swiss physical society

SPG MITTEILUNGEN

COMMUNICATIONS DE LA SSP

NR. 20 **April 2007**

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The Irchel Campus of the University of Zürich was hosting our annual meeting 2007.

The Winners of the SPS Awards 2007

The SPS award committee, presided by Prof. Hans Beck (Uni Neuchâtel), has again worked hard to nominate three winners for this year's SPS awards. The outstanding work of these three young physicists are presented below.

SPS Award for General Physics, sponsored by ABB

Carla Fröhlich obtained her physics diploma at the University of Basel in 2003. During her studies she spent a year as an exchange student at the Simon Fraser University in Canada. As a PhD student of Prof. Thielemann in Basel she investigated nuclear reactions taking place in supernovae. She is defending her thesis at the University of Basel one of these days. Carla Fröhlich's work has led to one of the most important discoveries in the field of nuclear astrophysics in the past few years. It includes pioneering investigations of the impact of neutrinos on the nucleosynthesis of core collapse supernovae and of their role in determining the type of ejectas produced. In this framework some long standing problems, such as the overproduction of neutron-rich iron and nickel isotopes, are now much better understood.

Neutrino-Induced Nucleosynthesis of A>64 Nuclei: The neutrino-p Process

The origin of the chemical elements is attributed to nuclear reactions during the Big Bang and in stars. The light elements - hydrogen, helium, and lithium - are created during the Big Bang. Stars fuse hydrogen and helium into elements as heavy as iron and nickel. The synthesis of even heavier elements is believed to take place in supernova explosions (the explosion of massive stars creating a neutron star or a black hole). But these accepted ways of making nuclei still cannot explain the observed amounts of several isotopes including those in the titanium to germanium region as well as certain isotopes of molybdenum and ruthenium.

Despite compelling observational evidence of supernova explosions the mechanism is still not fully understood and therefore the innermost ejecta (directly linked to the explosion mechanism) remain to a large extent unexplored. In recent supernova simulations with accurate neutrino transport we found a proton-rich neutrino-heated region surrounding the newly born neutron star [1]. Without the further inclusion of neutrino and antineutrino reactions in thenucleosynthesis calculations this matter willfinally consist of protons, alpha-particles, and Fe-group nuclei, with enhanced abundances of ^{45}Sc, ^{49}Ti, and ^{64}Zn. Also, in these calculations the matter flow stops at ^{64}Ge which has a small probability of capturing additional protons and a beta-decay half-life much longer than the expansion timescale.

However, the inclusion of neutrino and antineutrino reactions previouslyneglected in nucleosynthesis calculations changes the situation drastically: some protons in this proton-rich region are transformed into neutronsby reacting with the antineutrinos streaming from the hot neutron star.This constant supply of extra neutrons is critical during the first seconds when nuclei are formed, allowing the synthesis of heavy proton-rich nuclei including the problematic isotopes of molybdenum and ruthenium [2]. The same process also creates lighter elements such as strontium, yttrium, and zirconium which may be seen clearly in primitive stars (bearing a relatively clean signature of the first supernovae). For example, one of the most primitive stars observed in the galaxy [3] contains a surprising amount of strontium - more than predicited by standard nucleosynthesis models but consistent with this study.

[1] Fröhlich et al. Astrophysical Journal 637 (2006) 415
[2] Fröhlich et al. Phys. Rev. Lett. 96 (2006) 142502
[3] Frebel et al. Nature 434 (2005) 871

SPS Award for Condensed Matter Physics, sponsored by IBM

Santiago Serrano-Guisan is currently working at the "Physikalisch-Technische Bundesanstalt" in Braunschweig (Germany). After having obtained his Bachelor degree in physics at the University of Barcelona in 1998 he continued his studies in the field of Material Engineering at the Polytechnical University of Catalunya and did his Master work at the Université de Paris-Sud in Orsay, specializing in material science and thin film technology. He then came to Switzerland in order to become a PhD student of Prof. Ansermet (the previous president of our society) at the EPF in Lausanne. His thesis had the title "Spin-dependent thermoelectrical effects in magnetic nanostructures". The influence of the electronic spin on transport is usually studied by measuring the electrical conductivity, giant magnetoresistance being demonstrated in this way. However, the innovation in our laureate's work was to look into thermoelectrical transport coefficients, which do not have the same temperature and magnetic field dependence as the resistance, giving thus interesting new insights into the behaviour of the electronic spins. He carried out a novel type of measurement which was developed in the group of J.-Ph. Ansermet, showing the "magnetothermogalvanic voltage". As a researcher in Germany he is now working on "Magnetic Random Access Memory" (MRAM) technologies, for which his wide experience with magnetic structures is, no doubt, very precious.

Enhanced magnetic field sensitivity of spin-dependent transport in cluster-assembled metallic nanostructures

In ferromagnets, the band structure is exchange split, so that the density of states is not the same for spin-up and spin-down electrons. This asymmetry implies that transport properties of such materials are spin-dependent. Consequently, in addition to the charge of electrons, their spins could be used in nanosized electronic devices. Thus, large efforts have been carried out to find technological applications of such spintronic effects, like the giant magnetoresistance (GMR) [1], which is used for sensor devices.

However, the analysis of spin-dependent transport was usually focused on the study of the spin-dependent electrical conductivity (σ). But transport properties are not described only by σ but also by other coefficients like thermal conductivity κ, Seebeck coefficient S, Hall effect, ... In order to obtain a deeper understanding of spin-dependent transport, a thermoelectric measurement protocol was developed in our laboratory [2]. This method depends on the first derivative of the resistance with respect to the temperature and thus eliminates the resistive contribution of the magnetic response at low temperatures.

Applying this measurement protocol to granular cluster-assembled materials, a giant magnetic response of more than 500% (a 120-fold increase compared with the GMR ratio obtained in the same samples) was observed at low temperatures [3]. Moreover, this magneto-thermoelectric response is qualitatively different from GMR, both in its temperature, magnetic-field and grain-size dependence. Hence, a clearly different spin-dependent mechanism that cannot be reduced to some enhanced detection of the GMR must be considered. In order to explain this effect, we invoke the predominance of spin mixing effects caused by the spin-precession about the exchange field as the electron crosses the clusters.

In summary, the combined use of cluster-assembled materials and this novel measurement method reveal a novel spintronic effect. The extremely field sensitiviy of such effect at small clusters (i.e. 15 atoms per cluster) may open a new route towards possible applications.

[1] Baibich, M. N. et al. Phys. Rev. Lett. 61, 2472-2475 (1988)
[2] Gravier, L.; Serrano-Guisan, S.; Reuse, F. & Ansermet, J.-Ph. Phys. Rev. B 73, 024419 (2006) ; Phys. Rev. B 73, 052410 (2006).
[3] Serrano-Guisan, S.; di Domenicantonio, G.; Abid, M.; Abid, J.-P.; Hillenkamp, M.; Gravier, L.; Ansermet, J.-Ph. & Félix, C. Nature Materials 5, 730-734 (2006)

SPS Award for Applied Physics, sponsored by OC Oerlikon

Emanuel (Marc) Lörtscher studied at ETH Zürich where he got his diploma in physics in 2003. He was interested in Quantum Electronics already at that time and his diploma work was performed at the IBM Research Laboratory in Rüschlikon. This famous center impressed him so much that he continued working there for his PhD thesis. It was devoted to studying charge-carrier transport through single molecules. He then obtained his doctoral degree at the University of Basel, Prof. Christian Schönenberger being his advisor. Still at the IBM Lab Emanuel Lörtscher continues to investigate the behaviour of single or small groups of molecules in electronic circuits. Thanks to his exceptional experimental skill he has been the first to provide clear evidence that the switching effects observed in such devices has a truly molecular origin. This is a fascinating kind of "nano-physics" one could only dream of a couple of decades ago. It builds the bridge between basic quantum mechanics, determining the electronic states of the molecules, and promising future electronic applications.

Charge Transport through Single Molecules

Molecular electronics is aimed at the use of individual or small ensembles of molecules as functional building blocks in electronic circuits. This may provide advantages in future electronic applications such as high density, low power consumption, and intrinsic functionality combined with high speed. The mechanically controllable break-junction (MCBJ) technique provides an ideal testbed to contact individual molecules electrically. Atomic-sized electrodes are created which can be controlled with picometer accuracy. A novel statistical measurement and analysis approach was introduced [1,3] which simultaneously acquires current-voltage (I-V) curves during the repeated formation and breaking of a molecular junction. This controlled manipulation of the molecular junction allows the number of molecules captured in the junction and the most probable I-V characteristics to be determined. Using this measurement approach, various aspects of charge transport at the molecular scale have been studied systematically [1]. The investigations covered the molecule-metal contact and the influence of the molecular structure including intrinsic molecular functionality.

A major result was the first demonstration of voltage-induced switching of a single molecule in a break-junction experiment [2]. Voltage pulses were used to controllably switch the bipyridyl-dinitro oligo-phenylene-ethynylene dithiol (BPDN-DT) from a low- to a high-conductive “on” state and, furthermore, to reset the system to the “off” state. On this single-molecule level, collective phenomena or filament formation can be excluded; hence the observed switching in the BPDN-DT has truly a molecular origin. Both states of the BPDN-DT molecule are stable and accessible via non-destructive reading. Combined with the ability to reset the switch, this opens the way for employing this single molecule as a memory element. Repeated write–read–erase–read cycles with non-destructive read-outs have been demonstrated [2]. Thereby, a bit separation (I_{on}/I_{off}) ranging between 7 and 70 has been achieved. Periodic reading of a stored bit (no voltage applied between readings) established that this single-molecule memory is non-volatile over a measurement time of several minutes at 100 K. This intrinsic functionality of a single-molecule system illustrates the potential of molecular electronics for future electronic applications.

[1] E. Lörtscher, Ph.D. thesis, University of Basel (2006).
[2] E. Lörtscher, J. W. Ciszek, J. M. Tour, and H. Riel, Small 7/8, 973 (2006).
[3] E. Lörtscher, H. B. Weber, and E. Riel, submitted (2006).

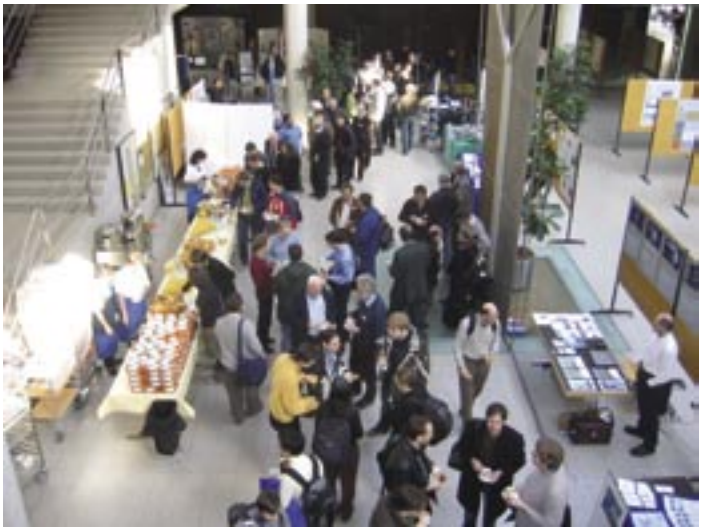
The happy winners of the SPS awards: Dr. Santiago Serrano-Guisan, Dr. Carla Fröhlich and Dr. Emanuel Lörtscher. On the right side two representatives of the sponsoring companies, Dr. Paul Seidler (IBM) and Dr. Frank Kassubek (ABB). Together with Prof. K. Alex Müller, Nobel prize winner 1987 and SPS honorary member since 1991, who was also attending our meeting.

Review of the Annual Meeting 2007 in Zürich

The annual meeting 2007 of the SPS was held on February 20th-21st at the University of Zürich. About 400 participants, 168 talks and 80 posters helped to make it a remarkable event. Besides the traditional sessions, this year's symposia covered the topics "Computational Physics", "Physics in Industry and Economy", "Physics in Medicine and Biology" and "Challenges of Future Energies". Many thanks also to the people "behind the scene", be it technician, caterer, janitor and everyone contributing to a smoothly working meeting.

The starting point was a plenary session on Tuesday morning. Four excellent talks by leaders in their respective fields about magnetic resonance imaging (K. P. Prüssmann), superheavy elements (H. W. Gäggeler), a more sustainable energysystem (A. Wokaun) and computational physics (M. Parinello) allowed to catch a glimpse of the enormous breadth of physics research and involvement in Switzerland.

Three young scientists won the SPS prizes 2007 and received the awards later on the first day. Support and promotion of the young talents is an important task and constant worry but, luckily, the impressive quality of their work allowed to stop worrying for the rest of the day.




Coffee breaks, the vendor exhibition and the poster session were held in the sunlight-bathed center hall.

A special surprise during the conference dinner was the band "Captain Frank", playing various songs from their repertoire which covers quite a few decades and styles of music. These guys are really good and don't need any electronic devices to be heard...

Another highlight was the Tuesday evening excursion to the archives of the ETH library. About 100 participants followed the invitation of the organizers and had the opportunity to see various physics related rare books, manuscripts and photographs which are not usually displayed. The subsequent dinner in the "Dozentenfoyer" of the old ETH building had added value in form of live music and an interesting view onto Zürich.

The second day of the meeting was mainly devoted to parallel sessions (see below as an example the review of the TASK session) and the poster session. At the end of the day, most people we could talk to were quite satisfied and would come again. We certainly hope they will. The ones which might have left unsatisfied or the ones which did not come at all can hopefully be convinced that the meeting can play an important role for a lively physics community in Switzerland. Criticism is necessary and highly welcome, please give us your feedback and suggestions about what we should improve for the future: sps@unibas.ch

From Kopernicus over Newton to Einstein: These and many other precious original books belong to the special collection of the ETH library, normally not for public access. A large picture archive is also part of the collection.

Short review of the TASK session

The number of contributions to the session of particle physics, astrophysics and nuclear physics (TASK section) continued the trend of last year and increased again. For the first time (or at least too long ago for the author to remember) we had considerably more submissions for oral contributions than time slots available for presentations.
While this, at first sight, is a lucky situation for the organizer, somebody whose talk gets converted to a poster may sometimes feel as unfairly treated. On the one hand side we would like to provide the opportunity, especially for PhD students and young Postdocs, to present their work in talks; on the other hand side we do not yet have sufficient participants to divide further into parallel sessions, so we have to limit the number of talks.
We finally had 36 oral and 15 poster contributions. Our condensed matter colleagues are used to having quite many poster contributions since long but we must still adapt to the new situation and find a good way for our community. One obvious way is a more transparent way for the talk selection process, for which every group leader could have his/her input.
Another promising way would be to keep on increasing the number of participants to the SPS meeting and achieve both, larger audience for talks and posters and high quality presentations. This year, the typical number of people in the audience was 30-35, but unfortunately only about 15 for the early morning and late afternoon sessions. Nevertheless, the tendency is very positive, especially because several institutes came with whole groups and stayed to listen to the others.
And, finally, concerning the quality of the talks: we heard many excellent talks among which as highlights were the presentations of "real" physics results of several experiments.

Klaus Kirch, PSI

Notes from the General Assembly 2007

At the general assembly on February 20, 2007 in Zürich, two members of the committee had to be replaced. After six years and two re-elections Prof. Jérôme Faist had to leave the committee as chairman of the "Condensed Matter" section (KOND) because of by-law restrictions. Dr. Laurent Sansonnens, chairman of the "Applied Physics" section (ANDO), chose to not be re-elected after four years in the committee. Professional reasons leave him not as much time for the SPS as he thinks would be appropriate and necessary. Dr. Ernst Ramseier, our "ad interim" chair for the "Industrial Physics" section (see SPS Communications No. 18), has been confirmed by the general assembly.

While we unfortunately were not yet able to find a replacement for Jérôme Faist, Dr. Ivo Furno has been elected as successor of Laurent Sansonnens.
We thank the leaving members for their dedicated and fruitful work in the committee and welcome Ivo Furno in our midst.

New SPS Committee member for Applied Physics: Dr. Ivo Furno

Ivo Furno was born in 1969 in Ivrea, Italy. In 1995, he received his Laurea in Nuclear Engineering from the Politecnico di Torino (Italy). In 2001, he obtained his PhD from the Ecole Polytechnique Fédérale de Lausanne (Suisse) for his work on fast transport phenomena in tokamak plasmas. From 2001 to 2005, he worked at Los Alamos National Laboratory (LANL), USA, as postdoctoral appointee first and then as Technical Element Leader with program development and technical responsibilities. At LANL, he was the main responsible for the construction of the Reconnection Scaling Experiment for basic plasma physics studies and he was involved in different outreach and development programs. In 2002, he founded and led for three years the LANL Plasma Physics Summer School, for which he was awarded the LANL Distinguished Mentor Performance Award in 2004. In the same period, he was visiting scientist at the Massachusetts Institute of Technology where he was Principal Investigator for the infrared imaging system of the Alcator C-Mod tokamak. His scientific interests include development pf diagnostics in low- and high-temperature plasmas, magnetohydrodynamics and turbulence studies in magnetically confined plasmas for nuclear fusion and astrophysics. Since October 2005, he is senior scientist in the basic plasma physics team at the Centre de Recherches en Physique des Plasmas at the EPFL.

It is with great honor that I take the opportunity to join the Committee of the Swiss Physical Society as the representative of the Applied Physics section. Applied physics research is stimulated by a broad variety of investigations in basic physics research, industrial applications, and other scientific fields. The goal of Applied Physics is both to advance scientific knowledge and to develop tools that can contribute to the progress of other fields. Therefore, strong connections and continuous scientific discussions between the Academia, Industry, and National Laboratories are vital to the advancement of Applied Physics. I believe that Switzerland with the excellence of its Universities, Engineering Schools and National Laboratories and its network of high technology Industries is strategically placed to push forward Applied Physics research. With my work at the Swiss Physical Society I hope to contribute strengthening the link between Industry, Academia, and National Laboratories by bringing together experts from different fields and fostering multidisciplinary collaborations.

New Series: Progress in Physics

The SPS board decided recently to inform regularly on its webpage and in its bulletin about current research activities at Swiss institutions. The purpose is to show in a short, but comprehensive way the broad diversity and the high level of research work performed at the cutting edge of science and technologies. The main goal, however, is to fascinate young students for the questions raised by modern physics, which hopefully will attract them to science.
We start our series with an example of research in theoretical physics, performed at the University of Basel.

The Pleasures on the Road to a Quantum Computer

Bernd Braunecker and Daniel Loss
Departement für Physik und Astronomie, Universität Basel

Quantum computing has a variety of properties that make it attractive for tasks that are particularly hard for classical computers. The most popular ones are perhaps their efficiency in factoring large numbers and thus in code breaking, or fast database searching algorithms. As important for physicists may be the intriguing possibility of simulating quantum systems *per se* in a controlled way.

Yet a quantum computer can only become really useful if it can be fabricated at large scale, at low cost, and if its constituents, the qubits (energetically degenerate 2-level systems with states $|0\rangle$ and $|1\rangle$), allow a reliable initialization, operation, and readout. With the expertise of the semiconductor industry, acquired over the last decades as the basis of the triumphant success of classical computers, it is suggestive to rely on the same technology for a quantum computer. If we take this as our starting point (there are many other propositions though), the challenge for a quantum engineer is then to produce a viable semiconductor qubit. Interestingly, however, this turns out not to be an engineering task but a problem of fundamental physics. It requires the understanding of the physical processes from the foundations of quantum mechanics to many-body physics, and the full set of methods of modern physics at our disposition.

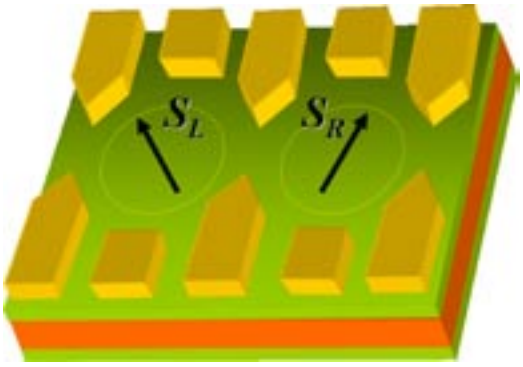


Figure 1: A double quantum dot. Top gates confine electrons in the two-dimensional electron gas to the circular regions. A negative voltage on the backgate depletes the dots until they contain a single electron with a spin ½ described by $\mathbf{S}_L$ and $\mathbf{S}_R$. The corresponding $|\uparrow\rangle$ and $|\downarrow\rangle$ states form the qubit basis.

As an illustration, we give here one specific example from our theory group at the University of Basel. The basic qubit is the spin of an electron confined to a semiconductor quantum dot (see Figure 1). It forms a natural 2-level basis, $|0\rangle=|\uparrow\rangle$ and $|1\rangle=|\downarrow\rangle$. Scalability as well as operability can be granted through local, all-electronic control (gating) of the exchange interactions between neighboring quantum dots [1]. The qubit operates through quantum superpositions of its basis states, $|\psi\rangle=a|0\rangle+b|1\rangle$.

Here the main source of errors of a quantum computer becomes visible: The quantum algorithm strongly depends on the fixed ratio of the amplitudes a and b. This ratio is distorted by any uncontrolled interaction with the rest of the universe. This is known as *decoherence*. In order to devise a

plan to protect the qubit from decoherence, we must, therefore, understand how it interacts with its environment. In a GaAs semiconductor environment the main two sources of decoherence for a spin qubit are spin-orbit coupling and the hyperfine interaction with the nuclear spins. This is many-body physics.

Let us focus on the hyperfine interaction only. Decoherence is mainly due to interaction with a disordered ensemble of nuclear spins. The decoherence time can be largely extended, however, if the nuclear spins are fully polarized [2] (see Figure 2). This usually would require a very strong external field, but interestingly can also be achieved differently. One possibility is described in [3]: The nuclear spins are well separated on the crystalline lattice and their direct interaction is weak. More significant, however, is their indirect interaction through the electron spins. As shown in [3] this interaction can induce a phase transition to a nuclear ferromagnet. If the electrons were not interacting, the transition temperature would lie at $T_c = 0$K, but electron-electron interactions and the resulting non-Fermi-liquid behavior drive it up to the millikelvin range for typical confined two-dimensional electron gases in semiconductors. This temperature lies within the reach of state-of-the-art experimental setups. A full polarization and so the elimination of a major source for decoherence can thus be achieved by cooling the system down through the transition temperature. The polarization persists upon subsequent reheating. The precise understanding of such processes is thus an essential ingredient in the prospect of implementing a fully controllable quantum computer.

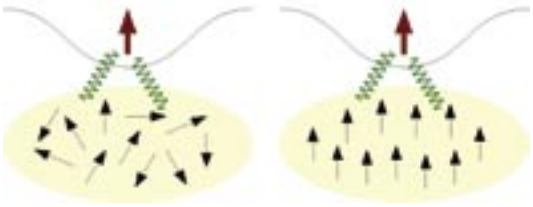


Figure 2: Illustration of the hyperfine interaction of the electron spin in the quantum dot with nearby nuclear spins. Disorder of the nuclear spins is an important source of decoherence (left). It can be largely reduced by polarization of the nuclear spins (right) as, for instance, achieved through a ferromagnetic phase transition triggered by many-body interactions.

With this specific example we have shown that the design of a quantum computer is intimately connected to the solution of problems of fundamental research. The above example, for instance, can be formulated as a Kondo lattice problem, a typical representative of strong correlation physics. Such problems are challenging, modern, and, last but not least, pleasurable for the active researchers.

[1] D. Loss and D. P. DiVincenzo, *Quantum computing with quantum dots*, Phys. Rev. A **57**, 120 (1998);
V. Cerletti, W. A. Coish, O. Gywat, and D. Loss, *Recipes for spin-based quantum computing*, Nanotechnology **16**, R27 (2005) [http://arxiv.org/abs/cond-mat/0412028];
W. A. Coish and D. Loss, *Quantum computing with spins in solids*, http://arxiv.org/abs/cond-mat/0606550 (2006).
[2] A. V. Khaetskii, D. Loss, and L. Glazman, *Electron spin decoherence due to interaction with nuclei*, Phys. Rev. Lett. **88**, 186802 (2002);
W. A. Coish and D. Loss, *Hyperfine interaction in a quantum dot: Non-Markovian electron spin dynamics*, Phys. Rev. B **70**, 195340 (2004).
[3] P. Simon and D. Loss, *Nuclear spin ferromagnetic phase transition in an interacting two dimensional electron gas*, Phys. Rev. Lett. **98**, 156401 (2007) [http://arxiv.org/abs/cond-mat/0611292].

The main research focus in the Condensed Matter Theory group of Prof. D. Loss at the University of Basel is on Spintronics and Quantum Computing. Much emphasis is put on understanding and proposing realistic implementations of a quantum computer. Indispensable here is the close contact with experimental groups. With the Center of Excellence in Quantum Computing and Quantum Coherence (QC2) and the NCCR Nanoscale Science program, combining experimental and theoretical groups, Basel offers an ideal environment for this activity, and allows us to keep an international high scientific standard. [More information on: http://www.physik.unibas.ch/]

Ausschreibung der SPG Preise für 2008

Auch im Jahr 2008 sollen wieder SPG Preise, die mit je CHF 5000.- dotiert sind, vergeben werden.

- SPG Preis gestiftet vom Forschungszentrum ABB Schweiz AG für eine hervorragende Forschungsarbeit auf allen Gebieten der Physik
- SPG Preis gestiftet von der Firma IBM für eine hervorragende Forschungsarbeit auf dem Gebiet der Kondensierten Materie
- SPG Preis gestiftet von der Firma OC Oerlikon für eine hervorragende Forschungsarbeit auf dem Gebiet der Angewandten Physik

Die SPG möchte mit diesen Preisen junge PhysikerInnen für hervorragende wissenschaftliche Arbeiten auszeichnen. Die eingereichten Arbeiten müssen entweder in der Schweiz oder von SchweizerInnen im Ausland ausgeführt worden sein. Die Beurteilung der Arbeiten erfolgt auf Grund ihrer Bedeutung, Qualität und Originalität.
Der Antrag für die Prämierung einer Arbeit muss schriftlich begründet werden. Die Arbeit muss in einer renommierten Zeitschrift publiziert oder zur Publikation angenommen sein. Der Antrag muss die folgenden Unterlagen enthalten:

Begleitbrief mit Begründung, Lebenslauf des Kandidaten mit Publikationsliste, die zu prämierende Arbeit, und ein Gutachten.

Diese Unterlagen werden elektronisch im "pdf"-Format direkt an das Preiskomitee eingereicht (große Dateien bitte komprimieren (zip oder sit)):

awards@sps.ch

Einsendeschluss: 01. November 2007

Die Preise werden an der Jahrestagung 2008 der SPG in Genf überreicht.

Das Preisreglement befindet sich auf den Webseiten der SPG: www.sps.ch

texte français au verso

Annonce des prix de la SSP pour 2008

En 2008, la SSP attribuera à nouveau des prix de CHF 5000.- chacun, à savoir:

- Le prix SSP offert par le centre de recherche ABB Schweiz AG pour un travail de recherche d'une qualité exceptionnelle dans tout domaine de la physique
- Le prix SSP offert par l'entreprise IBM pour un travail de recherche d'une qualité exceptionnelle en physique de la matière condensée
- Le prix SSP offert par l'entreprise OC Oerlikon pour un travail de recherche d'une qualité exceptionnelle dans le domaine de la physique appliquée

La SSP aimerait saluer l'excellence d'un travail scientifique effectué par de jeunes physiciens ou physiciennes. Les travaux soumis à candidature doivent avoir été effectués en Suisse ou par des Suisses à l'étranger. L'évaluation portera sur l'originalité, l'importance et la qualité des travaux.
La candidature soumise à nomination doit être justifiée par écrit. Le travail doit avoir été publié dans une revue renommée ou être accepté pour publication. Le dossier de candidature doit comporter les documents suivants:

une lettre de motivation, le curriculum vitae des auteurs, une liste de publications, le travail proposé et une lettre de recommandation.

Ces documents seront envoyés électroniquement en format "pdf" directement au comité de prix (svp. comprimez des fichiers très grands (zip ou sit):

awards@sps.ch

Délai: 01. novembre 2007

Les prix seront distribués à la réunion annuelle de la SSP 2008 à Genève.

Le règlement des prix se trouve sur les pages Web de la SSP: www.sps.ch

Deutscher Text siehe Rückseite.

Jahresrechnung 2006 - Bilan Annuel 2006

Die Jahresrechnung 2006 konnte aus terminlichen Gründen leider nicht wie üblich im Tagungsbulletin publiziert werden. Dies wird hiermit wie angekündigt nachgeholt.
An der Generalversammlung wurde die Jahresrechnung von den anwesenden Mitgliedern einstimmig genehmigt.

En raison des délais de publication, le bilan annuel 2006 n'a pu être publié dans le bulletin de conférence. Nous rattrapons ceci comme convenu par la présente.
Lors de l'assemblée générale, le bilan 2006 a été accepté à l'unanimité par les membres présents.

Bilanz per 31.12.2006

	Aktiven	Passiven
Umlaufsvermögen		
Postscheckkonto	118427,43	
Bank - UBS	46515,96	
Debitoren - Mitglieder	1215,00	
Debitoren - Verrechnungssteuer	236,15	
Transitorische Aktiven	173,40	
Anlagevermögen		
Beteiligung EP Letters	15840,00	
Mobilien	1,00	
Gelbes Festgeld	60000,00	
Fremdkapital		
Rückstellungen Andere		2700,00
Rückstellungen 100 Jahre SPG (2008)		15000,00
Mobiliar		1,00
Mitglieder Lebenszeit		49052,00
Transitorische Passiven		24149,38
Erlös Auflösung HPA		50094,84
Eigenkapital		
Verfügbares Vermögen		98714,12
Total Aktiven/Passiven	**242408,94**	**239711,34**
Gewinn		**2697,60**
Total	**242408,94**	**242408,94**
Verfügbares Vermögen per 31.12.2006 nach Gewinnzuweisung		**101411,72**

Erfolgsrechnung per 31.12.2006

	Aufwand	Ertrag
Gesellschaftsaufwand		
EPS - Membership	17990,97	
SCNAT - Membership	7812,00	
SATW-Mitgliederbeitrag	1745,50	
Jubiläum 100 Jahre SPG, 2008	15000,00	
SCNAT Verpflichtungskredite		
SPG-Jahrestagung und Bulletin	16006,65	
Delegierte - NuPECC, EPS, IUPAP	1085,46	
SCNAT und SATW Zahlungskredite		
SCNAT Periodika (SPG-Mitteilungen, Druckkosten)	11382,40	
SCNAT Internationale Zusammenarbeit	2221,50	
SCNAT Reisekosten Nachwuchs	5000,00	
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SATW Fachförderung SPS Teachers Afternoon	3017,15	
Betriebsaufwand		
Löhne	10985,42	
Sozialleistungen	3296,93	
Porti/Telefonspesen/WWW- und PC-Spesen	1368,85	
Versand (Porti Massensendungen)	6712,35	
Unkosten	1663,75	
Büromaterial	583,80	
Bankspesen	180,15	
Debitorenverlust SCNAT/SATW u.a.	796,21	
Debitorenverluste Mitglieder	2010,00	
Sekretariatsaufwand extern	11188,27	
Gesellschaftsertrag		
Mitgliederbeiträge		62019,86
Inserate/Flyerbeilagen SPG Mitteilungen		125,00
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Ausserordentlicher Ertrag		25113,20
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Total Aufwand/Ertrag	**133866,16**	**136563,76**
Gewinn	**2697,60**	
Total	**136563,76**	**136563,76**

Revisorenbericht zur Jahresrechnung 2006

Die Jahresrechnung 2006 der SPG wurde von den unterzeichneten Revisoren geprüft und mit den Belegen in Übereinstimmung befunden.
Die Revisoren empfehlen der Generalversammlung der SPG, die Jahresrechnung zu genehmigen und den Kassier mit bestem Dank für die gute Rechnungsführung zu entlasten.

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Der Kassier:
Dr. Pierangelo Groening

Revisor der SPG:
Prof. Dr. P. Aebi

Revisor der SPG:
MER Dr. A. Pochelon

Basel, Fribourg, Lausanne, Thun, 14. Februar 2007

F. Erkadoo, SPG Büro, Institut für Physik, Klingelbergstrasse 82, CH-4056 Basel
Tel : 061 / 267 37 50, Fax : 061 / 267 13 49, Email : francois.erkadoo@unibas.ch

Vorstandsmitglieder der SPG / Membres du Comité de la SSP

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Dr. Tibor Gyalog, Uni Basel, **tibor.gyalog@unibas.ch**

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Kassier / Trésorier
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Kondensierte Materie / Matière Condensée (KOND)
NN

Angewandte Physik / Physique Appliquée (ANDO)
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Astrophysik, Kern- und Teilchenphysik / Astrophysique, physique nucléaire et corp. (TASK)
Dr. Klaus Kirch, PSI Villigen, **klaus.kirch@psi.ch**

Theoretische Physik / Physique Théorique (THEO)
Prof. Frédéric Mila, EPFL, **frederic.mila@epfl.ch**

Industrial Physics
Dr. Ernst Ramseier, Leica Geosystems AG, **ernst.ramseier@leica-geosystems.com**

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S. Albietz, SPG Sekretariat, Inst. für Physik, Klingelbergstrasse 82, CH-4056 Basel
Tel. 061 / 267 36 86, Fax 061 / 267 37 84, **sps@unibas.ch**

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F. Erkadoo, SPG Sekretariat, Inst. für Physik, Klingelbergstrasse 82, CH-4056 Basel
Tel. 061 / 267 37 50, Fax 061 / 267 13 49, **francois.erkadoo@unibas.ch**

Administratives Sekretariat / Secrétariat admin.
Sandra Hüni, Dept. Informatik, Klingelbergstr. 50, CH-4056 Basel
sandra.hueni@sps.ch

www.sps.ch

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