lectures on neutron scattering (P. Böni, S. Janssen) and talks about excitations in He (B. Fåk), anomalous phonons (B. Hehlen), and magnetic fluctuations (N. Bernhoeft) several lectures were devoted to the various aspects of small angle neutron scattering, in particular materials physics (P. Fratzl), soft condensed matter (J.S. Pedersen), vortices in high-T_C superconductors (E.M. Forgan), as well as double crystal diffractometry (A. Ioffe) and high-resolution focusing SANS techniques (B. Alefeld). Furthermore the participants were introduced to the fields of polarized neutrons (B. Dorner), neutron reflectometry (J. Webster, J. Als-Nielsen), vortex matter (J. Blatter), and glass transition in polymer systems (R. Zorn). The last day of the school was dedicated to the applications of neutron scattering in biology by lectures from O. Byron, T. Hauss, and J. Zaccaï. Finally the scientific part was completed with an overview about the SINQ instrumentation by A. Furrer and the instrument responsibles. The lecture notes are available as 'PSI-Proc. No. 97-01' upon request.

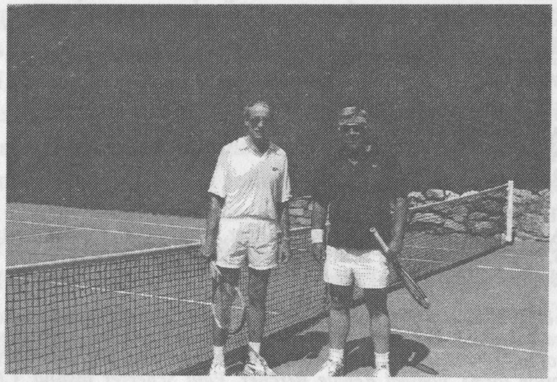
As in the years before the organization of the school with lectures in the morning, in the late afternoon, and sometimes in the evenings allowed for several freetime activities during the free afternoon hours. The beautiful scenery of the Engadine Valley invited for hiking tours, mountain biking, or excursions to the nearby 'National Park'. For the especially courageous participants even a rafting tour on the river 'Inn' was organised. After 'surviving' this event the participants could compare their sportive

abilities in a tennis tournament and a soccer match 'Russia against the rest of the world' where according to A. Ioffe's words during the banquet 'the highly disordered Russian team did not show up the necessary coherence'.

Next year's school is already envisaged to take place from August 8-14, 1998. Due to the recent decision to build the Swiss synchroton source 'SLS' at PSI the programme will focus on the complementarity between neutron and X-ray scattering in condensed matter research. Due to the expected large attendance our advice is: Book your ticket for Zuoz '98 now!

Stefan Janssen

The winning soccer team "rest of the world"



Two "champions of the tennis tournament

6th PSI Summer School on Neutron Scattering

COMPLEMENTARITY BETWEEN NEUTRON AND SYNCHROTRON X-RAY SCATTERING

8-14 August 1998, Lyceum Alpinum, Zuoz, Switzerland

The main purpose of the Summer School is to give participants an overview on the comlementarity between neutron and synchrotron x-ray scattering in various fields of condensed matter research. This topic is of particular importance after the successful start of the spallation neutron source SINQ as well as the approval of the project of the synchrotron source SLS, two large scale facilities for the benefit of the international user community at PSI. The lectures will cover both theoretical and experimental aspects. There will be special seminars in small groups for discussion of certain topics in depth. For participants no previous knowledge of the subject is required, but an honours degree in natural sciences (equivalent to the diploma) is essential. A poster session will be organized for participants who wish to present their own results. The posters will be on display during the whole School.

Preliminary list of topics and invited lecturers* (* not yet confirmed):

Hot topics in condensed matter research: *H.R. Ott, Zürich*

Principles of neutron and synchrotron x-ray scattering: *W.E. Fischer, Villigen*

Diffraction (structure determination): *A. Fitch*, Grenoble; P.G. Radaelli*, Grenoble*

Local structures: *T. Egami*, Philadelphia*

Magnetism: *Ch. Brouder*, Orsay; W.G. Stirling*, Liverpool*

Inelastic scattering: *W.J.L. Buyers*, Chalk River; D. Richter*, Jülich*

Small angle scattering, surfaces and multilayers: *D. McMorrow*, Risö; S.K. Sinha*, Argonne*

Photoemission: *X. Shen*, Stanford*

Theoretical concepts: *O. Gunnarsson*, Stuttgart; R. Klein*, Konstanz; G. Sawatzki*, Groningen*

Beam optics: *P. Böni, Villigen; A. Freund*, Grenoble*

Summary of the School: *S.W. Lovesey*, Didcot*

Discussion seminars will be introduced and convened by the following experts* (* not yet confirmed):
Chemical structure: *P.G. Radaelli*, Grenoble*; dynamics: *B. Dorner*, Grenoble*; magnetism: *G.H. Lander*, Karlsruhe*; electronic structure: *G. Sawatzki*, Groningen*; surfaces and multilayers: *J. Als-Nielsen*, Risö*; materials: *H.R. Ott, Zürich*

Organization of the School: W.E. Fischer (School Chairman)
A. Furrer (Programme Chairman)
R. Bercher (Secretary)

Programme Committee: H.B. Braun, Villigen; B. Dorner, Grenoble; W.E. Fischer, Villigen; A. Furrer, Zürich & Villigen; G. Kostorz, Zürich; G.H. Lander, Karlsruhe; S.W. Lovesey, Didcot; H.R. Ott, Zürich; P. Schurtenberger, Zürich; U. Staub, Villigen; K. Yvon, Geneva

*Residential accommodation will be available at the Lyceum Alpinum in Zuoz (costs: approximately 600 Swiss Francs, including full board, excursion, banquet, and Proceedings). The number of participants will be limited to 130. The language of the School is English. Closing date for applying is **30 June 1998**. For further information and application forms, contact Renate Bercher, Paul Scherrer Institut, CH-5232 Villigen PSI, Tel.: +41-56-310 34 02, Fax: +41-56-310 32 94.*

AUSTRON ahoi!

Mit diesem "Schlachtruf" hat sich Jack Carpenter von der letzten Sitzung des Internationalen Wissenschaftlichen Rates in Wien verabschiedet. Seither ist es um das Projekt AUSTRON still geworden. Das hat sich Ende November 1997 schlagartig geändert, wie Auszüge aus einem Bericht der Austria Presse Agentur (APA) zeigen:

"Wien, 27.Nov. 1997 (APA) - Entscheidender Schritt für die geplante Realisierung einer internationalen Grossforschungseinrichtung in Österreich: Die European Science Foundation (ESF) hat nun ihr Gutachten über die beiden potentiellen Projekte abgeschlossen und darin eine deutliche Empfehlung für die sogenannte Spallations-Neutronenquelle AUSTRON abgegeben. Das zweite Vorhaben, das Kristallzuchtlaboratorium EUROCRYST, wurde dagegen 'als nicht geeignet für eine Grossforschungseinrichtung' bewertet, wie Wissenschaftsminister Caspar Einem bei einer Präsentation der Ergebnisse des Gutachtens in Wien erklärte."

"Der Plan, eine internationale Grossforschungseinrichtung nach Österreich zu bringen, ist bereits sieben Jahre alt. 1990 wurde dieses Vorhaben als Ziel der Koalitionsparteien in die Regierungserklärung aufgenommen. Im Koalistionsübereinkommen von 1996 haben SPÖ und ÖVP diesen Plan erneuert. In diesen sieben Jahren haben zwei Wissenschafter-Gruppen Machbarkeitsstudien für die beiden Projekte ausgearbeitet, ehe die ESF beauftragt wurde, diese zu evaluieren."

"Das Projekt AUSTRON erschien den Gutachtern der ESF, einer Vereinigung von 62 nationalen Wissenschaftsfonds aus 21 Ländern, 'grundsätzlich für eine Grossforschungseinrichtung geeignet'. Da es aber in unmittelbarer Nachbarschaft Österreichs - in der Schweiz und in München - bereits zwei Neutronenquellen gibt bzw. in Planung sind, bedürfe es noch weiterer Untersuchungen. Der Wissenschaftsminister stellte klar, dass diese noch notwendigen Arbeiten durchgeführt und auch finanziert werden. Sie sollen bis zum Herbst 1998 abgeschlossen sein. Bei einem positiven Ergebnis sei dann die Errichtung einer Projektorganisation notwendig. Bei der Finanzierung des mit rund drei Milliarden Schilling veranschlagten Projekts werde am geplanten Finanzierungs-Schlüssel - ein Drittel national, zwei Drittel international - festgehalten."

Schweizerische Gesellschaft für Neutronenstreuung
Société Suisse pour la Diffusion des Neutrons
Swiss Society for Neutron Scattering

Memorandum concerning
medium- and long-term strategies for the supply of neutrons
and the project of the European Spallation Source (ESS)

The Swiss neutron scattering community, formally organized in the Swiss Society for Neutron Scattering, has agreed at its annual meeting on November 21, 1997, at PSI Villigen, on the following statements:

1. User community

Neutron scattering has been used by a large number of Swiss groups as an important tool in condensed matter research for many years. The Swiss neutron user community is steadily increasing, and consequently the demand for neutrons continues. Therefore appropriate actions have to be taken in medium and long terms both on a national and on a European level.

2. National level

The existence of a home base for neutron scattering is considered to be essential. In Switzerland this is guaranteed by the spallation neutron source SINQ at PSI Villigen which is a medium-flux source expected to be operational far into the next millenium. SINQ has a state-of-the-art instrumentation which allows the performance of high-quality neutron scattering applications in both research and technology. Moreover, SINQ ensures the basic education and training of young scientists and students in the field of neutron scattering and constitutes a nucleus for the development of new instrumental techniques.

3. European level, medium-term strategies

As neutron scattering is in many cases a flux-limited technique, the participation of Switzerland at European high-flux neutron sources is indispensable. Swiss user groups are increasingly engaged in experiments at the worldwide leading high-flux neutron sources HFR and ISIS located at the Institute Laue-Langevin (ILL), Grenoble, France, and at the Rutherford Appleton Laboratory (RAL), Didcot, UK, respectively. At present Switzerland is a scientific member of the ILL. The last years have seen a continuous development of instrumental techniques which offer a high potential for improving the efficiency of utilization of present neutron sources, in particular cases by more than an order of magnitude. This potential is not yet fully exhausted. In the medium term, efforts are needed to ensure the most effective use of present (high-flux) neutron sources.

4. European level, long-term strategies

On the longer term, there is a clear need for an advanced European neutron source which will push the neutron scattering applications beyond their present limits. An advanced neutron source, exceeding the flux of the existing high-flux sources by one to two orders of magnitude, will both boost new scientific ideas and allow experiments with better resolution, on smaller and more complex systems, on shorter time scales, and with more sophisticated techniques (e.g. polarization analysis). Today the European Spallation Source (ESS) is the only project in Europe which fulfills these criteria. Switzerland has been very active in the feasibility study of the ESS project through the Paul Scherrer Institute (PSI), Villigen, which made essential contributions to the target concept and will be further involved in the target development.

The Swiss neutron user community supports the ESS project and is willing to actively cooperate in defining an optimum concept and the technical specifications for the instrumentation as well as in the development of novel instrumental techniques.

Umfrage der SGN betr. die zukünftige Nutzung ausländischer Neutronenquellen durch Schweizerische Forschungsgruppen

1. Ausgangslage

Das Schweizerische Bundesamt für Bildung und Wissenschaft (BBW) hat die Schweizerische Gesellschaft für Neutronenstreuung (SGN/SSDN) mit Schreiben vom 28. Februar 1997 beauftragt, im Hinblick auf die Erneuerung des Vertrages zwischen der Schweiz und dem Institut Laue-Langevin (ILL) in Grenoble (Frankreich) für die Periode 1999-2003 eine Umfrage unter den Schweizerischen Mitgliedern und Neutronennutzern durchzuführen. Die Umfrage sollte nicht nur die Entwicklung der ILL-Nutzung nach der Inbetriebnahme der Spallationsneutronenquelle SINQ am PSI Villigen voraussagen, sondern auch den Bedarf nach der Nutzung anderer Quellen wie z.B. die gepulste Spallationsquelle ISIS am Rutherford Appleton Laboratory (RAL) in Didcot (U.K.) abschätzen. Auch sollten allfällig neue Nutzungsbedürfnisse von Gebieten, die gegenwärtig kaum Neutronen verwenden, evaluiert werden. Diese zweite Frage hat das BBW auch dem Schweizerischen Nationalfonds unterbreitet.

Der Vorstand der SGN/SSDN hat beschlossen, diese Umfrage im September/Oktober 1997 durchzuführen, wenn erste Erfahrungen in Bezug auf die Leistungsfähigkeit der SINQ - im Quervergleich zu andern Quellen - vorliegen. Die Teilnehmer der Umfrage wurden deshalb auch aufgefordert, einen Transfer der bisher an ausländischen Neutronenquellen durchgeführten Experimente an die SINQ am PSI Villigen abzuschätzen und diese Experimente nicht in ihren Strahlzeitbedarf an ausländischen Neutronenquellen zu integrieren.

2. Adressaten der Umfrage

Es wurden insgesamt 74 Schweizerische Wissenschaftler, die **58 verschiedene Forschungsgruppen** repräsentieren, zur Teilnahme an der Umfrage angefragt. Bis zum Stichtag des 10. Novembers 1997 haben **37 Forschungsgruppen** ihre Strahlzeitbedürfnisse an ausländischen Neutronenquellen mitgeteilt. Die 21 Forschungsgruppen, die keinen Input zur Umfrage geliefert haben, sind vorwiegend solche, die Neutronen in ihren Forschungsprogrammen noch spärlich einsetzen oder noch gar nicht verwendet haben.

3. Analyse der Umfrage

Das Interesse an Strahlzeit am ILL und an ISIS ist nach wie vor enorm. Praktisch alle an der Umfrage beteiligten Forschungsgruppen wünschen auch in Zukunft am ILL experimentieren zu können, wobei sich ein mittlerer jährlicher Strahlzeitbedarf von etwa 500 Tagen ergab. Die Hälfte der Forschungsgruppen (vorwiegend solche des PSI) wünscht zudem einen komplementären Zugang zur gepulsten Spallationsquelle ISIS, mit einem mittleren jährlichen Strahlzeitbedarf von etwa 100 Tagen. Erfahrungsgemäss werden die meisten Experimente in Kollaboration mit mehreren Forschungsgruppen verschiedener Länder durchgeführt. Geht man davon aus, dass solche Kollaborationen auch in Zukunft bestehen werden, dürfte die zukünftig gewünschte Nutzung etwa der Hälfte des angegebenen Strahlzeitbedarfs entsprechen, d.h. für das ILL 250 Tage/Jahr und für ISIS 50 Tage/Jahr. Für das ILL ergibt sich eine weitere Reduktion auf etwa 180 Tage/Jahr, weil viele Experimente in Zukunft auch an der SINQ durchgeführt werden können.

4. Schlussfolgerungen

4.1. **ILL**: Gemäss bisherigem Vertrag mit dem ILL haben Schweizerische Forschungsgruppen ein Nutzungsrecht im Umfang von 3.5%. Die bisherige Nutzung war wesentlich höher und betrug durchschnittlich 218 Tage/Jahr, was einer Nutzungsquote von 5.1% entspricht. Auch für die Zukunft ist mit einer Nutzung von mindestens 4% zu rechnen.

4.2. **ISIS**: Die bisherige Nutzung von ISIS durch Schweizerische Forschungsgruppen betrug durchschnittlich 16 Tage/Jahr, was einer Nutzungsquote von 0.7% entspricht. Es besteht keine vertragliche Regelung für die Nutzung von ISIS durch Schweizerische Forschungsgruppen. Der für die Zukunft gewünschte Bedarf übersteigt die bisherige Quote deutlich und dürfte etwa 2% betragen.

5. Empfehlungen

Die Generalversammlung der SGN/SSDN vom 21. November 1997 hat einstimmig folgende Empfehlungen verabschiedet:

5.1. **ILL**: Weiterführung des bestehenden Vertrages, mit Erhöhung der Nutzungsquote durch Schweizerische Forschungsgruppen von bisher 3.5% auf neu mindestens 4% (Antrag an das BBW).

5.2. **ISIS**: Aufnahme von Vertragsverhandlungen zwischen dem PSI und dem RAL und Paraphierung eines Vertrages, welcher die gegenseitige Nutzung der an beiden Instituten vorhandenen Grossforschungsanlagen regelt (Antrag an das PSI).

Jahresversammlung 1998 der Schweizerischen Physikalischen Gesellschaft (SPG) in Bern, 26./27. Februar 1998, in Zusammenarbeit mit der Schweizerischen Gesellschaft für Neutronenstreuung (SGN)

An der kommenden Jahresversammlung der SPG wird gemeinsam mit der unserer Gesellschaft ein

Symposium über

SINQ und Neutronenstreuung

veranstaltet. Wir rufen alle unsere Mitglieder auf, sich aktiv daran zu beteiligen. Anmeldungen für Präsentationen sind mittels speziellem Formular (siehe Beilage) **vor dem 5. Januar 1998** einzusenden an: Prof. Dirk Trautmann, Institut für Physik, Klingelbergstrasse 82, 4056 Basel. Auf dem Formular ist in der Zeile "Mein Sachgebiet" der Vermerk **Neutronenstreuung** anzubringen. Wir erwarten eine rege Beteiligung von Seiten unserer Mitglieder.

Neue Mitglieder

Seit dem 1. Januar 1997 hat die Zahl der Mitglieder wieder markant zugenommen:

- P. Lamparter
- G.N. Ourieva
- M. Dlouhà
- K. Gennadi
- S. Grigoriev
- V.L. Alexeev
- M. Lazzarini
- S.K. Manickam
- S. Vratislav
- S. Klimko
- N. El Khayati
- S. Romanzetti
- L. Giovanelli

Austritte:

M. Borkovec, ETH Zürich, Inst. f. terrest. Ökologie, Schlieren

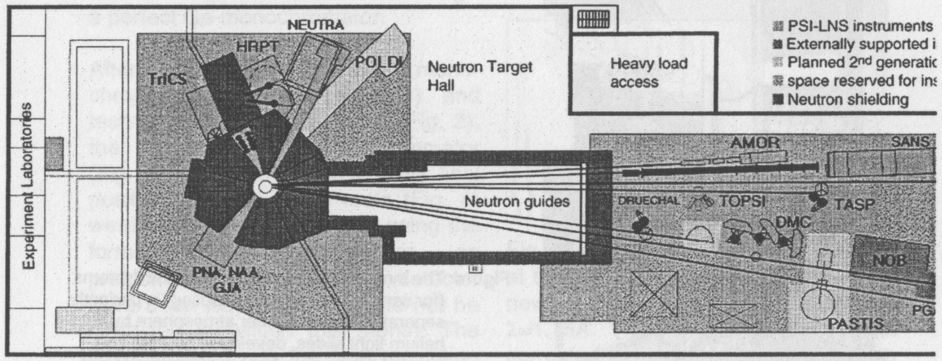
SINQ: Commissioning, first Results

P. Böni

After the extraction of the first neutron beams during Spring 1997 (see Swiss Neutron News Nr. 11), the Swiss spallation source SINQ was operated at high currents of the order of 830 µA during two to three days a week. The triple-axis-spectrometer Drüchal was the first instrument to be commissioned, followed by the powder diffractometer DMC, test spectrometer TOPSI, and the polarised triple-axis-spectrometer TASP. The neutron fluxes at the sample positions are excellent and compare favorably with medium flux sources throughout Europe. In addition, the prompt gamma-ray activation station is working.

At the target station, the transmission radiography station is now producing nice data. During the last days of beam time, a thermal neutron beam has been extracted at the beam port of the four circle diffractometer TriCS for the first time and a first neutron diffraction experiment was performed. The neutron irradiation facilities are also in an advanced state and are expected to be ready for operation in 1998.

On the following pages, you will find updated information on the present status of most instruments and some first new experimental results. For more details please consult WWW on http://www1.psi.ch/www_sinq_hn /Welcome_sinq.html. The first call for proposals will take place in February 1998.



The Irradiation Facilities at SINQ

E. Lehmann, Departments Spallation Source, Paul Scherrer Institut

During the first operational year of SINQ a compromise had to be found between installation and operation of the four irradiation facilities.
Being close to be finished, the completion became difficult because the access to the central components was very limited during periods with full beam power.
Nevertheless, two experiments could perform their first tests during the last operation day in November 1997.
The **Gas-Jet** located in beam line 62 is now prepared for interesting and varied experiments in Radiochemistry. The first fission products, generated inside the specially designed chamber system, exposed to the thermal neutron beam, could be measured in the chemistry laboratory, 80 meters far from the source. The remote controlled and completely automated system will go into its routine operation during the next beam time in 1998 with the full performance of three independent fission chambers.
One of the rabbit systems for **Neutron Activation Analysis (NAA)** was tested under "cold" and "live" conditions. In this manner, the neutron flux level, the flux gradient over the sample length and the activation of the capsule material could be measured. The inner helium circuit used for sample transportation and cooling of the capsules was first successfully utilised. After completion of the second system the whole facility will be used for high precision analytical investigations.
The two remaining rabbit lines to the SINQ centre **(PNA system)** have a similar design as NAA. They are used for long term irradiation and the generation of therapy nuclides for medicine. Because the activity level of the samples is much higher, the handling has to be performed more carefully. In 1998 the two independent rabbit lines will go into operation also.
The **NCR** facility was designed for irradiation experiments with cold neutrons, especially for biological samples for studies in the framework of boron neutron capture therapy (BNCT). The engineering as well as the software and hardware solution for the sample movement system was completed.

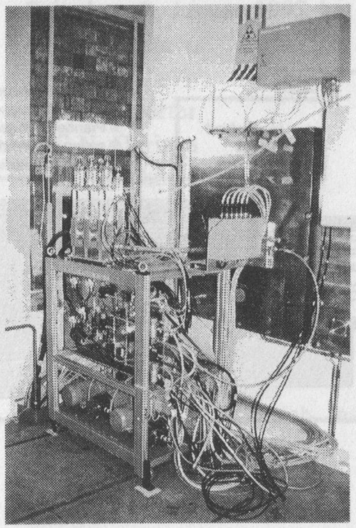


Figure: The inner helium circuit of the rabbit systems (for sample transport and cooling) is perfectly separated from the outer atmosphere by helium tight slides, developed by PSI. The entry of the transport channel into the target block can be seen in the centre of the picture. The remote controlled system is operated inside a concrete shielding.

Single Crystal Diffraction Instrument TriCS

J. Schefer
Laboratory for Neutron Scattering ETHZ&PSI, CH-5232 Villigen PSI

Fig. 1: Mounting of the monochromator lift outside of the main shielding by B8/PSI.

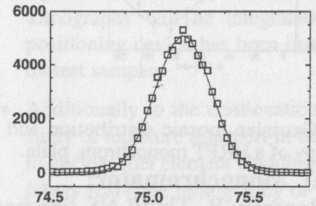


Fig. 2: Rocking curve of a single Ge_{311}-slab measured at TOPSI/ SINQ using a perfect Ge-monochromator.

After completion of the monochromator mechanics (Fig. 1) and testing of the individual slabs (Fig. 2), the focusing Ge_{311}-monochromator (Fig. 3) has been installed at its final position and first beam tests (Fig. 4) were successfully performed using the former P2AX spectrometer, as problems with the microstrip detector have been localised, but could not be corrected for within this month. The flux measured with the high resolution Ge_{311}-monochromator using Au-foils is $5.7 \cdot 10^5$ n/cm^2/s/mA focusing the beam to a height of 40mm (20mm is possible if fully adjusted, yielding a first gain factor of two). For flux comparisons: DMC at Saphir/ $Ge_{311}/\lambda=1.7$Å: $5 \cdot 10^5$, DMC at SINQ/ $C_{002}/\lambda=2.56$Å: $5.3 \cdot 10^5$. A second gain factor of two is possible for measurements of e.g. magnetic structures, phase transitions and superstructures when using a focusing C_{002}-monochromator instead of the high resolution mode described here.

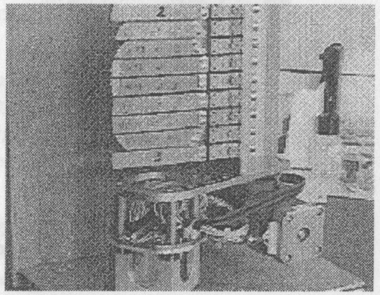


Fig. 3: Completed focusing TriCS monochromator with 9 slabs, each 12.5mm high.

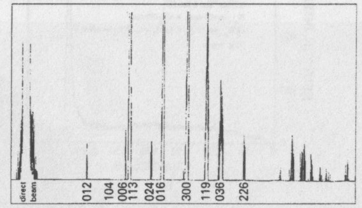


Fig. 4: First pattern of Al_2O_3 measured at the TriCS-sample position with the new Ge_{311}-wafer-monochromator, $\lambda=1.15$Å. The recording is not corrected for fluctuations of the source (present peak current: 820μA).

New Developments Concerning the High Resolution Powder Diffractometer for Thermal Neutrons HRPT

P. Fischer, M. Koch and N. Schlumpf*, Laboratory for Neutron Scattering ETH Zurich & Paul Scherrer Institute*, CH-5232 Villigen PSI

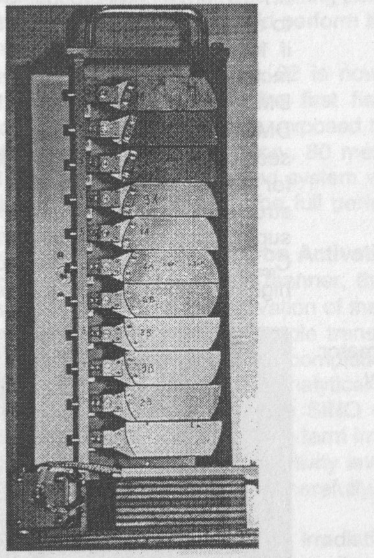


Fig. 1: 28.5 cm high, vertically focusing HRPT wafer Ge monochromator (511)

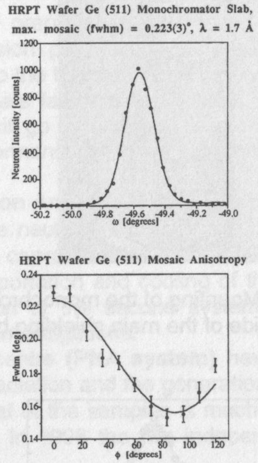


Fig. 2: Gaussian mosaic distribution and anisotropy of a HRPT monochrom. plate

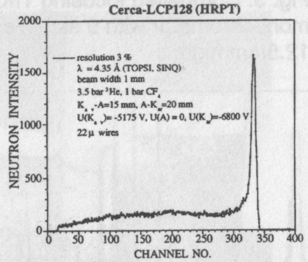


Fig. 3: HRPT prototype detector characteristics

a) Monochromator:

Recently R. Thut/LNS finished the mechanics (Fig. 1) of the new, vertically focusing wafer type Ge (hkk) monochromator of HRPT [(511) parallel to plate surface]. Each slab may be adjusted with respect to three directions. On TOPSI and Drüchal at SINQ the monochromator was successfully oriented and tested (cf. Fig. 2).

b) Multidetector:

The test results obtained on the final Cerca prototype detector LCP-128 are excellent (Fig. 3). The characteristics resembles the one of a single detector with resolution of 3 %. Earliest in March 1998 HRPT with large multidetector LCP-1600 and new electronics will be ready for first tests.

First Results at the NEUTRA neutron radiography station at SINQ

H. Pleinert and E. Lehmann

The Neutron Transmission Radiography facility NEUTRA has been in operation since August 97. It is located at the thermal beam channel 32 and provides a neutron beam of 3 10^6 cm^{-2} s^{-1} flux density and a circular aperture of 40 cm of diameter [1,2]. During the first months of operation, the following results could be obtained:

- A systematic characterisation of the instrument has been carried out: additionally to the measurement of the spectrum and of the flux and to first estimates of beam geometry carried out before the facility was completed, the beam profile has been mapped precisely and beam divergence has been measured with ASTM standard BQIs. Earlier estimates of a high quality beam geometry have been confirmed regarding spatial resolution down to 20 μm and excellent beam homogeneity.
- The range of detectors available at NEUTRA has been expanded: additionally to the existing standard set of converter foils used with X-ray film and to the electronic detector using a cooled slow-scan CCD camera, imaging plates have been introduced as a neutron radiography tool. First tests of a CCD camera real-time radiography system have also been carried out.
- A program of digital image processing and restoration in neutron radiography has been started to provide enhanced evaluation instruments in addition to the neutron signal transfer analysis method developed at PSI. Among other techniques, neutron tomography will be integrated into the radiography program and presently, a positioning device has been installed and tested by performing first measurements on test samples.
- Additionally to the continuation of existing neutron radiography applications like study of moisture transport in building materials or determination of hydride lenses in nuclear fuel element cladding, several new applications have been tested: among others real-time radiography of gas-liquid two-phase behaviour (Fig. 2) and study of fracture mechanics of concrete (Fig. 3).
- The design of a facility for neutron radiography of radioactive samples has been continued. This facility will be added to the present NEUTRA station.

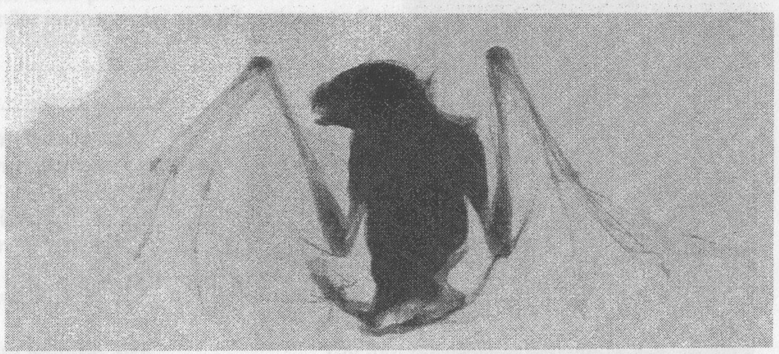


Fig.1: The image of a bat illustrates the good ability of neutrons to investigate organic samples and biologic objects.

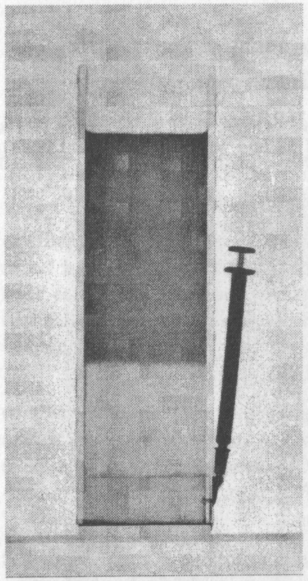


Fig. 2: The behaviour of light (above) and heavy (below) water as layers inside the case was investigated. Such measurements can be performed easily with NR only. The stability of the border was studied over several hours. Beside the qualitative impression also the numerical information is available for the description of the processes.

The first months of operation have confirmed that NEUTRA is a flexible instrument with excellent overall performance characteristics, and can be expected to perform well in numerous neutron radiography applications.

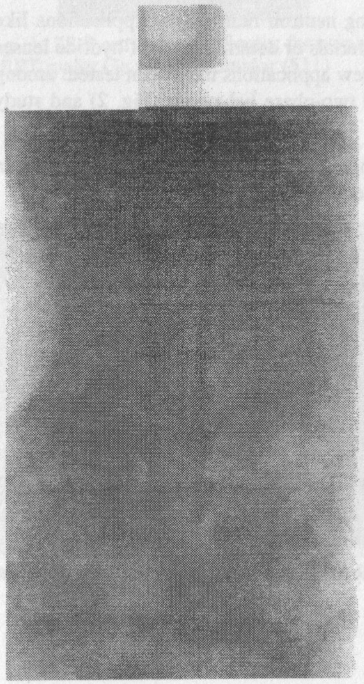
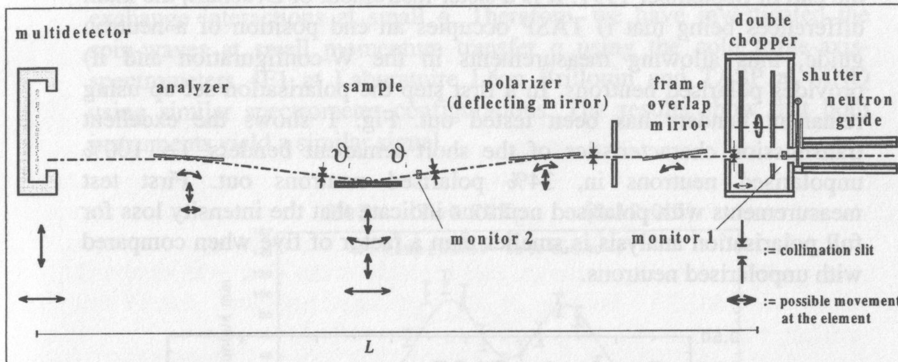


Fig. 3: Concrete samples with up to 15 cm thickness can be penetrated easily by thermal neutrons. Inner structures as well as modifications (as shown with the plastic insert) can be observed with good resolution and contrast

Apparatus for Multi-Optional Reflectometry AMOR

D. Clemens, P. Gross

Laboratorium für Neutronenstreuung ETH Zürich & Paul Scherrer Institut, CH-5232 Villigen PSI



Sketch of the overall instrumental layout of the PSI reflectometer. Components for the generation of magnetic fields, positioning aids, and single detectors are omitted.

AMOR will be a flexible instrument for polarized and nonpolarized neutron reflectometry on metallic, soft matter, and biological multilayers and films as well as fluids. For this reflectometer extreme care is taken to achieve optimal vibration isolation. Very much to our delight the guide position already offers a mean flux of 1.3×10^8 n/cm²/s/mA with the current target (Au foil irradition). The chopper station and a 3 Tesla magnet shared with SANS have arrived and are properly working. Several of the main installations are scheduled to be at PSI in February. In the supermirror team we made successful developments for multilayer monochromators and polarizers that will be used as optical components on AMOR. By the end of the current shut-down period AMOR shall be available. The outline of the new ILL reflectometer follows similar instrumental considerations as they have been made for our instrument.

maximum bandwidth:	0.13 ... 1.3 nm
deflecting mirrors / polarizer	FeCoV/Ti:N supermirror, multilayer monochromator
collimation	0.05 ... 20 mm × 5 ... 55 mm
analyzer	FeCoV/Ti:N supermirror or FeCo/Si supermirror
detectors	^{3}He x-y-detector and 2 ^{3}He single detectors
maximum sample size	150 mm × 500 mm
resolution	1.5% ... 10%
total length chopper-detector *L*	2.5 ... 10 m

Triple-Axis-Spectrometer TASP

P. Böni and B. Roessli

The polarised triple-axis-spectrometer TASP has been commissioned at the end of September 1997. It is a sister instrument of DrüchaL, the main differences being that i) TASP occupies an end position of a neutron guide, thus allowing measurements in the W-configuration and ii) provides polarised neutrons. In a first step the polarisation set-up using remanent benders has been tested out. Fig. 1 shows the excellent transmission characteristics of the short remanent benders, i.e. 100% unpolarised neutrons in, 34% polarised neutrons out. First test measurements with polarised neutrons indicate that the intensity loss for full polarisation analysis is smaller than a factor of five when compared with unpolarised neutrons.

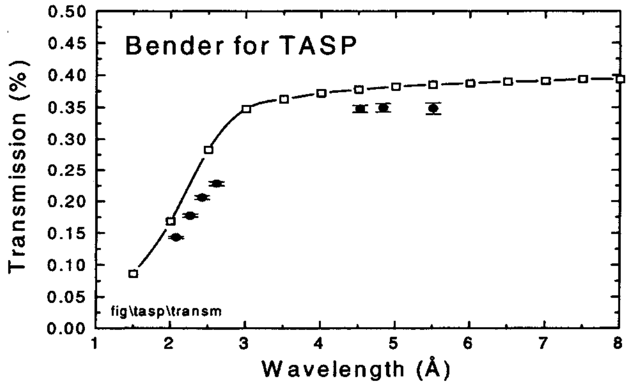


Fig. 1: Calculated transmission of the short polarising benders. The filled circles indicate the measured transmission for different neutron wavelengths.

1. Spin Waves in EuS

P. Böni, B. Roessli, and F. Semadeni

Spin-wave dispersion curves have been measured in many isotropic ferromagnets over large areas of the Brillouin zone. The dispersions from insulating materials like EuS or EuO are quite well understood in terms of localised magnetic moments, whereas band models have been proven

to be rather successful in describing the spin dynamics at low temperatures in itinerant ferromagnets like Fe and Ni.

Interestingly, the critical behaviour of a Heisenberg ferromagnet cannot be investigated in the limit $q \rightarrow 0$ because the magnetic moments induce long-range anisotropic dipolar fields that decay like r^{-3} and dominate the exchange interactions at small q. Therefore, we have investigated the spin-waves at small momentum transfer q using the cold triple-axis-spectrometers 4F1 at Laboratoire Léon Brillouin and TASP at SINQ using similar spectrometer configurations. The results show that both instruments yield a similar signal.

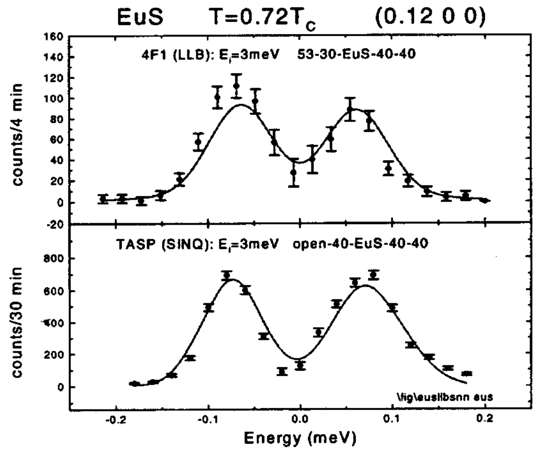


Fig. 2: Spin waves in EuS at small q.

Next year we shall implement the full polarisation set-up on TASP, using remanent benders. Going to smaller q we shall try to measure the dipolar critical scattering in order to prove that the magnetisation fluctuations along the magnetisation direction diverge like $1/q\kappa$, and that the number of Goldstone modes is reduced by one.

2. Magnetic Excitations in Ni_3Al

Böni, B. Roessli, and F. Semadeni

Weak ferromagnetism in ordered metals such as Ni_3Al has been the subject of experimental and theoretical interest and controversy for many years. The key issues have been the role of the collective spin-wave and the (incoherent) single-particle spin-flip excitations, respectively, on the thermodynamic properties of these materials. Ni_3Al is a particularly interesting system because the magnetic moment is small (0.075 μ_B/Ni atom), although the Curie temperature T_C=41 K is quite high.

Neutron scattering studies have been carried out by Bernhoeft et al. [1] on ingots of high-quality specimens of Ni_3Al. These measurements were restricted to very small momentum, q, and energy transfer, E, because of the polycrystallinity of the sample. In particular, it was not possible to characterise the spin-flip excitations due to kinematical restrictions.

In order to overcome these problems we have measured the low-energy excitations on a single-crystalline sample of Ni_3Al using very high energy resolution. Fig. 3 shows, that excitations can clearly be observed down to q=0.012Å^{-1} because of the very high resolution due to the primary collimator and the good neutron flux of TASP.

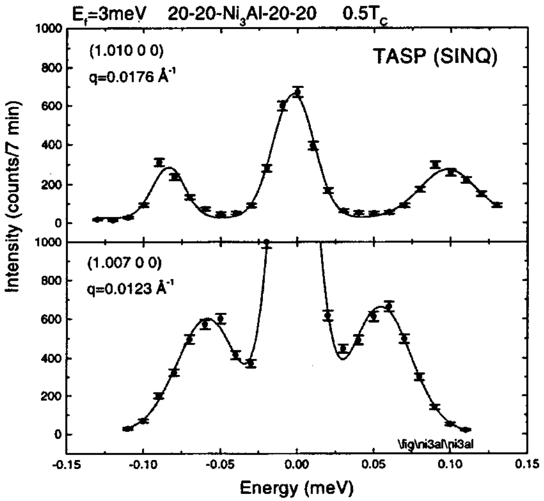


Fig. 3: Spin wave excitations in single crystal Ni_3Al at T=20K.

[1] N. R. Bernhoeft et al., Phys. Rev. B **28**, 422 (1983).

Two axis and neutron optics diffractometer at PSI, TOPSI

D.Clemens and M.Senthil Kumar
Paul Scherrer Institut, CH-5232 Villigen PSI

Since the installation, the test instrument TOPSI is serving as a reflectometer for the investigation of polarising and non-polarising supermirrors and multilayers. The important features of the instrument such as the operation in a horizontal geometry, variable wavelength and large accessible q-range make it possible to study a variety of samples. The reflectometric data of a Ni/Ti bilayer is shown in Fig.1 as an example, which demonstrates the intensity range achievable without any effort. It can also be seen from the figure that the very high quality of this multilayer produced at PSI makes the superlattice peaks visible up to the third order. Actually, the higher order peaks are only not accessible because they are buried in the background.

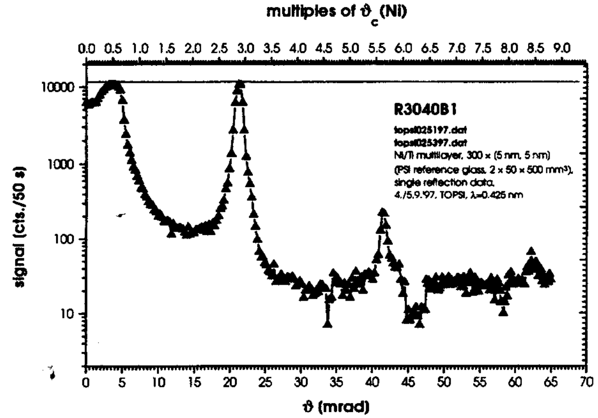


Fig.1. Reflectometry data of a Ni/Ti bilayer

Adding a bender polariser and a spin-flipper has enabled us to make polarised reflectometry studies on FeCoV/Ti mirrors and multilayers. Figure 2 shows the data for the |+> state of the neutrons, reflected from a FeCoV/Ti multilayer that has been kept at a magnetic field of 4mT after having brought the mirror to saturation. It is important to note that the resolution and quality within the measured range is comparable with that measured using the ADAM reflectometer at ILL. At higher angles the ADAM profits from its outstanding signal-to-noise ratio.

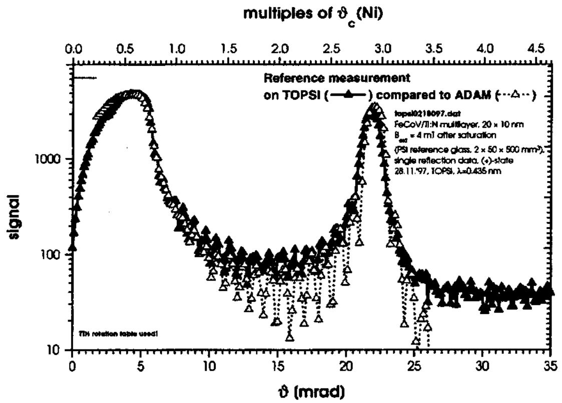


Fig.2. Polarised reflectometry data of a FeCoV/Ti bilayer

The attainable q-range at TOPSI is rather large. Thus the instrument is capable of working as a diffractometer as well. The (111) Bragg reflection of a Ni/Ni_3Al bilayer having a total thickness of 400 nm is shown in Fig. 3. This multilayer displays textured growth with its [111] along the surface normal. The shoulder is a satellite peak due to the vertical coherence in the bilayer structure. As a test instrument, TOPSI has been utilised for testing prototype devices such as micro-strip detectors, vertical-focusing monochromators and collimators for the application in Fermi choppers.

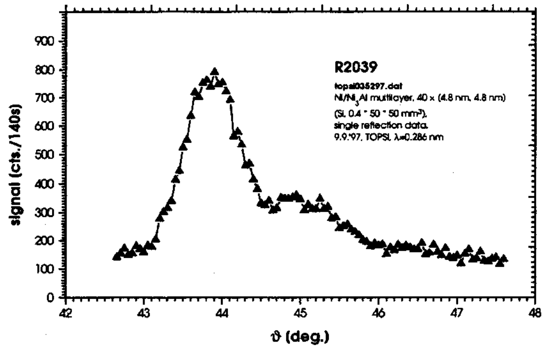


Fig.3. High angle diffraction data of a Ni/Ni_3Al bilayer

In order to improve the performance of the instrument, it is planned to install ^6Li apertures to increase the signal-to-noise ratio.

TRIPLE-AXIS SPECTROMETER DrüchaL

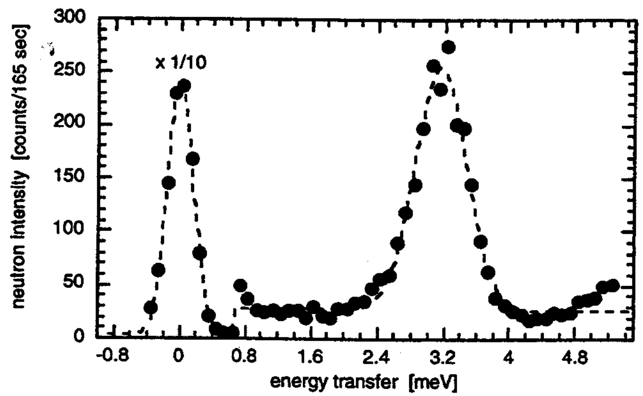
Willi Bührer and Peter Keller

The triple-axis spectometer DrüchaL ("**Drü**-achsigs am **chal**te **L**eiter": Swiss dialect for "triple-axis at cold guide") went into permanent scientific operation in the end of October 1997. The following three reports are the results of measurements on DrüchaL during SINQ operation in October and November.

1. Crystal field excitations in $TmNi_2{}^{11}B_2C$

Urs Gasser and Peter Allenspach

$RNi_2{}^{11}B_2C$ (R: rare earths) is a relatively new superconductor with comparable critical temperatures for superconductivity and long range magnetic ordering of the rare earths. For an understanding of the interplay between these two phenomenons a knowledge of the magnetic (crystal field) ground state is indispensable. We therefore measured in the past the crystal field splitting in this compound for different rare earths [1]. The figure shows a spectrum of $TmNi_2{}^{11}B_2C$ taken at 10 K on DrüchaL. The sample volume was rather small because of the absorption by remaining ^{10}B (annular cylinder, diameter 8/10 mm, length 50 mm). The monochromator set-up was PG_{002} (vertically curved, collimation 40'); PG_{002} analyzer (horizontally-curved); final energy was fixed at 8 meV. The detector count rate with this type of set-up is at present twice the count rate of IN3 (thermal guide at the ILL).



Energy spectrum of neutrons scattered from $TmNi_2{}^{11}B_2C$.

[1] U. Gasser et al., Z. Phys. B 101, (1996) 345.

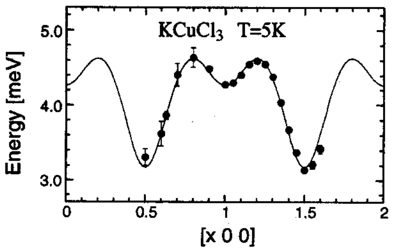
2. Magnetic excitations of the double spin chain system $KCuCl_3$.

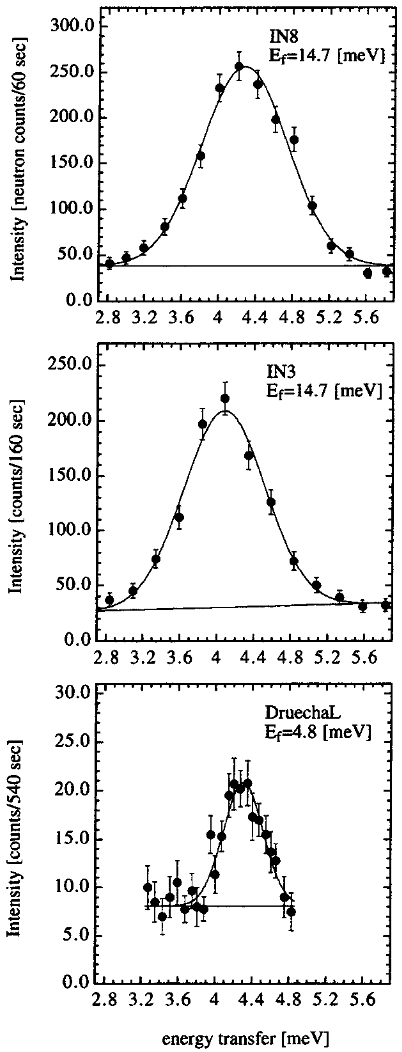
Nordal Cavadini and Wolfgang Henggeler

Recent investigations on monoclinic $KCuCl_3$ have shown interesting magnetic properties which are due to the spin-1/2 interactions of the Cu^{2+} ions. These are disposed in $CuCl_6$ octahedra along double chains and are thought to be a realization of a spin-1/2 ladder. The strong dimerization between spins along the rugs of the chain is responsible for the non-magnetic singlet ground state of the spin system, and for a finite excitation energy gap. Both properties are quantum effects typical to spin ladders.

Spin wave measurements on a single crystal have been performed for the first time to investigate the low-energy excitations and to determine the nature and strength of the exchange coupling parameters between the Cu^{2+} ions. A typical dispersion curve taken at ILL on IN8 is shown below.

Taking advantage of the superior resolution of DrüchaL, measurements at SINQ were also performed in order to refine the dispersion curve as well as to investigate the existence of additional, almost degenerate branches. The plots on the right compare the same reciprocal point [1 0 0] for three different three axis spectrometers.





3. Spin-wave dispersion in $Fe_{33.4}Cr_{66.6}$

P. Böni and B. Roessli

In the field of diluted magnetic systems, the problem of re-entrant spin glasses has proven difficult to solve, both experimentally and theoretically. $Fe_{33.4}Cr_{66.6}$ is at the borderline to becoming a spin glass and is therefore an ideal system to study the evolution of the spin glass order in a diluted ferromagnet. The purpose of the present experiment was the determination of the spin wave dispersion at 0.75 T_c.

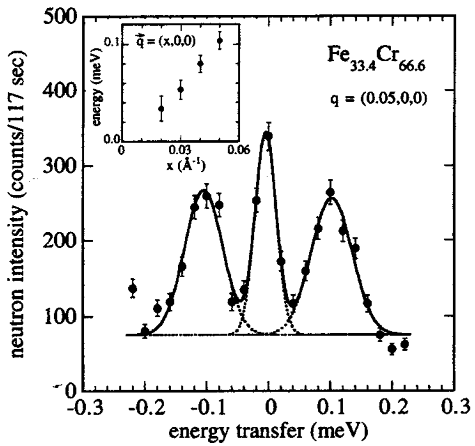
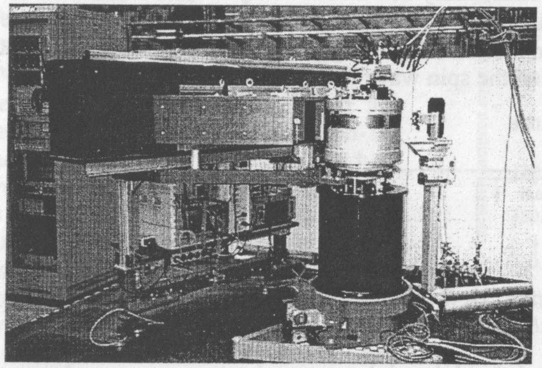


Fig. 1: Energy spectrum of neutrons scattered from $Fe_{33.4}Cr_{66.6}$. The inset shows the dispersion curve of magnons at small momentum transfer.

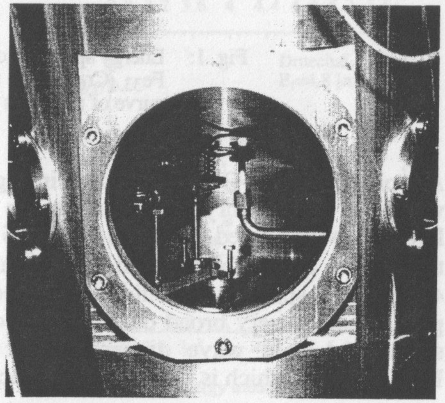
A typical constant-Q scan is shown in Fig. 1. In order to resolve the rather soft spin waves in the polycrystalline ingot, we used a high resolution configuration of DrüchaL with a fixed final energy E_f=2.5 meV and 20' collimations before and after the sample and before the detector, resulting in an energy resolution (FWHM) of 40μeV. The spin waves could be resolved above q=0.02Å^{-1}. Above q=0.10Å^{-1}, the peaks became very broad due to the disorder of the magnetic moments. The inset shows the spin wave dispersion for intermediate q, indicating a stiffness D=46meVÅ^2, which is significantly reduced with respect to pure Fe.

Cold Neutron Powder Diffractometer DMC

L. Keller, M. Gutmann and P. Fischer
Laboratory for Neutron Scattering, ETHZ & PSI, CH-5232 Villigen PSI

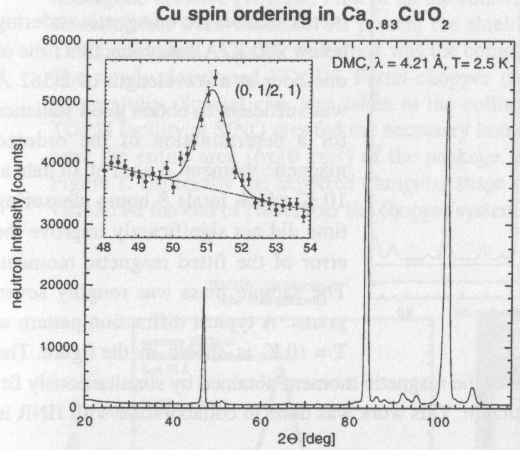


The cold neutron powder diffractometer DMC is a flexible instrument for efficient neutron powder diffraction studies in the fields of crystallography, solid state physics, chemistry, material science and biology, in particular for the determination of weak magnetic intensities. Due to the use of a position sensitive BF_3 detector (400 detectors, angular separation 0.2°) simultaneous measurements within a scattering angle range of 80° are possible. The wavelength range is 2 Å to 6.5 Å. Standard measurements are performed by means of an evacuated Vanadium pot equipped with a cooling machine. For experiments at very low temperatures cryostats are available. An oscillating radial collimator suppresses Bragg peaks from the sample environment such as cryostats or furnaces. The instrument became operational with the focusing graphite monochromator in July, 1997, and has since been successfully used by many scientists.
In the following a few examples of DMC experiments are presented.



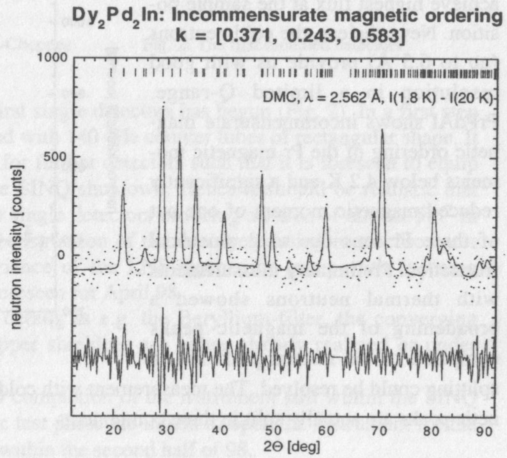
Undercooled melts are in a metastable state of matter. Most measurements of properties in undercooled melts require a freely suspended droplet and can therefore be obtained only with levitation technique. The best way to achieve the state of a deeply undercooled melt is containerless processing. This technique guarantees a complete avoidance of heterogeneous nucleation on container walls which otherwise dominates the solidification behaviour of a melt. Additionally, surface induced heterogeneous nucleation is reduced by a considerable amount by processing the melt in an ultrapure environment. Recently evidence for magnetic ordering in undercooled Co-Pd melts was found. Neutron scattering is the method of choice for investigation of structural and magnetic ordering phenomena. In collaboration with DLR, Köln, a new electromagnetic levitation facility was designed for neutron scattering experiments and installed on DMC. For the first time neutron diffraction experiments were performed on deeply undercooled melts. The photo shows a levitating liquid Co-Pd sample on DMC.

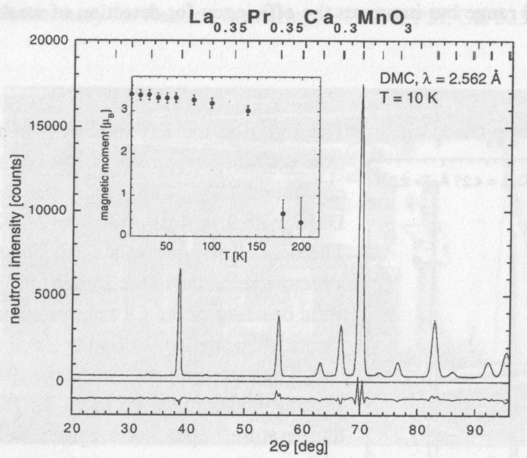
At the cold guides of SINQ highest flux is achieved at wavelengths $\lambda \geq 4$ Å. The use of long wavelengths reduces the accessible Q range but improves the efficiency for detection of weak, especially magnetic, intensities.



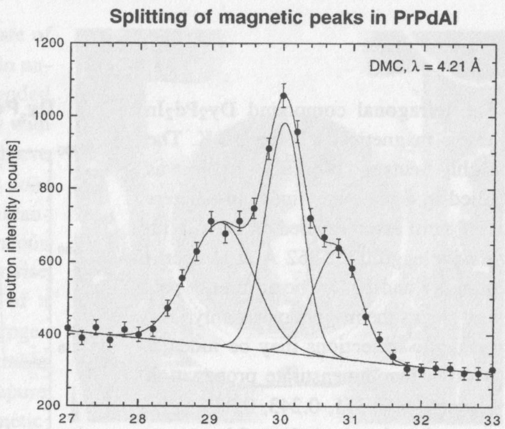
The figure to the left shows the neutron diffraction pattern of the novel compound $Ca_{0.83}CuO_2$ measured on DMC with $\lambda = 4.21$ Å at T = 2.5 K. The data clearly shows a weak superstructure peak due to the antiferromagnetic ordering of the Cu magnetic moments along the Cu-O chains (see inset). The measurement was repeated at several temperatures up to 55 K. The temperature dependence agrees well with previous torque measurements which proves the magnetic origin of the superstructure seen in our measurements. This is one of only few examples of clear evidence for Cu spin ordering obtained by powder neutron diffraction. These measurements have been performed in collaboration with IBM, Rüschlikon.

The tetragonal compound Dy_2Pd_2In orders magnetically below 12 K. The highly neutron absorbing sample was filled in a hollow cylinder (diameters 10/8 mm) and measured on DMC with a wavelength of 2.562 Å at temperatures 1.8 and 20 K. The difference pattern shows the magnetic part only. The magnetic reflections may be indexed with an incommensurate propagation vector k = [0.371, 0.243, 0.583]. The measuring time was about 5 hours per temperature which shows that highly absorbing samples can be measured in reasonable time on DMC.





$La_{0.35}Pr_{0.35}Ca_{0.3}MnO_3$ belongs to the group of compounds showing the colossal magnetoresistance effect. In this material the Mn magnetic moments exhibit ferromagnetic ordering below 200 K. A data collection time of one hour at a wavelength of 2.562 Å was sufficient to obtain good statistics for a determination of the ordered magnetic moment. A sum of all data at 10 K which totals 8 hours measuring time did not significantly improve the error of the fitted magnetic moment. The sample mass was roughly seven grams. A typical diffraction pattern at T = 10 K is shown in the figure. The inset shows the temperature dependence of the magnetic moment obtained by simultaneously fitting the chemical and ferromagnetic structure. This work was done in collaboration with JINR in Dubna.



As seen in the previous examples using the focusing graphite monochromator DMC is designed to achieve highest flux at the sample position. Nevertheless, the cold neutrons (up to 6.5 Å) provide us with good resolution in a limited Q-range. PrPdAl shows incommensurate magnetic ordering of the Pr magnetic moments below 4.2 K and a significantly reduced magnetic moment of one out of three Pr ions due to geometrical frustration. Preliminary measurements with thermal neutrons showed a broadening of the magnetic peaks compared to the nuclear peaks but no splitting could be resolved. The measurement with cold neutrons on DMC showed that the magnetic peaks are actually split in three components.

Time-of-Flight Spectrometer FOCUS: Present Status

During the last year the construction of the SINQ-TOF spectrometer FOCUS has undergone decisive progress. First of all the construction of the massive monochromator shielding has been finalized. At present the shielding is mounted at its position in the SINQ guide hall. Another milestone was the completion of the FOCUS chopper system. The newly developed FOCUS Fermi-chopper (DORNIER development) was tested successfully. Special care was taken to the collimation package. Detailed tests on the TOPSI facility at SINQ proofed the necessary homogeneous collimation of (2.05±0.05)° over the entire area (6x10 cm^2) of the package. A typical rocking curve is shown in Figure 1. Especially the expected triangular shape of the transmission function is clearly visible. At the end of November the chopper system has been delivered to PSI.

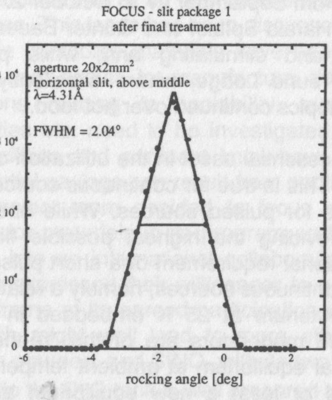


Fig. 1: Rocking curve of the Fermi-Chopper collimation package

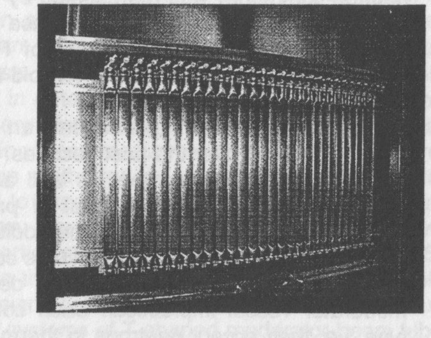


Fig. 2: The first mounted detectors

Furthermore the installation of the first single detectors has begun (Fig. 2). In a first step the central detector bank will be filled with 140 ^{3}He counter tubes of rectangular shape. It was possible to place another order for further detectors such that it is foreseen to equip even the other two banks within the SINQ shutdown. Hence it should be realistic that FOCUS is provided with all its 400 single detectors covering an area of almost 5m^2 in summer 98. During December the construction of the doubly focusing monochromator will begin. Due to the large experience of the LNS-mechanics group with focusing monochromators the completion is foreseen for April 98.

Besides that a lot of experimental details as e.g. the Beryllium-filter, the converging guide, the shutter, or the disc chopper shielding are either already realized or under construction.

In summary we expect the technical completion of the instrument still within the SINQ shutdown. After an intense neutronic test phase we intend to open the instrument for the user community as soon as possible within the second half of 98.

Responsible: S. Janssen, Engineering: L. Holitzner

New initiative on an old topic

OECD-initiated workshop at Argonne National Laboratory gives new momentum to the development of advanced cold neutron moderators.

By G.S. Bauer, Paul Scherrer Institut

One of the fields identified by the Neutron Sources Working Group of the OECD Megascience Forum as carrying a potential for further progress through international collaboration is the development of cold moderators, particularly for the pulsed sources of the next generation, such as ESS. Following the meeting of the working group at the occasion of the European Neutron Scattering Conference in September 1996 at Interlaken, Iran Thomas from the US Department of Energy encouraged one of the world's leading scientists in the field, Dr. John Carpenter from the IPNS Division at Argonne National Laboratory to organize a workshop in order to stimulate such cooperation and to review the state of the art as a starting point. 35 scientists and cryogenic engineers had the privilege of being invited to participate in this workshop, which took place at Argonne from September 27 to October 2. The Swiss neutron community was represented by Harald Spitzer and Günter Bauer from PSI. The workshop was extremely tense and stimulating and, while participants appreciated the cozy atmosphere of Freund Lodge, where excellently prepared meals were served, discussions on cold topics continued over hot food.

Cryogenic moderators have become an essential asset in the utilization of research neutron sources over the past decades. This is true for continuous sources such as SINQ and research reactors as well as for pulsed sources. While both types of sources have the common goal of providing the highest possible flux of cold neutrons, pulsed sources have the additional requirement of a short pulse duration. This makes the route chosen for some continuous sources, namely a relatively large volume of 20 to 30 liters of liquid deuterium at 25 K embedded in a thermal moderator vessel impractical. Such cold moderators are of the "re-thermalizing" type, i.e. they accept neutrons in thermal equilibrium at ambient temperature from their surroundings and establish (more or less) a new equilibrium at their low temperature. By contrast, pulsed source cryogenic moderators should slow down the source neutrons as fast as possible and in as small a volume as possible all the way from their original energy of around 1-2 MeV through nine orders of magnitude in energy.

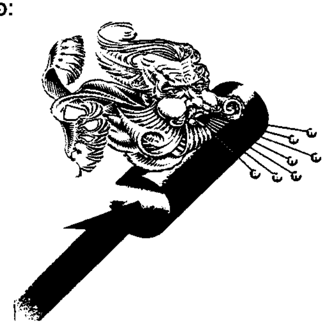
Clearly, Hydrogen, being of the same atomic mass as a neutron, is most efficient in picking up a large fraction of the neutron's energy in a single collision and is therefore the most desirable moderator substance. The cross section of hydrogen and hence the mean free path between two collisions being nearly constant in the whole slowing down regime, the time a neutron lives in a given energy interval is inversely proportional to its velocity. Consequently the product of the neutron velocity and pulse width is a constant whose magnitude is inversely proportional to the number of hydrogen atoms per unit volume. Another important requirement to a good cryogenic moderator material is that it should have sufficiently low-lying modes in its energy spectrum to which slow neutrons can couple. While liquid hydrogen has a rather low density, a material with very good properties in this respect is solid or liquid methane which has nearly free rotational modes at 1 meV. It is for this reason that early, low power pulsed spallation sources used solid methane at low

temperatures (around 15 K) with great success. Gains of a factor of three in cold neutron intensities for wavelengths above 0.4 nm for solid methane relative to liquid hydrogen have been measured for an identical geometry even for the time average flux [2], with even better performance in the pulse. However, even at a few kW of beam power (ESS is planned to run at 5 MW), a phenomenon called "burping" has been observed, which manifested itself in a sudden energy and gas release after a certain irradiation dose and which could lead to the destruction of the container. This phenomenon now is largely understood and solid methane moderators are still in use at low power sources but must be warmed up at regular intervals to release the stored energy. In view of these difficulties, intermediate power sources (ISIS, 160 kW) use liquid hydrogen as their cryogenic moderator and liquid methane at 100 K. However, even liquid methane suffers from radiation damage and the radicals form higher polymers that cling to the walls of the moderator vessel and tubes and eventually lead to complete blockage of the system.

A possible solution to both problems that had been under discussion for a while [1] is the use of spheres or pellets of solid moderator material transported through the moderator vessel at an appropriate rate and cooled by a different fluid, e.g. liquid hydrogen. This issue has been discussed intensely at the workshop and a number of possible candidate materials have been proposed that could potentially be better suited and easier to manufacture than spheres of solid methane. Numerous questions relating to coolability, mass transport, radiation effects, neutronic properties etc. need to be investigated in detail and the workshop clearly showed that facilities and pertinent know-how are distributed all over the world and that substantial savings can result from pooling these resources. As a consequence, the ESS project team decided to focus on clathrates as a new class of potential moderator materials in its program and to expand its cold moderator development activity into an international collaboration. Several non-European institutions have already expressed their willingness to participate. The work is currently lead by PSI in the frame of its agreed participation in the ESS R&D program. If successful, this research might well lead to more efficient cold moderators also for continuous neutron sources, and SINQ, with its two systems of T-shaped moderator-beam tube inserts in the D_2O tank is well prepared to accept such a new system in the future.

After the Argonne workshop tailoring of neutron spectra to the users' needs will certainly enter a new dimension. Hence the award winning name proposed by Trevor Lucas from Oak Ridge for the workshop logo:

Newt Ron Tailor



[1] A.T. Lucas, G.S. Bauer and C.D. Sulfredge, Proc ICANS XIII, PSI-Proc 95-02, 644-653
[2] R.K. Crawford et al, Proc ICANS XIII, PSI-Proc 95-02, 99-117

Generalversammlung 21. Nov. 1997

PSI, Villigen, Auditorium (WHGA/001), 14.30 Uhr

TRAKTANDEN

1. **Begrüssung:**

   Der Präsident begrüsst die 61 Anwesenden zur Generalversammlung 1997 der Schweizerischen Gesellschaft für Neutronenstreuung.

2. **Protokoll der GV vom 9.10.1996:**

   Das Protokoll der GV vom 9.10.1996 (siehe Swiss Neutron News Nr. 8) wird genehmigt und verdankt.

3. **Jahresbericht des Präsidenten:**

   Im Jahresbericht orientiert der Präsident über die verschiedenen Aktivitäten der SGN seit der letzten Generalversammlung.

   - In diesem Berichtsjahr sind leider zwei Todesfälle zu beklagen:
     - Prof. Dr. J. Benesch, ETH Zürich, 25. Nov. 1996
     - Dr. W. Bührer, Labor für Neutronenstreuung ETH & PSI, 4. Nov. 1997.
   - Aktuelle Mitgliederzahl: 174 (1996: 157)
   - **Veranstaltungen:**
     - 5. PSI-Sommerschule über Neutronenstreuung, 9.-15. August 1997, Lyceum Alpinum, Zuoz, mit 80 Teilnehmern. Thema: "Cold Neutrons: Large Scales - High Resolution".
     - Workshop "Powder Neutron Diffraction", 21.11.1997, PSI Villigen
   - **Swiss Neutron News:** Der Präsident verdankt dem Sekretär, Dr. P. Böni, die Herausgabe von weiteren drei Nummern der Swiss Neutron News:
     - Nr. 10 (Dezember 1996)
     - Nr. 11 (Juni 1997)
     - Nr. 12 (Dezember 1997)
   - **Mitarbeit in Kommissionen:**
     - European Neutron Scattering Association (ENSA):
       * neues Mitglied der ENSA: Russland
       * neuer Executive Board (1997 - 1999)
         · Chairman: A. Furrer, Switzerland
         · Vice-chairman: B. Cywinski, U.K.

         · Secretary: B. Lebech, Denmark
       * Committee Meetings:
         · June 13/14, 1997: Florence, Italy
         · December 8/9, 1997: Delft, Netherlands
       * Survey of European Neutron Scattering Facilities
       * Assessment of the Project ESS
       * Collaboration among Neutron Providers:
         Joint effort in the following fields:
         · Monochromators (CH member: J. Schefer)
         · TOF equipment (CH member: S. Janssen)
         · Detectors (CH member: N. Schlumpf)
         · Software (CH member: H. Heer)
         · Neutron Optics (CH member & convenor: P. Böni)
         · Sample Environment
         · Data Acquisition (CH member: N. Schlumpf)
       * Neutron Scattering Conferences:
         · ECNS'99: Budapest (September 1-4, 1999)
         · ICNS: Munich (most likely 2001)
     - OECD Megascience Forum: Neutron Sourcs Working Group:
       Vorteil: Delegierte können direkt bei der Regierung rapportieren.
   - Umfrage "Nutzung von Neutronenquellen" zu Handen des Bundesamtes für Bildung und Forschung (BBW):
     - Februar 1997: Auftrag des BBW an die SGN
     - September/Oktober 1997: Durchführung der Umfrage
     - Response der Adressen:
       * **74** Schweizerische Wissenschaftler werden angefragt
       * repräsentieren **58** Forschungsgruppen
       * **37** Forschungsgruppen haben geantwortet
       * **19** Forschungsgruppen haben nicht geantwortet (vorwiegend solche, die Neutronen spärlich oder noch nicht verwenden)
     - Resultate der Umfrage:

Quelle	mittlerer Bedarf an Messtagen pro Jahr	modifiziert durch internationale Koll.	Reduktion durch Transf. an SINQ	heutige Nutzung
ILL	518	250	180	218 (5.1%)
ISIS	113	40-50	40-50	16 (0.7%)
diverse			100%	

     - Empfehlung an das BBW:
       ILL: Weiterführung des Vertrages mit einer Nutzungsquote von mindestens 4% (bisher 3.5%)

- Empfehlung an das PSI:
  ISIS: Vertragsverhandlungen mit RAL zur gegenseitigen Nutzung der Grossforschungseinrichtungen

- Vorbereitende Arbeiten für das Jahr 1998:
  (siehe auch Traktandum Nr. 10)
  - Frühjahrstagung der SPG (26./27. Feb. 1998 in Bern: Gemeinsames Symposium "SINQ/Neutronenstreuung"
  - 6. PSI Sommerschule, 8.-14. August 1998, Zuoz: "Complementarity between Neutron and Synchrotron X-Ray Scattering"
- *Das* Highlight des Jahres 1997:
  Aufnahme der Experimentiertätigkeit an der SINQ!

4. Jahresrechnung des Kassiers:

Vermögen 1.1.1996 1952.35

	Einnahmen SFr	Ausgaben SFr
Mitgliederbeiträge	1175.00	
Beitrag Sommerschule Zuoz		640.00
Lunch GV96		1100.00
Taxen für Postcheck		35.70
Nettozins	20.90	
Total	1195.90	1775.70
Einnahmen 1996		-579.80

	Aktiven SFr	Passiven SFr
Postcheckkonto	967.80	
Kasse	404.75	
Vermögen am 1.1.1996		1372.55

5. Bericht der Revisoren:

Die Rechnungsrevisoren haben die Belege, die Abrechnung und die Bilanz für das Jahr 1996 überprüft und für in Ordnung befunden. Sie bitten die Mitglieder der SGN, den tiefen Jahresbeitrag von 10 Fr. jeweils unumgehend einzuzahlen. Sie schlagen den Anwesenden die Annahme der Jahresrechnung und die Décharge-Erteilung für den Vorstand vor. Die Anträge werden einstimmig genehmigt.

6. Budget für das Jahr 1998:

	Einnahmen SFr	Ausgaben SFr
Mitgliederbeiträge	1500.-	
Sommerschule Zuoz		600.–
Diverses		300.–
GV 1998/Benutzervers.	500.-	
Taxen für Postcheck		35.–
Zins	35.-	
Total	1535.–	1435.–
Einnahmen 1998		100.–

Das Budget 1998 wird von den Anwesenden einstimmig genehmigt.

7. Ergänzung der Statuten:

Ergänzungen der Statuten betreffend

- Vertretung SGN bei ENSA (Art. 2, Absatz h)
- Vorstandssitzungen, Abstimmungen (Art. 10, bis)
- Einladung von Delegierten an Vorstandssitzungen (Art. 10, ter)

werden einstimmig angenommen. Die neuen Statuten werden den Mitgliedern zugestellt.

8. Umfrage "Nutzung von Neutronenquellen"

- siehe Ergebnisse unter Traktandum 3. Die Empfehlungen an das BBW und PSI werden einstimmig akzeptiert.
- H. U. Güdel teilt aus dem Nationalfonds mit, dass die Umfrage überzeugend dargelegt hat, dass die Neutronenstreuer in der Schweiz sehr aktiv sind. Deshalb soll der Beitrag der Schweiz an das ILL auf keinen Fall reduziert werden. Der Nationalfonds hat dem BBW eine entsprechende Empfehlung zugestellt.
- die SGN gratuliert K. Yvon zur Ernennung zum Vorsitzenden des wissenschaftlichen Rates des ILL.
- neuer Direktor des ILL ab 1.1.1998: D. Dubbers, Universität Heidelberg
- K. Yvon informiert über das ILL:
  - dankt für die "Knochenarbeit" der schweizerischen Mitglieder in den Scientific Subcommittees
  - Review der Diffraktionsinstrumente am ILL im Februar 1998: Schweizerische Teilnehmer: D. Schwarzenbach, J. Schefer

- CRG's sehr erfolgreich: Frage der Begrenzung derer Zahl

- A. Furrer informiert über Doktorandenstellen am ILL: der Schweiz stehen zwei Stellen zu
- Entlastung von P. Schurtenberger im Subcommittee 9: Nomination von Dr. J. Ricka, Institut für angewandte Physik, Universität Bern. BBW wird informiert

9. Stellungnahme zur ESS

- allen Mitgliedern wurden zwei ESS (European Spallation Source) Broschüren zugestellt
- Memorandum der SGN betreffend der ESS:
  Der vorgelegte Text wird mit einer kleinen Änderung einstimmig akzeptiert

10. Wahlen (Vorstand, Präsident, Revisoren)

- neuer Vorstand (K. Yvon, P. Böni, S. Decurtins, G. Kostorz, P. Schurtenberger): einstimmig gewählt
- neuer Präsident K. Yvon: einstimmig gewählt
- Revisoren (P. Schobinger, W. Fischer): einstimmig gewählt, eine Enthaltung

11. Aktivitäten im Jahre 1998

A. Furrer übergibt das Wort an den neuen Präsidenten, K. Yvon:

- K. Yvon dank für die grosse Arbeit, welche die zurücktretenden Vorstandsmitglieder A. Furrer und H. U. Güdel für die SGN geleistet haben
- Ausblick 1998:
  - 26./27. Februar 1998:
    Frühjahrstagung der SPG mit gemeinsamem SPG/SGN Symposium: "SINQ/Neutronenstreuung"
  - 6. PSI-Sommerschule über Neutronenstreuung 8.-14. August 1998, Lyceum Alpinum, Zuoz: "Complementarity between Neutron and Synchrotron X-Ray Scattering"
  - Februar 1998: SINQ - Call for Proposals
  - Juni 1998: SINQ - Start of User Programme
  - Herbst 1998:
    - SINQ User-Meeting

    - GV der SGN im Rahmen des User-Meetings

12. Varia

H. Rauch orientiert über die Evaluation des Projekts Austron durch die ESF:

- Projekt sehr gut
- Einbettung zwischen SINQ und FRM-2 muss noch besser dargelegt werden.
- die österreichische User Community muss sich voll engagieren

13. Rückblick des Präsidenten A. Furrer

Bilanz 6 Jahre SGN:

- viele Erfolge:
  - Optimum für Neutronenstreuung herausgeholt,
    soll weiter gepflegt werden
  - stärkste (pro Kopf) Neutronenstreugemeinschaft der Welt
  - BBW und NF nehmen uns ernst:
    Gesellschaft wird orientiert und konsultiert
  - gute Beziehungen der SGN zu BMBF und zu Nachbargesellschaften
- Negative Aspekte:
  - Interesse an SINQ und Neutronenstreuung dürfte von Seiten des PSI-Direktors grösser sein
  - SANW: nimmt uns nicht als Mitglied auf (siehe Editorial Swiss Neutron News Nr. 8)
  - Evaluationen der Physik und der Materialwissenschaften durch den schweizerischen Wissenschaftsrat und ETH-Rat:
    SGN wir nicht konsultiert
  - Aufforderung an den neuen Vorstand: In diesen Belangen Überzeugungsarbeit leisten
  - Dankt den Mitgliedern für das in den letzten sechs Jahren entgegengebrachte Vertrauen. Ist überzeugt, dass das auch auf den neuen Vorstand übertragen wird.

Um 15.30 Uhr wird die Behandlung der Traktanden abgeschlossen.

Der Sekretär der SGN, Dr. P. Böni

Konferenzen 1998

Datum	Ort	Thema
6.-9.1.98	San Francisco	MMM-Intermag Conference
22.2.-3.4.98	Grenoble	HERCULES 1998
23.-28.2.98	Planneralm	13*th* Workshop "Correlated systems and superconductivity"
26.-27.2.98	**Bern**	**Frühjahrstagung der SPG mit Symposium "SINQ & Neutronenstreuung"**
2.-5.3.98	Karlsruhe	Jahrestagung der Deutschen Gesellschaft für Kristallographie
16.-19.3.98	**Luzern**	**ITMNR-3: Neutron Radiography**
13.-17.4.98	San Francisco	MRS Spring Meeting
14.-16.5.98	Uppsala	28*èmes* Journées des Actinides
9.-17.6.98	Erice	Conf. "Polarons and their Condensation"
14.-19.6.98	Vancouver	Int. Symposium on Metallic Multilayers
14.-19.6.98	Florence	CIMTEC'98 (World Ceramic Congress & Forum on New Materials)
15.-18.7.98	Paris	Int. Conf. on "Strongly Correlated Electron Systems"
26.-31.7.98	Jerusalem	12*th* Int. Conf. on "Crystal Growth"
8.-14.8.98	**Zuoz**	***6th* Summer School on Neutron Scattering**
16.-20.8.98	Prag	ECM-18
22.-25.8.98	Budapest	6*th* Europ. Powder Diffraction Conference
25.-29.8.98	Grenoble	17*th* General Conf. of the Condensed Matter Division of EPS
9.-12.9.98	Zaragoza	EMMA'98 (European Magnetic Materials and Applications Conference)
20.-23.9.98	Gatlinburg	Accelerator Applications
25.-28.10.98	Freemantle	International Rare-Earth Conference