GHP Newsletter August 2006

American Physical Society Topical Group on Hadron Physics

http://www.aps.org/units/ghp/

Executive Officers

Chair	*Chair-Elect*	*Vice-Chair*	*Past-Chair*
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Secretary/Treasurer	*Members at Large*	
Wally Melnitchouk	Mike Leitch	Dave Tedeschi
wmelnitc@jlab.org	leitch@lanl.gov	tedeschi@sc.edu

NB. EMail addressed to ghpexec@anl.gov will reach all members of the Executive.

GHP06

The *Second Meeting of the APS Topical Group on Hadronic Physics* will take place during the period October 22-24, 2006 at the Opryland Resort, Nashville, Tennessee. The conference web site is http://fafnir.phyast.pitt.edu/GHP06/index.html

In addition to program details, which are regularly updated, the site contains links that provide information essential to planning for participation. In particular,

- on-line REGISTRATION – deadline 22 SEPT, 2006
- on-line ABSTRACT SUBMISSION for the parallel sessions – deadline 25 AUG, 2006

NB. Please register early. This will help us keep costs down ...
http://fafnir.phyast.pitt.edu/GHP06/Registration.html.
Unhappily, we find that it is necessary to charge a $50 registration fee this year. It will be collected in cash at the meeting.

Moreover, if you have something you'd like to say, post a Title and Abstract as soon as possible ... http://fafnir.phyast.pitt.edu/GHP06/Abstract.html.

The Organizing Committee is

GHP06 Organizing Committee

Kees de Jager	David Ernst	Paul Sheldon
kees@jlab.org	david.j.ernst@vanderbilt.edu	paul.sheldon@vanderbilt.edu
Craig Roberts	Eric Swanson	
cdroberts@anl.gov	swansone+@pitt.edu	

Craig Roberts is Chair. Don't hesitate to contact a member of this group if you have questions about participating or contributing to the meeting's success.

The meeting is sponsored by the APS, Jefferson Lab, Brookhaven National Laboratory, Vanderbilt University and Institute of Physics Publishing.

Proceedings ... The proceedings of the Second Meeting of the APS Topical Group on Hadron Physics will appear in the open access "Journal of Physics: Conference Series" which is published by Institute of Physics Publishing in the UK. Upon publication the proceedings will be free for all to download.

Elections

This year, elections for the following positions in the GHP's Executive Committee:

- Vice-Chair (Curtis Meyer will become Chair-Elect, Craig Roberts will become Chair and Ed Kinney will, naturally, become Past-Chair. Ted Barnes will receive our gratitude.),
- Secretary-Treasurer (Wally Melnitchouk has completed one three-year term but is permitted to run again.)
- and one Member-at-Large (Mike Leitch has completed his two-year stint.)

will be held in November.

In October, the Nominating Committee will solicit input from the GHP membership. The nomination of candidates will close on Fri., 27 October and an electronic ballot will subsequently be held over a two week period: 6–17 November.

We urge GHP members now to begin considering whom they would like to see filling these positions in the new year.

2006 GHP Nominating Committee

Ted Barnes	Spencer Klein	Elton Smith
tbarnes@utk.edu	srklein@lbl.gov	elton@jlab.org

Ted Barnes is Chairman.

APS April Meeting, 2007

A topical group is invited to participate in planning the program of major APS meetings. This year, GHP is sponsoring one invited session at the April meeting in Jacksonville, Florida: April 14-17, 2007

http://www.aps.org/meet/APR07/index.cfm

The number of sessions can grow if we increase our membership and visibility.

Planning has already begun for the April Meeting. This year's Program Committee is

2006 GHP Program Committee

Craig Roberts	Peter Steinberg	Peter Tandy
cdroberts@anl.gov	peter.steinberg@bnl.gov	tandy@kent.edu

Craig Roberts is Chairman. GHP Members are encouraged to contact the program committee chairman with suggestions. Please provide (it should all fit within a $\frac{1}{2}$-page)

- Topic (title and short description)
- Rationale as to why the topic is timely
- Speaker (Name and qualifications)

The deadline for submission of GHP Invited Session Programs to the APS is

10th November, 2006.

APS April Meeting, 2006

At the April meeting in Dallas: April 22-25, 2006. Our session began at 13:30 on Saturday April 22nd and the speakers were

Eric Braaten (Ohio State)	The New Exotic Heavy Mesons
Berndt Müller (Duke)	Jet Interactions with Dense Matter at RHIC
Mark Pitt (Virginia Tech)	Strange Quarks in the Nucleon

The session was chaired by P. C. Tandy, Kent State University, from whom we received the following summary:

Session Summary
Eric Braaten reviewed the current understanding of the new heavy mesons containing at least a c and a $\bar{c}$ that have been discovered in the past few years by BaBar and Belle. In particular, attention was focussed upon the $X(3872)$, $Y(3940)$, $Y(4260)$, $X(3940)$ and $Z(3930)$. Some of these do not fit naturally into the systematics of the charmonium spectrum and are possibly exotic states. The scenarios explored in the talk included hybrid $[c\bar{c}g]$ mesons, tetraquark $[(cq)(\bar{c}\bar{q})]$ mesons, and mesonic molecules [e.g., $D^\star\bar{D}$]. The clearest of Eric's conclusions was that the $X(3872)$ is a charm meson molecule $D^{\star 0}\bar{D}^0 + \bar{D}^{\star 0}D^0$ with universal properties that are insensitive to details of QCD. Other conclusions drawn were that: $Z(3930)$ is the charmonium state $\chi_{c2}(2P)$; $X(3940)$ may well be the charmonium state $\eta_c(3S)$; and $Y(3940)$ is not charmonium nor a charm meson molecule nor a charmonium hybrid. The $Y(4260)$ was deferred to a talk later in the meeting by Robert Cahn. The analysis suggested that $B^\star\bar{B}$ molecular states must exist with binding energies around 50 MeV.

The contributions of the strange quark sea to the structure of nucleons has been the subject of several experiments in the past few years through parity violating electron scattering to measure the strange electric and magnetic form factors at low Q^2. The talk by Mark Pitt set these results into the wider context of strange quark contributions to scalar, axial-vector and vector matrix elements. The topic of the consistency of the recent results for the vector matrix elements was discussed at length, and the physics implications were explored. Already published results from the SAMPLE (MIT-Bates), A4 (Mainz), HAPPEx (JLab) and G0 (JLab) collaborations were used for this purpose. It was seen that these experiments and their analyses have not ruled out potentially large strange quark contributions to the nucleon's electromagnetic properties, but that small values consistent with theory, including recent lattice-QCD calculations, are not ruled out either. Mark reminded the audience that the new HAPPEx results from the Fall 2005 run, that were to be announced later in the meeting, would have error bars reduced by a factor of 2. [Those results, as presented in a subsequent session by Paul Souder, strongly support very small values for $G_{\rm E}^s$ and $G_{\rm M}^s$, consistent with theory.]

Berndt Müller reviewed the current quantitative understanding of the energy loss process for partons as a probe for the properties of the hot medium created in nuclear collisions at RHIC.

Much use was made of data, especially from the STAR and PHENIX collaborations. Particular attention was focussed on the observed suppressed emission of hadrons with high transverse momentum in $Au + Au$ collisions compared to $p + p$ collisions. This was argued to be a final-state effect caused by the energy loss of precursor partons propagating in the hot medium. A variety of aspects of the partonic energy loss process were discussed with a view to a wider class of possible observable effects. The jet-medium interactions were reasoned to provide rich and discriminating probes of the medium in terms of a well-defined transport coefficient $\hat{q}$; it was argued that semi-quantitative agreement with theory is starting to emerge. Curious effects of energy loss in the medium were canvassed, amongst them sound waves and wakes in the quark gluon plasma.

Forthcoming Meetings

The GHP web site http://www.aps.org/units/ghp/ has a *Conferences* link – http://www.aps.org/units/ghp/meetings.cfm. This lists meetings that are likely to be of interest to GHP's membership. The Executive welcomes suggestions for postings.

The following meetings are currently listed for the coming year:

August ...

- 18th International IUPAP Conference on Few-Body Problems in Physics
  Santos, São Paulo, Brazil 21-26 August, 2006

September ...

- Confinement 7: *Quark Confinement and the Hadron Spectrum VII*
  Ponta Delgada, Azores, Portugal, 2-7 September 2006

October ...

- SPIN 2006, *17th International Spin Physics Symposium*
  Kyoto, Japan, October 2 - 7, 2006
- GHP06, *Second Meeting of the APS Topical Group on Hadronic Physics*
  Nashville, Tennessee, 22-24 October, 2006
- DNP06, *APS Division of Nuclear Physics Fall Meeting*
  Nashville, Tennessee, 24-28 October, 2006
- DPF06, *Meeting of the APS Division of Particles and Fields* – Joint with JPS06
  Honolulu 29 October - 3 November, 2006

Long Range Plan

In a letter dated ***17 July, 2006***, the Department of Energy and National Science Foundation Nuclear Science Advisory Committee (NSAC) was requested to conduct a new study of the opportunities and priorities for nuclear physics research in the United States, and to recommend a long range plan that will provide a framework for coordinated advancement of

the nation's nuclear science research programs over the next decade. The charge letter is available at http://www.er.doe.gov/np/nsac/docs/NSAC%20Charge_LRP.pdf.

The letter states that the projected funding for DOE is compatible with implementing the 12 GeV upgrade of CEBAF, and commencing construction of the proposed Rare Isotope Accelerator early in the next decade. It also notes that at NSF a process has been put in place for developing a deep underground laboratory and taking this project to a funding decision.

The letter reminds NSAC that the Administration requires activities to be evaluated against established performance goals. It indicates that this long range plan process should gauge progress toward achieving the long-term goals for the nuclear physics program, which were identified in 2003, and that consideration be given to whether these goals should be revised. The 2003 measures can be reviewed at
http://www.er.doe.gov/measures/scprograms/np/np.html.

In addition, the letter acknowledges the role played by Town Meetings in the formulation of previous long range plans and encourages NSAC to again exploit this method of obtaining broadly based input.

An interim report, containing the essential components of NSAC's recommendations, is requested by October, 2007. The final report is required by the end of calendar year 2007.

GHP Membership

At the beginning of 2005, the GHP had 308 members. On 6 Dec. the number was 337. Our membership on 3/April was 344. GHP accounts for 0.76% of APS membership.

While the GHP is no longer the smallest topical group. Continued growth is nevertheless something for which to strive.

The DNP now has a total of 2465 members and DPF has 3419. However, only $\sim 8\%$ of DNP are members of GHP, and only $\sim 6\%$ members of DPF! It is therefore very likely that there are many Hadron Physics researchers who are not involved with GHP.

Hence, if you are reading this newsletter but are not a member of GHP, *please join*. Current APS members can add units online through the APS secure server:
http://www.aps.org/memb/unitapp.cfm.

On the other hand, if you are already a member of GHP, please encourage your colleagues to join. As noted above, we had modest success with this in 2006. However, we only have 2% growth so far this year.

Membership in a strong GHP brings many benefits. A vital GHP

- establishes and raises the profile of Hadron Physics in the broader physics community, e.g., by nominating members
  - to APS governance committees,
  - to APS prize and award selection committees,
  - for election to Fellowship in the APS
- has a greater role in planning the program for major APS meetings;
- and provides a vehicle for community action on topics that affect the way research is conducted and funded.

Membership is only $7. Of this, GHP receives $5 from the APS. (The remainder stays with the APS and covers the many services they provide.) The GHP is using this money to support GHP06, which is expensive this year because of the venue that we have been compelled by circumstances to use. The money can also be used for example, to assist with: the preparation of publications that support and promote the GHP's activities; and the participation in those fora that affect and decide the direction of basic research.

Fellowship

We wish to remind the GHP that each year the APS allocates a number of Fellowship Nominations to a Topical Group. That number is based primarily on membership. A strong GHP can nominate more of our members for Fellowship. This year we were allocated ONE Regular nomination and ONE Alternate, for a total of TWO nominations.

This year the committee was:

2006 GHP Fellowship Committee

Mike Leitch	Curtis Meyer	Adam Szczepaniak
leitch@lanl.gov	cmeyer@cmu.edu	aszczepa@indiana.edu

with **Curtis Meyer** as Chair. Three nominations were received, two of which were forwarded to the APS Fellowship Committee. That committee will complete their review by 1 September, with final approval by the full APS Council due by November 30.

The Executive would like to see more nominations submitted next year. It is likely that more than $\lesssim$1% of GHP's members are worthy of recognition.

A Committee for 2007, chaired by the incoming Vice-Chair of GHP, will be formed after the November 2007 GHP elections. In the meantime, the Executive urges members of GHP to nominate colleagues who have made advances in knowledge through original research and publication or made significant and innovative contributions in the application of physics to science and technology. They may also have made significant contributions to the teaching of physics or service and participation in the activities of the Society.

The instructions for nomination may be found at http://www.aps.org/fellowship/fellinfo.cfm

To summarize, one must

- Ensure nominee is a member of the Society in good standing.
- Obtain signatures of two sponsors who are members of the Society in good standing.
- Submit a complete original nomination packet (signed Nomination Form and Supporting Letters ... these document are available for download from the web page) and one photocopy packet prior to **27$^{\text{th}}$ April 2007** (GHP's deadline) to:
  - Executive Officer
    ATTN: Fellowship Program
    The American Physical Society
    One Physics Ellipse
    College Park, MD 20740

Supporting letters should be included with nomination form to ensure attachment to the correct nomination package. Individuals providing letters of support do not have to be members of the APS, however, it is preferable in practice that sponsors be APS Fellows.

The APS will subsequently forward the Nominations to the GHP Fellowship Committee.

APS Convocation and Congressional Visits Day

This year the APS Unit Convocation was held on Saturday, Feb. 18, at the American Center for Physics in College Park, Maryland. The purpose of the Unit Convocation is to familiarize new executive officers from various APS units with the APS, and introduce them to staff from APS headquarters. The Convocation is a useful forum in which to learn about logistical issues such as planning unit meetings, increasing membership or handling finances. In addition, there were two discussion sessions focusing on how the APS can help foster interdisciplinary research, and how APS units can work more effectively with the APS Washington Office to advocate physics research and education. This year the Convocation was attended by Wally Melnitchouk, Curtis Meyer, and Dave Tedeschi.

On Friday, Feb. 17, prior to the Unit Convocation, the APS organized a Congressional Visits Day. This is arranged each year as part of the APS's ongoing work to inform congress about physics in the US. In the morning a briefing was held at the APS Washington D.C. offices about the background to and current status of the FY07 budget process. While FY06 has been a particularly difficult year for nuclear and particle physics, the President's FY07 request would significantly increase DOE and NSF funding to the physical sciences. It was pointed out that an important factor leading to the proposed funding increase was the document late last year, "Rising Above the Gathering Storm: Energizing and Employing America for a Brighter Economic Future", prepared by The National Academies' Committee on Science, Engineering, and Public Policy, http://www7.nationalacademies.org/cosepup/. This had a major impact on the development of the President's American Competitiveness Initiative, which aims to double America's science budget over the next ten years.

At the briefing, information packages were provided for the delegates from the various APS Units, to be given out to congressional staffers during the afternoon meetings. The meetings with the staffers were generally informative and productive. Delegates were encouraged to urge their respective members of congress to sign the "Dear Colleague" letters in the House and in the Senate, supporting the White House FY07 budget request. In some cases, Representatives who at the time of the visit had not yet signed on, did so shortly thereafter.

This year Wally Melnitchouk (together with Colm Whelan from Old Dominion University, who was representing the Topical Group on Few Body Physics) visited the offices of the two Virginia senators and four members of the House of Representatives, Curtis Meyer visited representatives of Pennsylvania, and Dave Tedeschi, those of South Carolina.

State of the Laboratories

For this issue the Executive solicited and received input for this section from JLab and RHIC.

We would be pleased to receive input from GHP membership, in particular from people at labs with hadron physics programs who are willing to prepare input and clear it with their lab's leadership. The following contributions should serve as a template.

Upgrade at JLab
(Communicated by Wally Melnitchouk, JLab; EMail: wmelnitc@jlab.org)

In recent news from Jefferson Lab, on February 22, 2006, Secretary of Energy Samuel W. Bodman announced DOE's approval of CD-1 (Critical Decision-1) for the upgrade of the Continuous Electron Beam Accelerator Facility (CEBAF) from 6 GeV to 12 GeV. Approval of CD-1 allows for Project Engineering and Design efforts to officially begin. The 12 GeV Upgrade will allow the study of the origins of confinement, through the search for hybrid mesons, as well as to probe the large Bjorken-x region of nucleon structure and the first comprehensive studies of the 3-dimensional picture of the nucleon via generalized parton distributions. In another step forward, the project had a very successful Annual Review in June.

Also, as of April 17, 2006, Jefferson Lab is being managed and operated by a new contractor – Jefferson Science Associates, LLC (JSA) http://www.jsallc.org/. JSA is a joint venture between the Southeastern Universities Research Association (SURA), that has operated JLab since its inception, and CSC Applied Technologies, which is based in Fort Worth, Texas, and brings a strong background in operations and business management systems. The new JSA Board has 6 members from SURA, and 4 from CSC, with the JLab Director, Christoph Leemann, serving as the JSA President.

In physics news, the most precise measurement yet of strange quarks in the proton was performed by the second phase of the parity-violating electron scattering experiment HAPPEx II (Hall A Proton Parity Experiment). This showed that the strange quark contribution to the proton's overall charge distribution and magnetic moment, at a scale $Q^2 = 0.1\,\mathrm{GeV}^2$, is small – less than 1 percent of the proton's charge distribution and no more than 4 percent of its magnetic moment. This result firmly pins down strange quark contributions to the proton's charge distribution and magnetic moment, constraining the world data to less than half of its previous range.

News from RHIC at BNL
(Communicated by Brant Johnson, BNL; EMail: brant@bnl.gov)

It was a very interesting year at the Relativistic Heavy Ion Collider (RHIC) and Alternating Gradient Synchrotron (AGS) complex at BNL. Throughout FY 2005 and into FY 2006 there was significant uncertainty that RHIC would have sufficient funding to run at all. In February 2005 the President's Budget for FY 2006 had an 8.4% cut for Nuclear Physics and RHIC was short $12 million in operating funds. Meanwhile power costs had risen dramatically so that $18 million more would be needed for full operations.

Encouragingly, both the House and Senate appropriations subcommittees had provided additional funding for operation of user facilities like CEBAF and RHIC. But then in November we were told that the conference committee had removed the extra funding and the appropriations bill became law without it. At this point a RHIC run in FY 2006 looked very unlikely. Efforts to overcome this funding shortfall seemed hopeless, but then in late December we received word that a Run-6 was now likely again due to a $13 million donation from Jim Simons and associates at Renaissance Technologies.

It seemed too good to be true, but the additional funding on top of the base DOE budget did allow for a very successful 20-week long RHIC run from March through June with polarized proton collisions at 200 and 62.4 GeV. There were also short development runs at 22 and 500 GeV. At 200 GeV the total integrated luminosity (L) for physics of $45\,\mathrm{pb}^{-1}$ was nearly a factor of four larger than that for Run-5 and the average polarization (P) was 60% in Run-6, compared to just under 50% in Run-5. Both PHENIX and STAR used their independent spin

rotators to record data for either transverse radial or longitudinal collisions. The improved luminosity and polarization enabled STAR and PHENIX to significantly improve and extend their Run-5 spin physics results. For example, PHENIX achieved a recorded figure of merit, (P4)L longitudinal of $1.1\,\mathrm{pb}^{-1}$, which was 7 times greater than in Run-5. BRAHMS also recorded data at 62.4 GeV and all three experiments are busily analyzing with the hope of releasing preliminary results at the Spin 2006 conference in Kyoto, Japan, October 2-7.

The 62.4 GeV running was useful not only for spin physics measurements, but also for the primary purpose of providing much-needed comparison data sets for Au+Au and Cu+Cu data recorded at 62.4 GeV in Run-4 and Run-5. The integrated luminosity of $80\,\mathrm{nb}^{-1}$ should be more than adequate to allow for important heavy-ion comparison results like measurements of the nuclear modification factor (R_{AA}) at 62.4 GeV to compare with the many measurements of R_{AA} at 200 GeV. The significance of R_{AA} is that dividing the heavy-ion collision results by the scaled data for a comparable number of $p + p$ events gives a clear indication of suppression or enhancement relative to a ratio of 1.0. Again, the experimenters are busily analyzing with the hope of presenting preliminary Run-6 results and final results from earlier runs at the Quark Matter 2006 Conference in Shanghai, China, Nov. 14-20.

In April Sam Aronson was named Interim Director of Brookhaven National Laboratory (BNL). Sam has a long history with BNL and RHIC. From its inception in 1992 until 2002 Sam served as the Project Director and then Operations Manager of the PHENIX Experiment at RHIC. He then became first Chairman of the Physics Department and then Associate Laboratory Director for High Energy and Nuclear Physics. As Interim Director, Sam will steer not only the future course of RHIC, but also of NSLS II and many other science initiatives at BNL.

The President's budget for FY 2007 would provide sufficient operating funds to generously support all fields of physical sciences research and education, including sufficient research, development, and operating funds for robust RHIC runs in FY 2007 and beyond. We are hopeful that Congress will appropriate the full presidential request for the Office of Science (up 14.1%), Nuclear Physics (up 23.7%), and High Energy Physics (up 8.1%). All members of the Hadronic Physics group and all nuclear and high energy physicists are urged to express through appropriate channels their full support for the President's budget for FY 2007.

(NB. The Executive of GHP endorses this request.)

This GHP Newsletter was edited by Craig Roberts for the Executive Committee.