GHP Newsletter March 2014

American Physical Society Topical Group on Hadron Physics

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

Executive Officers

Chair	*Chair-Elect*	*Vice-Chair*
Matthias Burkardt	Peter Petreczky	Raju Venugopalan
burkardt@nmsu.edu	petreczk@quark.phy.bnl.gov	raju@bnl.gov

Past-Chair	*Secretary/Treasurer*	*Members at Large*	
John Arrington	Craig Roberts	Christine Aidala	Susan Schadmand
johna@anl.gov	cdroberts@anl.gov	caidala@bnl.gov	s.schadmand@fz-juelich.de

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

Join GHP by following a link on the lower-right of our web page; namely, from: http://www.aps.org/units/ghp/.

Contents

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1 Thesis Prize

The GHP Dissertation Award was established in February 2012, thanks to significant contributions from Brookhaven Science Associates (the management contractor for the Brookhaven National Laboratory), Jefferson Science Associates, LLC (the management contractor for Jefferson Lab), Universities Research Association (the management contractor for Fermi National Accelerator Lab) and personal contributions from some of our members.

The Award is a prize of $ 1000 and a travel allowance of up to $ 1500; and the winner will be invited to deliver a plenary presentation at GHP 2015.

Nominations for the Second GHP Dissertation Award will close on

6 October, 2014.

As 2014 Chair of GHP, Matthias Burkardt will lead the Dissertation Award Committee, whose full composition is:

Christine Aidala
U.Michigan, Ann Arbor
caidala@bnl.gov

Matthias Burkardt
NMSU
burkardt@nmsu.edu

Ian Cloët
ANL
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Ramona Vogt
LLNL/UC-Davis
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The dissertations will be evaluated according to the following criteria: the quality of the written dissertation (40%), the contribution of the student to the research (30%), the impact of the work (15%), and the broader involvement of the student in the community (15%).

For more information, including "Rules and Eligibility", please check the APS web-site:

Dissertation Award in Hadronic Physics.

The current endowment enables GHP to present the Dissertation Award biennially. In order to maintain that endowment and, perhaps, to expand the Award, the Executive encourages our members to

Donate to the award fund.

For information on how to proceed, please see:

https://www.aps.org/memb-sec/profile/DonationFunds.cfm

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2 Elections

Elections for two posts in the GHP Executive closed on 15th November 2013. The new Executive Committee is listed at the top of this newsletter.

On behalf of GHP, the Executive thanks the people who entered their names on the ballots.

In addition, we thank Jianwei Qiu and Ramona Vogt for their efforts in the GHP Executive on behalf of hadron physics and beyond.

Elections will open again in October 2014. We will fill two positions on GHP's Executive Committee:

- Vice-Chair (Peter Petreczky will become Chair and Raju Venugopalan will become Chair-Elect, leaving the position of Vice-Chair vacant. Naturally, Matthias Burkardt will become Past-Chair, whilst John Arrington will refocus on teasing the proton, as he has done on and off throughout his career.)
- and one Member-at-Large (Susan Schadmand will by then have completed her stint.)

It is planned that in August, 2014, the Nominating Committee will solicit input from the GHP membership. The nomination of candidates will likely close on Fri. 5 September and an electronic ballot will subsequently be held over a one-month period: 14 October – 14 November.

Our rules state that: *the Committee shall nominate at least two candidates for the offices of Vice-Chair and for the open position of Member-at-Large; the slate of candidates will be balanced as much as possible to ensure wide representation amongst the various fields of physics included in the GHP's membership; the Nominating Committee shall be chaired by the immediate past Chair*, who is

John Arrington (johna@anl.gov)

this year; *and shall include three members in addition to its Chair, one of whom shall be appointed by the APS.*

We urge GHP members now to begin considering whom they would like to see filling the two open positions in 2014 and encourage members with ideas to contact the *Chair of the Nominating Committee* and pass on their suggestions. There is strength in diversity and so the Executive would like to see nominations from across the entire spectrum of GHP's membership.

NB. The APS stipulates that we state the following: "Attracting and serving a diverse and inclusive membership worldwide is a primary goal for APS. In calling for nominations, we wish to remind you how important it is to give full consideration to qualified women, members of underrepresented minority groups, and scientists from outside the United States."

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3 Fellowship

We take this opportunity to congratulate Bob Mawhinney (Columbia) and Bolek Wyslouch (MIT), both of whom in 2013 were elected to Fellowship in the APS under the auspices of the GHP:

Robert (Bob) Mawhinney (left) and Boleslaw (Bolek) Wyslouch (right) GHP's 2013 Fellows.

Bob "for his pioneering contributions using lattice techniques to the quantitative description and understanding of the physics of quarks and their role in the weak interactions and QCD phase diagram;"

and Bolek "for his leadership role in the PHOBOS experiment and in creating a world-class heavy ion research program within the CMS Collaboration at the LHC."

This is a good time 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. Since we are in the neighbourhood of 500 members, we are allocated TWO Regular nominations.

The Executive urges members of GHP to be prepared in 2014 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/programs/honors/fellowships/nominations.cfm
The entire process is now performed on-line.

A few things to know before proceeding, however. One must

- Ensure the nominee is a member of the Society in good standing. The on-line site will do this for you but it's best to check beforehand, to save yourself time or get your nominee to join APS and GHP.
- A nomination requires a sponsor and a co-sponsor. During the on-line nomination process, you will be required to provide details for a co-sponsor. After you complete a nomination, the co-sponsor will be notified by EMail. It would be best to coordinate with the co-sponsor beforehand.
- In addition to the nomination letters, you will require supporting letters, that will need to be up-loaded to the APS web site. Two letters of support are sufficient. Individuals providing letters of support do not have to be members of the APS, however, in practice it is preferable that sponsors be APS Fellows.
- The nomination process should be complete prior to GHP's deadline:

Sunday 1st June 2014

The APS will subsequently forward the nominations to the GHP Fellowship Committee, which this year is

2014 GHP Fellowship Committee

Nora Brambilla	Haiyan Gao	Raju Venugopalan
nora.brambilla@mytum.de	gao@tunl.duke.edu	raju@bnl.gov

Raju Venugopalan is Chair. Do not hesitate to contact Raju or his colleagues on the committee if you have questions.

The Executive urges members of GHP to react quickly to this call for nominations.

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4 APS April Meeting, 2014

5 – 8 April, Savannah, GA
http://www.aps.org/meetings/april/index.cfm

4.1 GHP Program

A topical group is invited to participate in planning the program of major APS meetings. At this year's meeting in Savannah, we have two invited sessions, one of which is shared with the Topical Group on Few Body Systems (GFB):

GHP/GFB: Light Baryons as Few-Body Systems
Saturday, 5 April 2014 at 15:30. Chair: Martin Savage (University of Washington)

- Ian Cloët (ANL) *Nucleon and Delta structure in continuum QCD*
- Volker Burkert (JLab) *What nucleon resonances teach us about nucleon structure*
- Christian Weiss (JLab) *Nucleon structure on the light front*

GHP: Chromo Dynamics
Sunday, 6 April 2014 at 10:45, Matthias Burkardt (NMSU)

- Christian Hölbling (U. Wuppertal) *Measurement of initial state fluctuations at RHIC*
- Martin Savage (U. Washington) *Nuclear Forces from Lattice QCD*
- Peter Tandy (KSU) *QCD Modeling of Hadron Physics*

In addition, the GHP has two contributed sessions:

- Sunday, 6 April 2014, 8:30am. Session H14, Room: 102 – *Spin Structure.* Chair: Harut Avakian (JLAB)
- Tuesday, 8 April 2014, 10:45am. Session X14, Room: 102 – *Hadron Structure.* Chair: Volker Crede (FSU)

The following session might also be of interest to GHP members:

DNP: Prize/Award Session

Monday, 7 Apr. 2014 at 3:30PM. Chair: Berndt Mueller (Duke U.), Chatham Ballroom B

- Bonner Prize, William Zajc
- Herman Feshbach Prize, John Negele
- The Proton Radius Puzzle – A problem for all of us, Gerald A. Miller

along with numerous other DNP and DPF sponsored parallel sessions.

4.2 April 2015

Moving on to next year, **Peter Petreczky** will serve as Chair of the GHP's 2014 Program Committee:

2014 GHP Program Committee, preparing for April 2015

Peter Petreczky	Ken Hicks	Craig Roberts	Raju Venugopalan
petreczk@quark.phy.bnl.gov	hicks@ohio.edu	cdroberts@anl.gov	raju@bnl.gov

The 2015 April Meeting is scheduled for

11-14 April 2015, Baltimore, MD.

http://www.aps.org/meetings/meeting.cfm?name=APR15

4.3 Future of the April Meeting

Looking at the longer term, it should be noted that attendance at the APS April meeting is relatively low and APS loses money on this meeting. Therefore APS would like to increase the visibility of, and attendance at, the APS April meetings.

To achieve this goal a special task force has been formed – consisting of the representatives of the APS units involved in the April Meeting – to suggest changes that could make the April meeting a *must attend* event.

Peter Petreczky (BNL) is representing GHP on this task force. Other members of the task force are Megan Comins (Cornell University), Brenda L Dingus (LANL), Cary Forest (University of Wisconsin), Tim Gay (Chair, University of Nebraska), Karsten Heeger (Yale University), Daniel Holz (University of Chicago), Daniel Kleppner (MIT), Patricia McBride (FNAL), and Bill Zajc (Columbia University).

On or around 14 February, all APS members received an e-mail from ⟨meetings@aps.org⟩ requesting that members complete a survey that will help the Task Force to collect the input needed to make recommendations to the APS Executive Board.

Whilst over 600 APS members have completed the survey, only 14 GHP members have responded. This is disappointing, given that GHP has almost 500 members, of whom approximately 100 attend the April meeting.

The GHP Executive would like to encourage our members to complete the survey by

Friday 7th March 2014

If you need to have the survey re-sent to you, please email communications@aps.org.

5 GHP 2015: 6th Workshop of the GHP

The Executive has begun planning for the Sixth Meeting of the APS Topical Group on Hadron Physics. If we follow the pattern of our previous successful meeting, it will take place over 3 days:

8-10 April 2015

i.e., just before the APS April Meeting, being held in Baltimore, MD.

Peter Petreczky and Raju Venugopalan are co-chairing the Organising Committee, which will be constituted from the entire Executive and selected members of GHP.

Topics to be discussed include:

- AdS/QFT, novel phenomena
- Exotic hadrons
- Future facilities
- Lattice QCD
- Light and heavy quark mesons and baryons
- Nucleon spin physics and hadronic structure
- Physics of the quark-gluon plasma
- Physics of gluon saturation

As past meetings have demonstrated, the GHP workshop offers a very good opportunity for nuclear and particle physicists to meet and discuss their common interests in hadronic interactions. So please mark these dates and the location in your calendar, and plan on attending.

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6 Membership

The Official 2014 Unit Membership Statistics list GHP with 498 members, which represents 0.98% of APS membership. Of these people, 304 are also in DNP (Division of Nuclear Physics) and 249 are in DPF (Division of Particles and Fields). The number of members we share with DNP grew by 26 (9.3%), continuing a steady increase; and although the number shared with DPF grew by 6 (2.5%), it is still only 92% of our 2012 peak.

Year on year, GHP's membership grew officially by 15 (3.1%). In this connection, it is notable that membership in DNP grew by 44 people (1.6%) but DPF was static in 2013, losing 2 members.

At least part of the growth in GHP membership may be attributed to the success of the *5th Workshop of the GHP*, with its registration fee structure that favored GHP members. Now, with our membership strong and standing at approximately 500, we will be able to make two

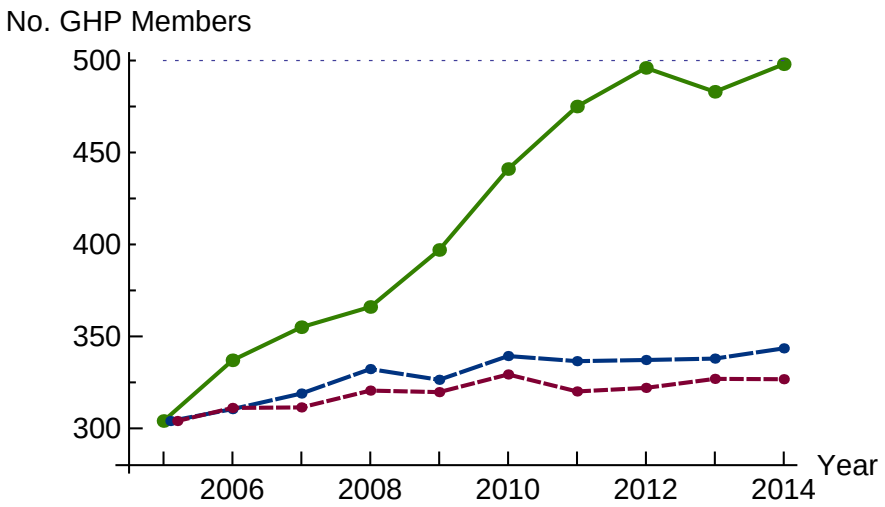

Figure 1: *Solid line* – GHP membership, true value, with "2014" representing the current APS Official Count; *long-dashed* – DNP membership normalized to GHP's value in 2005 (2401 → 304); and *short-dashed* – DPF membership normalized to GHP's value in 2005 (3291 → 304).

regular-fellowship nominations in 2015, which is an excellent boost for Hadron Physics. (See Sec. 3.)

There are currently twelve Topical Groups listed in the 2014 Unit Membership Statistics. Of these Groups, the GHP is 8$^{\text{th}}$ largest; but only three groups grew at a faster rate – Energy Research and Applications (5.2%), Few Body Systems (14.3%), Quantum Information (5.6%).

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.

Whether one considers the APS alone, or takes a broader perspective, the impact GHP can have is primarily determined by the number of members. (It is also influenced by the energy of the Executive.) The Executive urges existing members to encourage their colleagues to join us. We know there are absent-minded people who have overlooked the opportunity to join GHP but many will react positively to a little gentle prodding.

Membership is only $8. Of this, GHP receives $5 from the APS. The remainder stays with the APS and covers the many services they provide. They were very helpful, e.g., in connection with GHP11 and GHP13. With this support we can be an active force for Hadron Physics. The money can be used, for example, to assist with: the GHP Dissertation Award – see Sec. 1; the organization of meetings – such as the forthcoming GHP2015, see Sec. 5; the preparation of publications that support and promote the GHP's activities; and participation in those fora that affect and decide the direction of basic research.

Hence, if you are reading this newsletter but are not a member of GHP, please join. On the other hand, if you're already a member, please circulate this newsletter to your colleagues and encourage them to join.

Current APS members can add units online through the APS secure server by following a link on the lower-right of our web page; namely, http://www.aps.org/units/ghp/index.cfm.

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7 Congressional Visits and Unit Convocation

The Convocation is the gathering of unit officers. It provides for their familiarization with the ways of the APS, and is also an excellent opportunity for unit officers to learn from each other. This year, the Convocation was held at the American Center for Physics (APS Headquarters) in College Park, Maryland on

Friday 21st February – Saturday 22nd February.

As in the past two years, the Convocation provided an opportunity for unit officers to interact with the APS Executive Board and the Presidential Line on Strategic Plan implementation. There was a social reception and dinner on Friday evening, and organized discussions on Saturday morning. In addition, as a highlight of the meeting, there was a special scientific lecture by Prof. Feryal Ozel, University of Arizona, who is last year's recipient of the Maria Goeppert Mayer Award.

This year, three members of the GHP's Executive volunteered their time and took part: Christine Aidala, Member-at-Large; Peter Petreczky (Chair-Elect); and Raju Venugopalan, Vice Chair. Their report follows.

Highlights and Observations from the Unit Convocation
As usual the opening address was given by APS President (Malcolm Beasley) followed by presentations by the Executive Officer (Kate Kirby), Treasurer/Publisher (Joe Serene) and Physical Review Editor-in Chief (who could not be present this year and was represented by Dan Kulp). APS now has more than 50,000 members and is working on implementing its strategic plan.

As a part of this plan APS intends to increase its membership in industry and the private sector; and to help with this goal Steven Lambert was recently hired into the newly created position of Industrial Physics Fellow.

The APS finances are in good shape. Its total assets are valued at about $ 120-million dollars, while its annual operating costs are about $ 20-million dollars.

Publications continue to be one of the most important sources of revenue for APS. In response to the OSTP memo on open access, APS worked with other publishers to create CHORUS (Clearinghouse for the Open Research of the United States). For more information see http://www.aps.org/publications/journals/chorus.cfm.

The APS journals are amongst the top international journals and account for one-third of all citations in physics. Interestingly enough 44% of all papers published come from Europe, while North America accounts only for about one-third of all publications. The recently launched Physical Review X has been a success; its first measured impact factor is 6.7 (in comparison, Physical Review Letters has an impact factor of 7.9). To be more appealing to industrial physicists, APS also launched a new journal: Physical Review Applied.

A major topic of the discussions at the APS Leadership Convocation was the planned APS corporate reform. This was triggered in part by a change in regulations that govern non-profit organizations and in part by the planned retirement of Treasurer/Publisher, Joe Serene. It is very likely that this position will be split into two or more positions in the future. During the discussion on February 22, led by Marybeth Fidler (external consultant hired by APS), the unit leaders were asked to provide input for this process. A question that was raised and discussed is whether in the future the day-to-day operations of APS should be overseen by a Chief Executive Officer rather than by a troika of three equal executive officers as it is now (Executive Officer, Treasurer/Publisher and Editor-in-Chief).

Several unit leaders expressed concerns with having a CEO, citing that this may undermine the sense of community within APS. Some unit leaders emphasized the importance of involvement of every member of APS in the process of corporate reform rather than just participating in the final vote. GHP representatives expressed their regret that their input was not solicited in advance, and they had to provide input on the spot. They also stressed the importance of involving unit leadership in the process of corporate reform. A clear message that came out of the corporate reform discussion with those present at the Convocation was that it is critical to preserve the longstanding physics culture at the top levels of APS leadership.

Unit members attended an interesting presentation by Theodore Hodapp, the APS Director of Education and Diversity. Hodapp pointed out that while the percentage of women with bachelor's and doctorate degrees has shown steady, if not spectacular growth, the number of physics majors from under-represented minorities has remained flat over the last 20 years, with only 9% of BS degrees and 52 PhDs granted to minorities in 2010. Another striking statistic mentioned was that less than one-half of high school classes in physics were taught by a teacher with a degree in physics. Hodapp mentioned two APS initiatives to help ameliorate these concerns. The APS has established a 1-2 year bridge program that would assist minorities who are undergraduate physics majors in preparing for graduate school, by providing intensive advanced undergraduate and entry level graduate course work, coaching on preparing graduate admissions, and mentorship continuing through graduate school. The first year of the project saw the successful placement of 14 students in graduate programs. Interested unit members should contact Hodapp about this program, if their home institution is not already participating. With regard to teacher training, Hodapp discussed the APS PhysTEC initiative to improve teacher training in school districts in five states. The project oversaw a dramatic increase in physics teacher certifications with certifications remaining significantly higher than previous to the PhysTEC funding period.

Capitol Hill Visits

In addition, APS encouraged Convocation participants to spend Thursday, 20 February, before the Unit Convocation, on Capitol Hill, meeting with their Congressional representatives to discuss the contributions that physics and physical science make to the nation. For those involved, this is not always entertaining but usually enlightening. Unfortunately, this year no one from GHP was able to participate.

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8 Science Funding

Office of Science Anticipates Reduced Award Success Rate

Much of the following information is drawn from this link:

https://www.aip.org/fyi/2014/doe-office-science-anticipates-reduced-award-success-rate

In a 29^{th} January memorandum to Office of Science Grant and Cooperative Agreement Applicants and Recipients, Patricia Dehmer, Acting Director of the Department of Energy's Office of Science, wrote:

> "The Office of Science anticipates that applications for new and renewal grants and cooperative agreements will be awarded at reduced success rates over the next three to five years."

This does not follow from a reduction in the budget for the Office of Science. The FY 2014 appropriations bill enacted on January 17 actually *increased* the Office of Science budget by $449.9 million or 9.7% from $4,621.1-million to $5,071.0-million.

The anticipated reduced success rate owes instead to language in the General Provisions section of the 639-page appropriations law pertaining to the Department of Energy:

> "Notwithstanding section 301(c) of this Act, none of the funds made available under the heading 'Department of Energy - Energy Programs Science' may be used for a multiyear contract, grant, cooperative agreement, or Other Transaction Agreement of $1,000,000 or less unless the contract, grant, cooperative agreement, or Other Transaction Agreement is funded for the full period of performance as anticipated at the time of award."

This language can be found on PDF page 171 of Section 310 of Public Law 113-76.

The key words are "funded for the full period of performance."

In her memorandum, Dehmer described as follows what the Office of Science is legally required to do as a result of this language:

> "The Office of Science's financial assistance awards have historically been made for three- to five-year project periods with funding provided annually in discrete budget periods."
>
> "We will no longer fund awards with a project period total cost of $1,000,000 or less in this way. Any new or renewal financial assistance award with a project period total cost of $1,000,000 or less will be funded in full."
>
> "Beginning immediately, the entire value of any grant or cooperative agreement with a total cost of $1,000,000 or less with will be obligated when the award is made."

In other words, from this point onwards the Office of Science is required to account for the total award in the year that it was made instead of spreading it out over, as the memorandum states, "for three- to five-year project periods with funding provided annually in discrete budget periods." The Office of Science will consequently make fewer awards for an estimated three to five year "transition period."

Note that this requirement is contained in the enacted law and not merely in the Explanatory Statement accompanying this law.

The memorandum also includes language on compliance with award terms and conditions for access to funds.

Unsurprisingly, this sudden change, imposed by lawmakers, is having a deleterious effect on many areas of basic research. Not only does it mean that many groups will go unfunded for a measurable period; but groups with continuing budgets and/or those that exceed the $1,000,000 threshold are also suffering cuts as the Office scrambles to find ways and means to

enact the change. For example, experimental equipment budgets are being "plundered" and funding for numerous so-called "discretionary" items, such as support for students and the hiring of postdoctoral fellows, is likely to be curtailed. This places yet another series of barriers in the way of building a future for basic science in the USA.

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9 Meeting Summaries

9.1 Indiana-Illinois Workshop on Fragmentation Functions

(Communicated by Anselm Vossen <agvossen@gmail.com>.)

The "Indiana-Illinois Workshop on Fragmentation Functions" (http://www.indiana.edu/~ffwrkshp/) took place 12-14 December 2014 in the Biddle Conference Center on the campus of Indiana University, Bloomington, hosted by the Nuclear Physics groups at Indiana University and the University of Illinois, Urbana-Champaign. The organizing committee consisted of Elena Boglione (University and INFN Torino), Daniel Boer (University of Groningen), Francesca Giordano (University of Illinois, Urbana-Champaign, co-chair), Matthias Grosse Perdekamp (University of Illinois, Urbana-Champaign), Marco Stratmann (Brookhaven National Laboratory), and Anselm Vossen (Indiana University, co-chair).

About 50 participants from 8 countries in 4 continents came to Bloomington, in order to discuss the impact of new experimental results and advances in theory on our understanding of the fragmentation process of polarized and unpolarized quarks into hadrons in the vacuum and in cold and hot nuclear matter. One focus of the discussion was the recently published results on pion and kaon multiplicities in e^+e^- annihilation from the Belle and Babar collaborations. These measurements improve the precision of previous data by more than an order of magnitude, with the greatest impact at high z, the fractional hadron momentum. The enhanced precision translates into much improved knowledge of the fragmentation functions (FFs) and improved access to the gluon fragmentation function when combined with multiplicity measurements at different center of mass energies. However, the uncertainties are small enough to reveal systematic differences between the Belle and Babar results. Discussions at the workshop led to the identification of possible sources for these differences. These include the treatment of corrections for initial state radiation and hadron decays in flight.

Presentations of phenomenological extractions of fragmentation functions from e^+e^- data, multiplicity measurements in SIDIS, and $p+p$ data, including LHC data, showed the increasing importance of higher-order QCD corrections and, perhaps, all-order resummation techniques to match the increased precision of the data. In particular at the high energies reached at the LHC, discrepancies emerge between particle multiplicities measured at LHC and expectations from present PDF and FF sets.

A topic of intense debate at the workshop was transverse momentum dependent (TMD) fragmentation functions. These are not only accessible in e^+e^- but also appear in SIDIS and $p+p$ measurements convoluted with their corresponding TMD parton distribution functions. Precise knowledge of TMD FFs is required as input for the extraction of intrinsic TMD parton distribution functions of the nucleon from transverse spin asymmetry measurements in pp collisions and SIDIS. In particular, it became evident that the future precision SIDIS measurements expected from CEBAF at 12 GeV will require equally precise data for TMD

FFs from e^+e^- annihilation. Several talks highlighted relevant experimental results and progress in phenomenology to fit the data by incorporating flavor dependence and TMD evolution. The latter uses the same techniques as TMD evolution for PDFs, which makes measurements in e^+e^- annihilation a good test-bed.

In this context, future measurements of multiplicities planned at BES were presented at the workshop. These measurements are expected to be very valuable in testing the evolution for TMD FFs. At large momentum transfers, the spin dependence in TMD PDFs arises from hard scattering processes at twist-3. Recent progress to extend the knowledge of twist-3 fragmentation functions was presented. However, it also became more evident, that as our understanding of single spin asymmetries in SIDIS and *pp* collisions becomes better, a quantitative account for the observed large A_N in polarized *pp* collisions becomes more elusive.

The workshop participants also heard updates concerning work on the fragmentation functions of Lambda baryons, new measurements of nuclear modification of fragmentation functions in cold nuclear matter from the CLAS and HERMES experiments and hot nuclear matter at RHIC and the LHC.

Finally an ongoing effort to probe local strong parity violation in e^+e^- annihilation was discussed.

A wintery Bloomington provided for a very productive atmosphere and with more data to come from Belle, BaBar, RHIC, LHC and Jefferson Laboratory, participants were already looking forward to a follow-up workshop.

9.2 MeNu2013

(Communicated by Annalisa D'Angelo <annalisa.dangelo@roma2.infn.it>.)

The 13^{th} International Conference on "Meson-Nucleon Physics and the Structure of the Nucleon" (http://menu2013.roma2.infn.it) was held in Rome (Italy) from September 30^{th} to October 4^{th} 2013.

The Conference belongs to a series started in Karlsruhe, Germany (1983) and continued in Los Alamos, USA (1987), Gatchina/Leningrad, Russia (1989), Bad Honnef, Germany (1991), Boulder, USA (1993), Blaubeuren, Germany (1995), Vancouver, Canada (1997), Zuoz, Switzerland (1999), Washington DC, USA (2001), Beijing, China (2004), Juelich, Germany (2007), and Williamsburg, USA (2010).

More than 200 physicists, both experimental and theoretical, convened from all over the world with the aim of exchanging expertise and confronting different approaches to the study of quark confinement and to the understanding of how hadrons are formed of quarks and gluons in a quantitative way.

The Conference featured invited as well as contributed talks, with morning plenary sessions and afternoon parallel sessions, covering the following topics:

* Hadron Spectroscopy
* Nucleon Structure
* Few-Body Systems
* Meson-Nucleon Interactions

* Electro-weak Probes and Fundamental Symmetries
* New Trends in Theory
* Future Facilities and Directions

The experimental efforts carried on in many accelerator facilities throughout the world (JLab, MAMI, Bonn, GSI, CERN, J-PARC, BesIII, LNF) were presented, covering, e.g., the search for exotic mesons and missing baryons, the spin and flavor content of the proton, the investigation of the strange sector of the nuclides, and the study of parity and time-reversal violating effects.

Some of the latest phenomenological tools and theoretical models, which allow for a multidimensional picture of hadrons, were reported and compared with data, aiming at achieving a deeper understanding of the non-perturbative regime of QCD.

The International Advisory Committee was composed of distinguished and widely known physicists in the field (http://menu2013.roma2.infn.it/iac.php) and guaranteed high standards for the choice of topics and speakers.

MeNu 2013 was preceded by the PWA7 satellite workshop (http://www.ge.infn.it/pwa7/), which took place at Camogli (Ge) on 23-27 September 2013 and addressed the problem of disentangling contributions from overlapping resonances through partial wave analysis.

Hints of physics beyond the Standard Model where covered by the satellite meeting on "New generation of beam dump experiments to search for Dark Matter", which followed MeNu 2013 at the same venue.

The full program, including all the presentations, is available on-line at the Conference website (http://menu2013.roma2.infn.it) while Proceedings will appear on EPJ Web of Conferences.

MeNu2013 was organized with the support of the Istituto Nazionale di Fisica Nucleare (INFN), it was sponsored by the Thomas Jefferson National Accelerator Facility (JLab), the Jefferson Science Associates (JSA), the University of William and Mary, the University of Rome "Tor Vergata" and CAEN. It has was endorsed by the International Union of Pure and Applied Physics (IUPAP).

The next edition of the MeNu Conferences will take place in Japan in 2016.

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10 State of the Laboratories

10.1 The Year 2013 at JLab

(Communicated by R. D. McKeown – bmck@jlab.org.)

Thomas Jefferson National Accelerator Facility (JLab) successfully completed the 6 GeV experimental program on May 18, 2012, and has since been fully engaged in preparing for the 12 GeV era. This report will begin with some highlights of new results emerging from the 6 GeV running. The progress on the 12 GeV upgrade project will then be summarized, followed by a brief discussion of the 12 GeV science program.

Some Recent Science Highlights

The Qweak collaboration has published its first result in Physical Review Letters, based on 4% of their total dataset. It is consistent with the Standard Model.

The PVDIS measurement in Hall A has been accepted by Nature for publication. The measurement is also consistent with the Standard Model.

CLAS collaboration reported photoproduction cross sections of the $\Sigma^0(1385)$, $\Lambda(1405)$, and $\Lambda(1520)$ in Physical Review C.

DarkLIGHT published the transmission of a megawatt electron beam through a 2 mm aperture in Physical Review Letters.

The first calculation of a resonant scattering amplitude in Lattice QCD has been performed, mapping out the shape of the ρ-meson (Physical Review D).

The proton-proton weak capture reaction, important in astrophysical processes, has been calculated in chiral effective theory with improved accuracy (Physical Review Letters).

A careful comparison of the spin asymmetry for single inclusive proton-proton collisions at RHIC with the Sivers asymmetry in SIDIS experiments provides the first indication that the Sivers effect shows the process-dependence expected from color gauge invariance (Physical Review Letters).

12 GeV Upgrade

The 12 GeV upgrade project continued to make excellent progress during 2013. The goal of this project is to double the maximum beam energy to 12 GeV, implement enhanced experimental hardware in the existing experimental halls, and construct a new Hall D to include the new GlueX experiment. The construction project was approximately 85% complete at the end of 2013.

The 12 GeV upgrade project plan was successfully rebaselined with DOE approval in September 2013. Several months of time were added to the construction schedule for Halls B and C, to account for delays in superconducting magnet deliveries. The CD-4B project completion milestone was moved out to the end of FY2017.

The first phase of the Accelerator Readiness Review (ARR) was successfully passed in September 2013. Accelerator beam commissioning started in December 2013, positioning JLab for the successful completion of the CD-4A DOE milestone "accelerator project completion and start of operation" on or ahead of the scheduled date of December 2014.

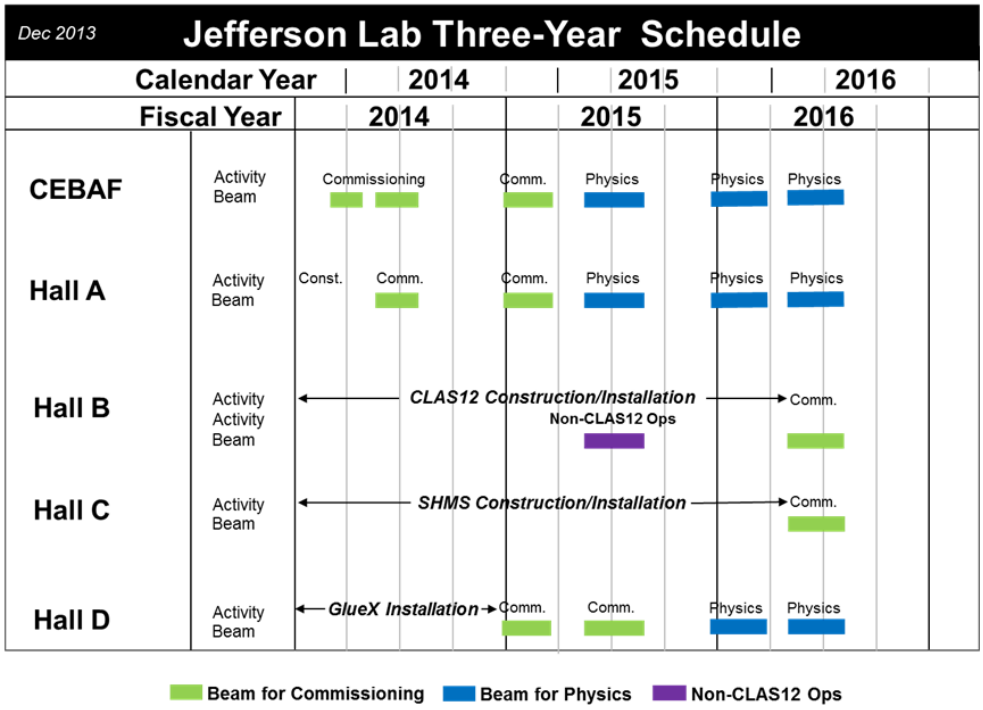
The GlueX superconducting solenoid installation in Hall D achieved a successful cooldown and test, and installation of the BCAL, FCAL, and FDC detector components neared completion. De-installation of CLAS was completed and the steel structure for the CLAS12 spectrometer assembled, including installation of the preshower-calorimeter (PCAL) modules in Hall B. The SOS spectrometer was removed from Hall C, and fabrication of the SHMS support structure and shield house was well-advanced.

Schedule

During the next three years, the Lab will transition the 12 GeV CEBAF and experimental equipment from construction to commissioning to physics production running. Subject to the availability of sufficient operating funds, the Lab anticipates the following schedule for the next three years.

Other Projects

The new Technology and Engineering Development Facility (TEDF), a modernization and enlargement of the existing Test Lab building, was completed with CD-4B status in September



JLab's plans for 2014-2016.

2013.

The Super BigBite Spectrometer construction began in earnest in 2013. Successful GEM chamber prototypes were built and tested at the University of Virginia. The dipole magnet from BNL was delivered to JLab.

The RICH sector for CLAS12 was successfully reviewed and will proceed to construction. NSF-MRI proposals for the proton radius experiment and for the CLAS12 forward tagger were funded. The Heavy Photon Search (HPS) experiment in Hall B was reviewed and approved for FY14 funding by DOE-HEP.

The CLEO solenoid was requested from Cornell, and is anticipated to be utilized for the SoLID project. The SoLID collaboration is in the process of completing its preliminary Conceptual Design Report in anticipation of a Director's Review in 2014.

12 GeV Physics Program

During the last few years, the JLab user community, in collaboration with JLab staff, has developed an impressive set of experiment proposals for the 12 GeV program. These have been reviewed by the Jefferson Lab Program Advisory Committee (PAC), resulting in a total of 59 experiments being approved. All these experiments have been assigned a nominal recommended beamtime allocation and scientific priority. These proposed experiments represent almost 4000 PAC-days of approved beamtime which translates into more than 7 years of running at full simultaneous 3-hall operation during the 12 GeV era of CEBAF. The PAC will hold a special meeting, PAC41, in May 2014, to assess the priorities of approved experiments for the first 5 years of 12 GeV running. PAC42 will be held in July 2014, and will review newly submitted proposals.

Acknowledgment: I would like to thank H. Montgomery, Rolf Ent, Allison Lung and Mike Pennington for their assistance in preparing this report.

10.2 Update from RHIC

(Communicated by Berndt Mueller ⟨bmueller@bnl.gov⟩ and Jamie Dunlop ⟨dunlop@bnl.gov⟩.)

Despite past fall's budgetary chaos, RHIC Run 14 started as planned on February 3, 2014 with the cool-down of the rings to near absolute zero. Collisions of Au ions for the STAR and PHENIX experiments began two weeks later on February 17. With funding from the Office of Science in place, Run 14 will last for 22 weeks as originally planned. It will be the first run where the full complement of machine and detector enhancements that comprises the RHIC-II facility upgrade is in place.

The upcoming run is largely focused on Au+Au collisions at 200 GeV, using the complement of RHIC II detector and accelerator upgrades fully installed together for the first time this year. STAR and PHENIX have fully installed micro-vertexing systems, which allow for precision measurements of the interactions of heavy quarks with the deconfined matter produced at RHIC. First measurements were made last decade of the quenching and flow of heavy quarks at RHIC, which indicated an unexpectedly large level of interaction and stimulated a re-examination of the theory behind jet quenching in general. However, these first measurements suffer either from low statistical power or the inability of the measurements to fully resolve charm from beauty. Resolving these issues led to a nearly decade-long campaign of upgrades. With the combined power of the accelerator and detector upgrades, precise and separate measurements of charm and beauty will be made, allowing for precision measurements of the heavy flavor diffusion constants, and so providing better insight into the nearly perfect fluidity of the matter produced at RHIC.

At the heart of the RHIC-II configuration is the stochastic cooling of the heavy ion beams in the collider. Run 14 will be the first Au+Au run in which cooling is available in all three dimensions, vertically, horizontally, and longitudinally. While this system was in place for U+U and Cu+Au collisions in 2012, for this run the longitudinal system has been upgraded for better performance and reliability. The upshot of these improvements is that the collider expects to deliver an integrated luminosity of $15\,\mathrm{nb}^{-1}$ of Au+Au collisions, thereby doubling the amount of integrated luminosity delivered in the entire 14-year history of RHIC in single year's run.

Additional systems to improve the performance of the collider will be tested and commissioned in this run. Run 14 will benefit from the first superconducting RF cavity installed at RHIC. This cavity is designed to further focus the beams longitudinally, shrinking the length of the collision diamond and delivering a higher fraction of the luminosity into the center of the detectors where maximum advantage can be taken by their micro-vertexing systems. While Run 14 will likely be a commissioning run for this cavity, some improvement may be seen by the end of the run, and the commissioning will be invaluable for performance in future runs. This run will also be an opportunity to test and commission the recently completed electron lens system, which is designed to increase luminosity in proton-proton collisions. This testing will be extremely valuable for next year's run, which is intended to focus on polarized proton-proton and proton-nucleus collisions, both as a reference for measurements in heavy ion collisions and for additional insight into the polarization of partons in the proton.

Run 14 will be the first Au+Au run in which the PHENIX detector will have its full mico-vertexing system, composed of the barrel VTX system at 90 degrees and the forward FVTX system in front of its forward muon arms. This system, partially installed in 2011 and fully in place in 2012, has been refurbished prior to Run 14. It is ready to take an order of magnitude more data in Run 14 than in previous runs, and so make precision measurements of the interaction of charm and beauty with the matter produced at RHIC.

The STAR detector has two new components installed, which focus on different sides of the heavy flavor coin. The first, the Heavy Flavor Tracker (HFT), is the culmination of more than a decade of R&D on the use of Monolithic Active Pixel Sensor technology in the collider environment. This technology allows for a detector to be both precise and thin, less than 0.4% of a radiation length per layer and with fundamental resolution of 12μm. This combination of precision space points and low material allows for precision reconstruction of the decay point of D-mesons of moderate momentum, where multiple scattering in conventional hybrid silicon detectors greatly limits the resolution. This reconstruction will allow for detailed measurement of the flow patterns of charmed mesons and put strong constraints on the diffusion constant of charm quarks in the nearly perfect liquid QGP at RHIC. The successful use of this technology in a collider environment is a major step forward: plans are already underway for adapting this new technology for an upgrade to the ALICE detector at the CERN LHC.

The second new detector for STAR is the Muon Telescope Detector (MTD), which developed from the successful US-China collaboration on the STAR Time of Flight (TOF) detector. This detector uses the timing resolution of Multi-gap Resistive Plate Chambers, like those used in the TOF, in combination with the STAR magnet steel to identify muons of moderate momentum. The detector is targeted at muons from Upsilon decays, in order to measure the suppression pattern of the three Upsilon states separately. This pattern serves as a "thermometer"; and more broadly in combination with measurements of charmonium and in comparison to similar measurements at the LHC can shed light on the deconfinement of quarks and gluons in the Quark Gluon Plasma. The detector was also designed to measure correlations between electrons and muons, to separate signals of thermal radiation from those of correlated charm and beauty decays.

Beyond measurements at the top RHIC energy, Run 14 will also provide 3 weeks of heavy ion collisions at a center-of-mass energy of 15 GeV per nucleon pair, as part of the RHIC beam energy scan (BES) program. The aim of the BES is to map out the QCD phase diagram and, if possible, find evidence for the existence of a critical end-point on the QCD phase diagram. This search requires an accelerator with the ability to deliver collisions over a broad range of energies, a capability that is unique to RHIC. At very high energies or, equivalently, very low net baryon densities, it is known that the transition to a new state of deconfined matter, the strongly coupled quark-gluon plasma, is a smooth crossover transition and not a more familiar first- or even second-order phase transition. On solid grounds, many theorists believe that at higher net baryon densities the transition becomes a first order phase transition. The point on the phase diagram where this happens is called the critical end-point because, exactly at this point, the phase transition is second order and thus characterized by an infinite correlation length. Finding the critical point, or ruling out its existence, is a crucial step toward understanding the QCD phase diagram. A second higher luminosity phase of the BES is planned for the latter half of this decade, using additional cooling to increase luminosity at the energies of interest by an order of magnitude.

Run 14 will be the long-anticipated culmination of a set of upgrades that have moved RHIC into an era of unprecedented precision and flexibility. The accelerator will provide nearly 20 times the original design luminosity, and the detectors continue to drive forefront technology to take full advantage. The capabilities built up over the past decade will be used to push the boundaries of our understanding of the unusual properties of the strongly coupled quark gluon plasma discovered at RHIC.

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11 Forthcoming Hadron Physics Meetings

Meetings of interest to GHP's membership are listed at Mark Manley's page: http://cnr2.kent.edu/ manley/BRAGmeetings.html. In this connection, if there is a meeting you feel should be included, please send the appropriate information to John Arrington (johna@anl.gov) or Mark Manley (manley@kent.edu).

The following list is based on Mark's page:

- 23nd Meeting of the Crystal Ball Collaboration (Mainz, Germany) Mar. 13-14, 2014
- APS April Meeting 2014 (Savannah, GA) Apr. 5-8, 2014
- APFB 2014: 6th Asia-Pacific Conference on Few-Body Problems in Physics (Hahndorf, Australia) Apr. 7-11, 2014
- 50 Years of Quarks and Color (College Park, MD) Apr. 11-12, 2014
- DIS 2014: XXII International Workshop on Deep-Inelastic Scattering and Related Subjects (Warsaw, Poland) Apr. 28-May 2, 2014
- Many Manifestations of Nonperturbative QCD under the Southern Cross (Ubatuba, Brazil) 5-10 May 2014
- AWLC14: Americas Workshop on Linear Colliders 2014 (Batavia, IL) May 12-16, 2014
- Quark Matter 2014, May 19-24, 2014, Darmstadt, Germany
- Light Cone 2014: Theory and Experiment for Hadrons on the Light-Front (Raleigh, NC) May 26-30, 2014
- MESON2014: 13th International Workshop on Meson Production, Properties and Interaction (Kraków, Poland) May 29-Jun. 3, 2014
- 2014 JLab Users' Group Meeting (Newport News, VA) Jun. 2-4, 2014
- xQCD 2014, 19-21 June 2014, Stony Brook, NY
- RHIC & AGS Users' Meeting, June 17-20, 2014, BNL
- EIC International Users Meeting, 23-27 June 2014, Stony Brook, NY
- Lattice 2014, June 23-28, 2014, New York, NY
- ECT* Workshop on Exciting Baryons: Design and Analysis of Complete Experiments for Meson Photoproduction (Trento, Italy) Jun. 30 - Jul. 4, 2014
- CTEQ Summer School on QCD and Electroweak Phenomenology (Beijing, China) July 8-18, 2014
- Hadron-China-2014: 6th Workshop on Hadron Physics in China and Opportunities in US (Lanzhou, China) July 21-24, 2014
- Gordon Research Conference on Photonuclear Reactions: From Quarks to Nuclei (Holderness, NH) Aug. 10-15, 2014

- PANIC 14: 20th Int. Conf. on Particles and Nuclei (Hamburg, Germany) Aug. 24-29, 2014
- XIth Quark Confinement and Hadron Spectrum (Saint Petersburg, Russia) Sep. 8-12, 2014
- DSEMP2014: ECT* Workshop on "Dyson-Schwinger Equations in Modern Mathematics and Physics", (Trento, Italy) 22-26 September 2014
- QCDNP14: Connecting Nuclear Physics and Elementary Particle Interactions – Building Bridges at the Spanish Frontier, 30 Sept. – 4 Oct. 2014
- 4th Joint Mtg. of the APS Div. of Nuclear Physics and the Physical Society of Japan (Waikaloa, HI) Oct. 7-11, 2014
- SPIN 2014: 21st Interntational Symposium on Spin Physics (Beijing, China) Oct. 20-24, 2014
- HiX2014: 4th Int. Wksp. on Nucleon Structure at Large Bjorken x (Frascati, Italy) Nov. 17-21, 2014
- FB21: 21st Int. IUPAP Conf. on Few-Body Problems in Physics (Chicago, IL) May 18-22, 2015

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