GHP Newsletter March 2016

American Physical Society Topical Group on Hadron Physics

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

Executive Officers

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

Contents

---

1 Membership

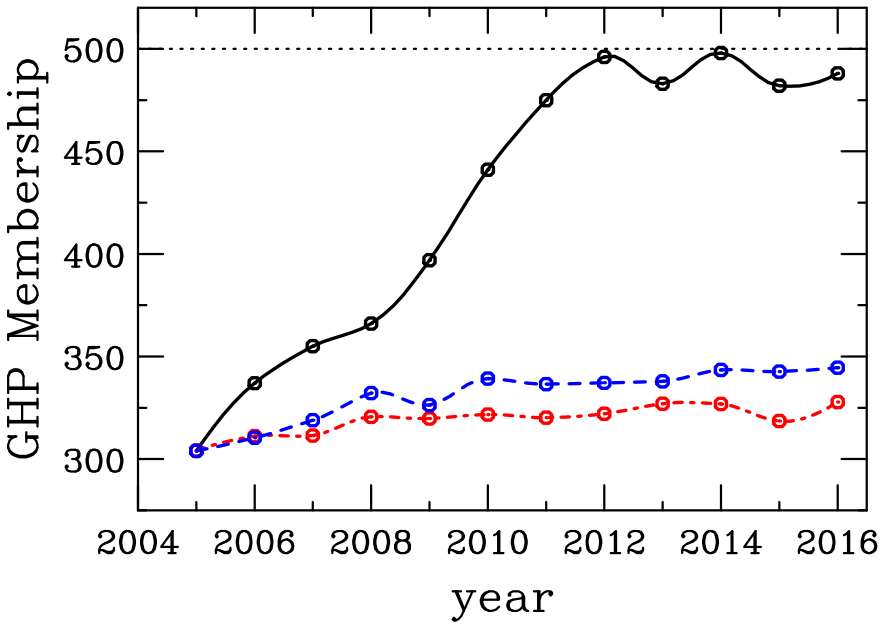

Figure 1: Solid line GHP membership, absolute value, with 2016 representing the APS Official Count at the beginning of 2016; dashed DNP membership normalized to GHPs value in 2005 (2401 $\longrightarrow$ 304); and dot-dashed DPF membership normalized to GHPs 2005 value (3291 $\longrightarrow$ 304).

At the beginning of 2016, the APS Unit Membership Statistics list GHP with 488 members, which represents 0.92% of APS membership. This represents a gain of 6 members since January 2015. If a Topical Group has a membership of 3% or more of the APS members, it can apply to become a Division. The "Gravitation" and "Quantum Information" Topical Groups are at this level now and may soon transition to become Divisions, joining the 14

existing Divisions. Interestingly, three of the existing Divisions, "Polymer Physics", "Physics of Beams", and "Laser Science" are now below the 3% criteria.

While the GHP has been holding rather steady since 2012 with $\sim 489 \pm 8$ members over this time period, the APS as a whole has been gaining members, starting off 2016 with 53,096 members, a 6% increase overall.

There are fourteen Topical Groups listed in the January 2016 Unit Membership Statistics. Of these Groups, GHP is now one of the smallest, ranked 10^{th} in terms of membership. In 2015, all Topical Groups gained in membership except for "Physics of Climate" and "Plasma Astrophysics" which both lost a small number of members.

Some other statistics are of interest as well. The GHP has 128 student members and 25 early career members, 31.4%, compared to 285 regular members. While this is good, in some Groups the number of students is larger than the number of regular members. In terms of gender diversity, the GHP ranks 10^{th} among the Topical Groups in members that stated 'female' as their gender, with 10.9%. (About 5% of members declined to state a gender.) Encouragingly, 20% of the Forum on Graduate Student Affairs (FGSA) are female. Other Units with $\sim 20\%$ female members are the Division of Biological Physics (DBIO) at 20%, Topical Group on Education Research (GPER) at 28%, and the Forum on Outreach and Engaging the Public (FOEP) at 26.5%. Across the geographically-distributed Sections, approximately 14% of all members are female.

So long as GHP membership remains at a level of approximately 500, we will be able to nominate two regular Fellows in 2016, an excellent boost for Hadron Physics, see Sec. 2. Currently, 125 of GHP members are Fellows, 25.6% of our membership, a higher percentage than either the Division of Nuclear Physics (20%) or the Division of Particles and Fields (22.7%). Thus the GHP is doing well in this category.

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 that 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 have been very helpful, *e.g.*, in connection with the last four GHP meetings where we have been able to use the same venue as the April meeting. 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. 3; the organization of meetings such as GHP2017, see Sec. 5; the preparation and publication of manuscripts that support and promote the GHPs 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 youre 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.

---

2 Fellowship

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 instructions for nomination may be found at
http://www.aps.org/programs/honors/fellowships/nominations.cfm
The entire process is now online.

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

- Ensure the nominee is a member of the Society in good standing as well as a member of GHP. The online 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 online 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 uploaded 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:

Monday 1st June 2016

The APS will subsequently forward the nominations to the GHP Fellowship Committee, chaired by GHP Vice-Char Tanja Horn.

	Fellowship Committee Tanja Horn (*Chair*) hornt@jlab.org	
Robert Edwards edwards@jlab.org	Elke Caroline Aschenauer elke@bnl.gov	Ed Kinney Edward.Kinney@colorado.edu

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.

---

3 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 is invited to deliver a plenary presentation at the Biennial GHP Meeting, the next of which will take place in 2017.

The first two winners were

- 2013 . . . Dr. Jin Huang, who received his PhD from the Massachusetts Institute of Technology in 2011, for the first measurement of double spin asymmetries in charged pion production from deep inelastic scattering on a transversely polarized ^{3}He target
- 2015. . . Daniel Pitonyak, who received his PhD from Temple University, Philadelphia, PA, in 2013, for his thesis entitled "Exploring the Structure of Hadrons Through Spin Asymmetries in Hard Scattering Processes"

At this time the GHP Executive would like to urge GHP's members to begin thinking about suitable candidates for the Third GHP Dissertation Award, nominations for which will close on

Monday 6 September, 2016

The nominations should be sent to Raju Venugopalan, who will be GHP Chair at that time. In the interim, Raju will invite four other GHP members to join his five-member Dissertation Award Committee.

The submissions are judged according to the following criteria: quality of the written dissertation (40%), contribution of the student to the research (30%), impact of the work (15%), and broader involvement of the student in the community (15%).

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

It would be ideal if we could increase the endowment so that sufficient funds were available to present this award in every year and thereby honor more of the bright young scientists entering Hadron Physics.

4 GHP Program at the APS April Meeting, 2016

16 – 19 April, Salt Lake City, UT
http://www.aps.org/meetings/april/

GHP participates in the annual APS April Meeting, which is also the primary meeting of the unit in even years. Roughly 100 of our members attend the APS April meeting each year.

GHP is allocated two invited sessions at the April meetings. We often organize joint sessions with other units, in order to raise our profile by increasing the number of sessions sponsored by the GHP. (The maximum currently possible is four.)

The program committee for the 2016 APS April meeting is

2015 GHP Program Committee, preparing for April 2016

Volker Crede	Paul Reimer	Raju Venugopalan	Ramona Vogt
crede@fsu.edu	reimer@anl.gov	raju@bnl.gov	rlvogt@lbl.gov

Raju Venugopalan is Chair.

This committee has prepared three sessions: one is GHP-only; and there are two joint sessions, one with DNP and another with DPF. The invited sessions are:

GHP/DNP: 30 Years of J/ψ Suppression in Heavy Ion Collisions
Session J3, Ballroom B, Sunday 17 April 10:45-12:33, Chair: Ramona Vogt (LLNL and UC Davis)

- Frithjof Karsch (BNL) *Screening of Quarkonia in hot and dense media: historical overview and latest lattice results*
- Enrico Scomparin (INFN, Torino) *Recent results on Quarkonium production from LHC and RHIC*
- Mike Strickland (Kent State) *Phenomenology of Onium suppression in heavy ion collisions*

GHP: Insights in Hadron Structure from Transverse Momentum Dependent Distribution (TMDs)
Session S6, Room 150ABC, Monday 18 April 13:30-15:18, Chair: Paul Reimer (ANL)

- Caroline Riedl (Univerity of Illinois, Urbana-Champaign) *Experimental overview of COMPASS and CLAS results on TMDs*
- Elke Caroline Aschenauer (BNL) *Experimental overview of TMDs in proton-nucleus collisions*
- Zhongbo Kang (LANL) *TMDs: Theory overview*

GHP/DPF: Recent Advances in Hadron Spectroscopy
Session Y2, Ballroom A, Tuesday 19 April 13:30-15:18, Chair: Raju Venugopalan (BNL)

- Paul Eugenio (Florida State) *Light Exotic Mesons*
- Jozef Dudek (Jefferson Lab) *Hadron resonances from QCD*

- Yuanming Gao (Tsinghua University) *Exotic hadron spectroscopy at LHCb*

We also share three contributed sessions with DNP:

GHP/DNP: Light Mesons and Baryons
Session C10, Room 250B, Saturday, 16 April 13:30-15:06, Chair: Leonard Gamberg (Penn State Berks)

GHP/DNP: Heavy Flavor Hadrons
Session J10, Room 250B, Sunday, 17 April 10:45-11:57, Chair: Peter Petreczky (BNL)

GHP/DNP: Hadronic Physics
Session R10, Room 250B, Monday, 18 April 10:45-12:33, Chair: Tanja Horn (Catholic University of America)

Finally, we list other invited sessions also of interest to GHP members:

DNP: New Results on the Spin Structure of the Nucleon
Session E3, Ballroom B, Saturday, 16 April 15:30-17:18, Chair: Xiaochao Zheng (University of Virginia)

- Zein-Eddine Meziani (Temple) *Nucleon transverse spin structure in the valence quark region: Probing color forces*
- Xiaorong Wang (New Mexico State and Riken BNL Research Center) *Transverse Spin at RHIC*
- Andrey Kim (University of Connecticut, Storrs) *Studies of chiral-odd GPDs using pseudoscalar meson production at Jefferson Lab*

DNP/DPB: Electron-Ion Colliders
Session K7, Room 150G, Sunday, 17 April 13:30-15:18, Chair: TBD

- Abhay Deshpande (SUNY at Stony Brook) *Physics at Electron-Ion Colliders*
- Thomas Roser (BNL) *eRHIC, the BNL design for a future Electron-Ion Collider*
- Fulvia Pilat (Jefferson Lab) *JLAB Design for a Future Electron-Ion Collider*

DNP: Baryon Resonances and the Evolution of the Early Universe
Session X9, Room 250A, Tuesday, 19 April 10:45-12:33, Chair: Volker Burkert (Thomas Jefferson National Accelerator Facility)

- Peter Petreczky (BNL) *QCD thermodynamics and missing hadron states*
- Volker Burkert (JLab) *The quest for missing baryon states in electromagnetic interactions*
- Daniel Cebra (UC Davis) *Results from the RHIC energy scan and prospects for the future*

The GHP will hold a Business Meeting on Sunday, 17 April beginning at 19:00 in Room 250B. The tentative agenda is as follows:

19:00 Welcome by Raju Venugopalan, GHP Chair, overview, and awarding of APS Fellow Certificates

19:15 Perspectives from DOE (Ted Barnes) and NSF (TBD)

19:45 Report on EIC Users Meeting and future plans by Abhay Deshpande

20:05 Funding and Membership by Ramona Vogt, GHP Secretary/Treasurer

20:15 Discussion of Amendments to GHP Bylaws, open discussion

---

5 GHP 2017: 7th Workshop of the GHP

The Seventh Workshop of the APS Topical Group on Hadron Physics will held during the three days that immediately precede the April APS meeting. Since the April 2017 meeting will take place in January rather than April, the dates for GHP 2017 are:

January 28-31, 2017
Washington, DC

The topics to be covered include:

- AdS/QFT, novel phenomena
- Continuum QCD and Phenomenology
- 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

The Program Committee will be chaired by Paul Reimer and Tanja Horn and will include the members of the GHP Executive Committee and selected GHP members.

5.1 April 2017

Paul Reimer, GHP Chair-Elect, will serve as Chair of the GHP's 2016 Program Committee. Now that elections are complete, the GHP can begin to form Paul's four-person committee and begin planning for "April 2017".

As noted above, however, the 2017 April Meeting is the "April Meeting" in name only because it is scheduled for

28-31 January 2017 in Washington, DC.

See http://www.aps.org/meetings/meeting.cfm?name=APR17 for more details on the April meeting as they become available.

---

6 Proposed Changes to the GHP Bylaws

The GHP Bylaws have not been updated since the founding of the Group in 2003. At that time, we had one Member-At-Large who served for one year. We had no plans for a regular meeting of our own and we also had no Dissertation Award at that time. In addition, the current Bylaws are based on the old APS governance structure.

Therefore, it is time to update the Bylaws to reflect more accurately the composition of the GHP Executive and the GHP activities. We are in the process of updating the Bylaws at this time.

The GHP Executive Committee has approved a set of revisions and has sent the revised Bylaws to Ken Cole, APS Corporate Secretary, for presentation to the APS Council at the April meeting in Salt Lake City. After the Council approves the changes, the GHP membership can vote on the amended Bylaws. The modified Bylaws will be presented and discussed at the GHP Town Hall Meeting on Sunday evening, 17 April, but the vote will be held as a special GHP referendum rather than at the meeting itself. Prior to the special referendum, a special edition of the GHP newletter will come out with the complete text of the new Bylaws and a detailed discussion of the changes. Per the current Bylaws, two-thirds of members voting have to approve the changes.

The proposed updates include the following:

- Changes to reflect the new APS governance, *e..g.* 'CEO' instead of 'Executive Officer'. These were suggested by APS.
- The addition of Past Chair as a regular member of the Executive Committee.
- The addition of a second Member-at-Large to the Executive Committee, with both members serving two-year terms, as opposed to the previous wording with a single Member-at-Large serving a one-year term.
- The inclusion of the Dissertation Award Committee as an Appointed Committee.
- Changing the 'Meetings' section to include the Biennial GHP meeting as a Regular Meeting of the Group.
- Modifying the terms of office of the members of the Executive Committee to be the Calendar Year. The 'Elections' section had to be changed to reflect this timing also. The Calendar Year term is more in line with the schedule the Group has effectively been following.

The Executive Committee has unanimously agreed on these modifications. They are numerous but will make the Bylaws conform to the way the Executive has governed itself in the last few years.

There will be another, special, newsletter in May to announce the special vote on the Bylaws and to highlight the differences in more detail. Please stay tuned and vote.

---

7 Elections

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*,

Peter Petreczky (petreczk@bnl.gov)

this year; *and shall include four 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 2016 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."

---

8 Unit Convocation and Capitol Hill Visits

The APS Leadership Convocation was held in Washington, DC 29-30 January 2016. Three members of the GHP Executive Committee, Ian Cloët (Member-at-Large), Ramona Vogt (Secretary/Treasurer) and Tanja Horn (Vice-Chair), volunteered their time and participated in the APS Leadership Convocation. The Convocation is a meeting of the unit officers and provides them with an opportunity to learn about the structure and procedures of the APS, as well as to learn from each other. It was timed to coincide with awarding of the new APS Medal for Exceptional Achievement in Research. Capitol Hill visits took place on Thursday 28 January 2016 and were attended by Tanja Horn and Ian Cloët. This year the Convocation was held at the J W Marriott Hotel on Pennsylvania Avenue, NW, in Washington DC.

8.1 Capitol Hill Visits

On the 28th January Tanja Horn and Ian Cloët participated in the Congressional Visit Day (CVD) organized by the APS in conjunction with the APS Leadership Convocation. In total about 40 members of the APS participated, drawn from executive positions within the various Divisions and Topical Groups. As much as practical, participants were divided into state based groups of four, and meetings with Members of Congress were scheduled based upon their relevant influence within government and alignment of Congressional district with the members of each group.

Tanja was grouped with Gianfranco Vidali (Secretary/Treasurer NYSS, Syracuse University), Itai Cohen (Vice Chair FOEP, Cornell University) and Scott Franklin (Secretary/Treasurer GPER, Rochester Institute of Technology); and met with Congressional Aides to Senator

Charles Schumer (D-NY), Senator Kirsten Gillibrand (D-NY), Representative John Katko (R-NY), Representative Tom Reed (R-NY) and Representative Louise Slaughter (D-NY). Ian was grouped with Mark Byrd (Secretary/Treasurer GQI, Southern Illinois University), Jonathan Freund (Secretary/Treasurer DFD, University of Illinois at Urbana-Champaign) and John Wilkerson (Chair DNP, University of North Carolina at Chapel Hill); and met with Congressional Aides to Senator Richard Burr (R-NC), Senator Richard Durban (D-IL), Representative Mike Bost (R-IL), Representative Rodney Davis (R-IL), Representative Daniel Lipinski (D-IL) and Representative David Price (D-NC).

These arrangments, together with pre-CVD webinars and a briefing on the evening of 27th January, were largely organized by Michael Lubell (Director of Public Affairs), Gregory Mack (Government Relations Specialist) and Fred Schlachter (Office of Public Affairs). During the CVD meetings we were encouraged to address the following three topics:

1. The general importance of increased funding for basic research and to highlight America's declining position with regard to overall funding and output (patents, publications, etc) when compared globally.

2. Establishment of an "American Research Investment Fund" with a capitalization of \$100–\$200 billion funded by a 5-10% one-time tax on repatriated corporate profits. This would produce a self-sustaining research fund of \$4–\$8 billion annually. This portion of *the ask* generated a lot of discussion between APS members and the APS Office of Public Affairs during the briefing prior to the CVD, and throughout the Leadership Convocation.

3. The poor performance of U.S. school students in STEM related subjects and to stress the importance of the STEM fields to today's and future job markets. We were also asked to highlight that on the 2012 PISA test U.S. students ranked 27th in math and 20th in science amongst the 34 OECD countries. However, when the PISA test is corrected for poverty, U.S. students ranked near the top. The APS is advocating for a study into these issues by the National Academy of Science.

The Congressional Aides were generally interested in what they had to say, with the meeting tending to last for about 30 minutes. The importance of improving U.S. school student performace in STEM related subjects was universally recognized, and the suggestion of a National Academy of Science study was well received. The critical need for government funding of basic research was accepted and the important role science plays in the U.S. economy, both today and into the future, was understood. The idea of an American Research Investment Fund was new to the Congressional Aides they spoke with, and was generally received as a positive attempt to explore alternative sources for science funding. It was made clear to them, however, that attempts to link other funding ideas (*e.g.* infrastructure) to the possible repatriation of corporate funds have already been made and therefore a very strong case will need to be constructed.

Their take away impressions were that the Congressional Aides they spoke with, and the Members of Congress the aides represent, are aware of America's declining position in the sciences and the need to reverse this trend by maintaining or increasing funding, both through government and the private sector. However, only a few were willing to strongly advocate for this in Congress. One example is Senator Durbin who is pushing for a 5% increase in DOE funding in each of the next five years. It also seemed like there was some degree of preaching to the choir and they felt that more effort needs to be made to communicate with Members of

Congress who are less aware of the importance of science to the U.S. economy, society, national security, and other important issues.

8.2 Leadership Convocation

The Congressional visits were followed by a reception to honor Edward Witten, the first recipient of the APS Medal for Exceptional Achievement in Research on 28 January. The award, established from a donation by entrepreneur Jay Jones, is the largest prize awarded by APS. It is intended to "recognize contributions of the highest level that advance our knowledge and understanding of the physical universe in all its facets" and "to celebrate the human value of open and free inquiry in the pursuit of knowledge".

As in previous years, the Convocation provided an opportunity for unit officers to interact with the APS Executive Board, the APS Coucil, and the Presidential Line. To successfully meet future challenges and opportunities, and to achieve the vision of "one APS", the Society recently completed a reform from a triumvirate model to a corporate structure with Kate Kirby as CEO. This was one of the first leadership convocations held since the corporate reform took place.

The opening address on Friday morning was given by APS president Homer Neal followed by an overview by the Chief Executive Officer Kate Kirby and a discussion of APS Journals by the Interim Editor-in-Chief Dan Kulp. APS is currently searching for an Editor-in-Chief and invites nominations and applications. A Publisher, Matthew Salter, has been hired and will shortly take the helm. He comes to the APS from IOP Publishing in Tokyo, Japan. He has a PhD in Chemistry from Imperial College, London.

The 2016 official APS membership count is 53099 members. The numbers of graduate and undergraduate members make up about one third of this and early career membership continues to grow. APS finances are healthy. At the end of fiscal year 2014, the total assets of the APS increased from $168M to about $174M, while the Society's liabilities increased to $35M from $34.5M the previous year.

Publications continue to be one of the most important sources of revenue for the APS. In response to the memo on open access, APS has been working on policies to advance sustainable, cost-effective public access to articles reporting on funded research. APS journals are amongst the prime international journals and account for one third of the citations in physics. More than 40% of the papers are submitted from Europe. North America accounts for one third of all publications. The latest addition to the APS Physical Review family of journals, Physical Review Fluids, is now open for submission, and, at the time of the Convocation had already several submissions.

Unit members had the opportunity to attend program presentations on International Affairs, Education&Diversity, Public Affairs, and Public Outreach. In each session APS staff presented the various APS initiatives. For example, in the Education&Diversity session, Theodore Hodapp, the APS Director of Education and Diversity, discussed several APS initiatives to address concerns about under-represented minorities on both undergraduate and graduate levels. To increase the number of women in physics and to reduce isolation and provide professional development for female physics majors APS hosts Conferences for Undergraduate Women in Physics throughout the US each year. More information can be found at this location: aps.org/cuwip. Hodapp mentioned that about a third of all college age students in the US identify as minorities, but only bout 10% of undergraduate physics degrees are earned

by individuals from this group. The statistics get worse at the graduate doctoral level where only 5-6% of domestic PhDs are earned by under-represented minorities (URM). The Bridge Program is an APS initiative designed to address this issue. Now in its fourth year, the program is well on track to eliminate the achievement gap between undergraduate and graduate degrees earned by under-represented minorities. In 2015, the program placed 28 students into graduate programs and the applicant pool has been growing each year. Early studies show that 95% of the students placed by the Bridge Program are still on track to receive a PhD. Interested unit members can find more information at this web site: http://www.apsbridgeprogram.org/ or contact Hodapp (hodapp@aps.org) directly. Aside from closing the gap between undergraduate and graduate degrees earned APS has been investing resources to raise the fraction of bachelor's degrees from the 10% awarded to the fraction of students from these groups that comprise the general population. A year ago APS launched the National Mentoring Community program. The goal of the program is to increase the number of URM students through the development of effective mentor-mentee relationships at universities. As another interesting insight Hodapp pointed out that less than one-half of high school classes in physics were taught by a teacher with a degree in physics. The Physics Teacher Education Coalition (PhysTEC) is a project of the APS and the Americal Association of Physics Teachers to increase the number of highly-qualified high school physics trachers in the US. The project now connects more than 300 institutions, holds an annual conferecnce, and funds key programs.

The Outreach Department manages several programs designed to increase the general public's engagement with physics and support similar efforts by APS members. The main projects include the PhysicsCentral web site, the PhysicsQuest comic book kit program for middle school class rooms, and the Outreach Mini-Grant program for APS members.

To reach out to industrial physicists, the APS has named Steven Lambert APS Industrial Physics Fellow. He joined the APS staff to improve the visibility of and service to industrial physics. This includes collaborating on sessions and job fairs at meetings, for example the Industry Day at the March Meeting, engaging with early career programs to highlight industrial options, and bringing the perspective of industrial physicists to the APS Staff and the Society at large. More than half of all physics students end up in inudstrial jobs and the Forum on Industrial and Applied Physics is the largest APS unit, with more than 6,300 members.

The APS has also started a program called Local Links. The aim of this group is to develop mutually beneficial links between academia and industry by connecting industry professionals, early career physicists, and faculty in geographically centered areas. APS partners with volunteers in different geographical regions to launch new groups. So far there are APS Local Links groups in Ann Arbor, Austin, Boston, Denver-Boulder, DC-Baltimore, Silicon Valley, St. Louis and Tampa Bay-Orlando. The plan is for the groups to meet on a regular basis to share ideas, learn about current academic and industrial research, build personal network, and potentially encourage recruitment of students and postdocs into industries. If just a fraction of the industrial physicists who had been APS members as students joined APS now and helped mentor students looking to move into industry after graduation, it could be quite useful. It could also help retain student members who take jobs in industry. For exmaple, Jay Jones, the donor of the new APS medal for Exceptional Achievement in Research, left physics with a bachelor of science and became the founder and former president of Olympic Medical Corporation. He approached APS to ask how he could give back to the Society and the establishment of the medal was the result. While attracting industrial physicists to APS will not likely increase the GHP membership, it would help strengthen and broaden the Society as

a whole.

To successfully meet future challenges and opportunities, and to achieve the vision of "one APS", the Society recently completed a reform from a triumvirate model to a corporate structure with Kate Kirby as CEO. The APS is now working on the implementation of its Strategic Plan, where priorities for 2016 include new positions within the corporate structure, task forces and advisory boards, integration and consolidation, as well as preparations for the next strategic plan. The entire Saturday of the Leadership Convocation was dedicated to this discussion, where input from unit members was solicited. The four main goals are: 1) to better serve members, 2) to better serve the physics community, 3) to better serve society, 4) to increase organizational excellence. Based on member feedback, the main priority out of the four categories was to ensure that APS journals maintain their high standards and that the APS provide a cost-effective way for its members to publish their research.

The impression was that the APS has several important initiatives to serve its members, the physics community, and society. For the future it is important to maintain the APS's leadership status in physics. In the near term it will also be very important to develop a plan that provides APS members with a way to publish their research in a cost effective manner, see next item.

---

9 Open Access: An Existential Issue for APS

At the Convocation's Saturday morning strategic planning session, the attendees were divided up into groups according to table seating and the tables were each assigned one of the goals discused previously to focus on and discuss what the society was doing well, what was lacking and how to fix it. After all the tables had been heard from, the participants were asked to enter what they felt was the most important issue currently facing APS into an online survey that continually updated responses. Certain themes appeared multiple times, even if not with the same wording.

The biggest concern overall, expressed different ways by those in attendance on Saturday morning, had to do with maintaining the integrity of the journals. This issue was brought into focus following CEO Kirby's talk at the opening of the convocation. More than half of her talk was devoted to the state of APS finances and the importance of the journals to the health of the Society.

Out of the $54.9M APS budget, more than half of the expenses are due to the cost of the research publications. However, closer to 75% of the APS revenue came from journal subscriptions. Thus the journals are a great benefit to the APS, both in terms of net revenue and of prestige. Indeed, the programmatic activities of the APS (Education & Diversity, Outreach, Advocacy/Public Affairs and International Affairs) are funded in part by the excess journal revenue. (Other sources of funding are federal grants, member donations and APS reserves.)

The journals are the best known face of the Society around the world. For example, only 37% of the journal revenue comes from North America. Europe contributes 30% of the revenue, Asia 28% with Latin America and the Middle East & Africa contributing the rest (4% and 2% respectively). It is notable that Europe leads in the number of papers published in the Society journals, with 44%. North America is second with 27%, followed by 22% from Asia, 4% from

Latin America and 3% from the Middle East & Africa. Most of the journals do not charge page charges or article processing charges (APCs).

Many of the APS journals are paid for by subscription with a couple of exceptions. Physical Review X, an online-only journal, is fully open access and, as of 1 January 2016, charges an APC of $2500/paper. The Physical Review Physics Education Research also have APCs although waivers and reductions are available. Papers in Physical Review Accelerators and Beams are funded by sponsorships. The other journals, Physical Revew A, B, C, D, E, Fluids, and Physical Review Letters are subscriber supported with an open access option that would allow papers to be made available to the general public at no cost. The APC is $1800 for Physical Review and $2900 for Physical Review Letters as of 1 January 2016. (Physical Review Applied and Reviews of Modern Physics are subscription based only.) Kirby noted that most of the subscriptions are institutional rather than individual.

While APS is a low cost publisher and a good value, the move to open access can force changes in the way APS publishes the journals. In 2009 APS released a statement to the effect that "APS supports the principles of Open Acces to the maximum extent possible that allows the Society to maintain peer-reviewed, high-quality journals". As long as the status quo has been maintained since this time, institutional subscriptions are unaffected and the journals are healthy. However this issue has not remained static. In February 2013, the Office of Science and Technology Policy (OSTP) directed federal agencies that fund scientific research to come up with a plan to make publications arising from their support available to the public at no cost after a 12 month embargo period.

Last year the bipartisan bill, Fair Access to Science and Technology Research Act (FASTR), was introduced in Congress on March 18, 2015. Co-sponsored by Senators John Cornyn (R-TX) and Ron Wyden (D-OR) and Representatives Mike Doyle (D-PA), Kevin Yoder (R-KS), and Zoe Lofgren (D-CA), it mandates open access to articles within 6 to 12 months of publication. For more information, see *e.g.* http://sparcopen.org/our-work/fastr/faq/. The proponents of the bill believe that journal subscriptions will remain unaffected, as was the case after arXiv became available. However, arXiv is outside the peer review process: papers are often submitted to arXiv before the journal submission. In the case of FASTR, the published version is archived which will affect the institutional subscriptions.

If FASTR or legislation like it reduces the embargo period for open access to zero, institutional subscriptions will likely be discontinued and the primary source of APS revenue will be gone and have to be replaced for the APS to continue its programs. In this case, most of the APS journals will have to transition to the "author pays" model, at least for US authors since they are directly affected by the legislation mandate to make federally funded research open access.

However, many of the issues raised about open access have not been determined yet. Just how the APS will go about implementing a complete open access model is a large unknown and will be very dependent on how the scientific publishing industry goes. It is very much an international and publishing-wide issue and no one as yet knows how it will turn out. There is a lot of pressure also across Europe for open access and each country seems to be developing a slightly different model or set of regulations.

The SCOAP^3 (Sponsoring Consortium for Open Access Publishing in Particle Physics) initiative at CERN is an example. SCOAP^3 is a partnership of libraries, funding agencies and research centers in more than 40 countries. Working with leading publishers, SCOAP^3 has converted key journals in the field of High-Energy Physics to open access at no cost for authors. SCOAP^3 centrally pays publishers for the costs involved in providing open access. Publishers in turn reduce subscription fees to all their customers who contribute to SCOAP^3.

Each country participates in a way commensurate to its scientific output in the field. In addition, existing open access journals are also centrally supported with no cost to authors yet satisfies funding-agencies or universities open access mandates, at no cost for authors. CERN conducted a tendering process and, on the basis of the bids submitted by publishers, identified 10 journals by 11 publishers and learned societies for participation in SCOAP^3. This open and competitive procedure took into account the quality of the journals and services provided and the unit price for publishing each article. The list includes Physics Letters B and Nuclear Physics B from Elsevier; Advances in High Energy Physics from Hindawi; Acta Physica Polonica B from Jagellonian University; New Journal of Physics from IOPP; and European Journal of Physics C and Journal of High Energy Physics from Springer. Detailed technical specifications are publicly available at http://scoap3.org/.

The services of SCOAP^3 fall under two categories. Model I applies if at least 60% of research articles published in a journal in 2011 were submitted to the arXiv.org site in a "hep" category. (Cross-listed articles do not count toward this total.) All research articles in such journals are considered SCOAP^3 articles and all other content of the journals are published under open access conditions. Model II applies if fewer "hep" articles are published in the journal. The open access mandate applies only to the "hep" articles published in the journal. These mandated articles will appear alongside regular articles. All articles falling under either Model I or Model II are published with a creative commons licensce.

The APS declined to participate directly in SCOAP^3 because it is not a sustainable financial model. Instead, it has a separate and individual arrangement with CERN regarding publication of LHC articles in APS journals. For now, the APS is offering APCs for open access to all who chose it (the recent LIGO paper published in Physical Review Letters was open access because the authors wanted it to be free and paid the APC) but it is still essentially in the subscription model until the rest of the industry changes.

There are multiple questions arising from this topic that the APS is looking into. One interesting question is the impact on already stretched research budgets. If Open Access is mandated, will the funding agencies increase grants to cover the costs of APCs? If only the US authors ($\sim 30\%$) are under the US FASTR mandate and they have to cover the costs for publication without the aid of major subscriptions, the cost will be around \$2000/article. APS members and athours should stay tuned to find out more. Information is presented in APS News when available, see the recent stories: Getting Up to Speed on FASTR Legislation (Aug./Sept. 2015); Open Access Could Mean Authors Pay to Publish (Oct. 2015); and, for an alternative idea, New Journals Piggyback on arXiv (Feb. 2016).

Dan Kulp, Interim Editor-in-Chief of APS had this to say:

FASTR: From my understanding of the current version of the legislation, this would requiring all research funded in part by a US Federal grant (from an agency with research expenditures in excess of \$100M) to be made publicly available "as soon as practicable, but not later than 6 months after publication in peer-reviewed journals." There are no additional funds available through the grants specifically meant to cover publisher charges for open access, so it has to be done essentially for free. CHORUS (Clearinghouse for the Open Research of the United States) was a collaborative effort, to which APS was a founding member, which cooperates with US funding agencies to conform to the OSTP mandate (which was 12 months after publication). This functionality could, in fact, respond to the FASTR legislation, though there are significant concerns about the 6 month embargo, rather than 12.

This, of course, is only related to US Government funded research and does not effect manuscripts without such funding.

Europe, through the European Commission (EU executive body), has/is moving in the same direction. Some individual countries already have enacted open access mandates on Government subsidized research with a mix of Green[1] and Gold[2] open access. The UK initially requested Gold Open Access, but found that they budgeted too little to pay the appropriate APCs to make all UK content full open access. The EC as a funding source has included some open access legislation in their Horizon 2020 plans. Research must be made available and publisher APCs can be funded through the Horizon 2020 grant, but authors can also deposit accepted versions into a repository (Green Open Access) as well.

For LHC and other papers out of CERN, open access is something the CERN is promoting[3]. APS has an agreement with CERN to insure that all CERN papers published in the Physical Review are open access and APCs are paid by CERN.

So, for US based authors, they retain a certain amount of freedom in where to publish. If their funding is not from a major US Government agency, they generally have full freedom and have the choice of whether or not to pay for open access. Those who are federally funded, must publish in a venue which allows the free and open distribution of their work within the 12-month limit stipulated by the OSTP mandate (and in the future, possibly under the 6-month FASTR requirement).

After his comments, the GHP Secretary/Treasurer, Ramona Vogt, had some further questions. The (slightly edited) Q&A is below:

Vogt: Thanks for your detailed reply. I had a couple of further questions.

What does it mean that 'it has to be done essentially for free'? Is CHORUS able to cover all fees as a nonprofit under the current system?

Kulp: I believe that CHORUS is working with the agencies to fulfill the mandate without additional cost. Currently the costs are shouldered by the member organizations through membership fees.

Vogt: You said there are concerns with the 6 month embargo period. Is it because that shorter period might reduce subscriptions?

Kulp: Yes. Though the research intensive Institutions (Tier 4 and 5) will likely maintain subscriptions because of the need for instantaneous access to published material, non-Ph.D. granting institutions (Tier 1 and 2) may decide that a six month delay is is cheap enough a price to discontinue their subscriptions. Roughly 25% of our publications revenues come from Tier 1 and 2 institutions.

Vogt: In her talk Kate was talking about a scenario where subscriptions fail (are dropped). Are you assuming that all subscriptions are dropped or only US ones? I guess I could imagine that subscriptions outside the US would also go down significantly if most papers are published open access.

Kulp: Depending on how other funding agencies, around the world, react, this could be an international issue. It may not happen with just FASTR, but since such laws are being discussed in many international venues, there could be a world-wide funding decision on the "appropriate" embargo periods.

Vogt: In this scenario, will all authors pay APCs or only US funded ones?

[1] self-archiving in a repository like arXiv
[2] journal open access
[3] This is done through SCOAP[3]

Kulp: Right now the US mandate does not include the payment of APCs. There is simply an unfunded mandate to make the material freely and publicly available after the embargo ends. Therefore, there is no expectation of any APC funds coming in from the agencies.

Vogt: Can CHORUS and other nonprofits cover the cost for a shorter (or zero) embargo period?

Kulp: No. The editorial handling of manuscripts, including peer-review, costs money. The APS journals have expenses in the range of $30M. Without some source of income, APS would have to shutdown its publishing enterprise. If, however, there is money available from the funding agencies, then APS would be able to operate through the collection of APCs. If an APC for open access is paid, the article if free at the moment of publication.

Vogt: At what point do we start talking about a real cost to authors? Kate mentioned an APC of $2000/article to publish for US authors. (I assume US authors only but for a shorter or zero embargo period for US authors only, maybe this is different.)

Kulp: The open access funds are would be between $1800 - $2900 per article depending on whether it is a Physical Review article or a Letter.

Vogt: It seems to me that this OA issue needs to be coordinated internationally somehow for it to work and keep the burden off the authors – if possible. Nothing is for free really, and the APS operation is pretty big. As someone also mentioned at the convocation, the cost would fall only on published papers, not ones that are rejected but these can often take much more time.

Kulp: That is correct. If magically all funding agencies/source redirected subscription money into payment of APCs, we would do fine. However, this does place a greater financial burden on the institutions that produce publishable results and leaves the consuming institutions with no cost. For example, a research intensive institution may have to pay as much as three or four times their current subscription costs in APCs for their published work. In the current subscription model, some of that expense is spread out over a broader market of consumers who do not produce.

Stay tuned for further developments of this important issue.

---

10 Science Funding

The APS maintains a web-page devoted to the observation of Capitol Hill: http://www.aps.org/publications/capitolhillquarterly/index.cfm. This site provides a regular snapshot of the state of interactions between science and government. There is also the "Inside the Beltway": http://www.aps.org/publications/apsnews/201512/beltway.cfm, which provides a perspective from Michael S. Lubell, APS Director of Public Affairs.

---

11 Meeting Summaries

11.1 Electron-Ion Collider User Group Meeting

Communicated by Leonard Gamberg lpg10@psu.edu and Feng Yuan fyuan@lbl.gov

The Electron Ion Collider Users Meeting took place January 6th through 9th, 2016 on the UC Berkeley Campus at Le Conte Hall
(http://portal.nersc.gov/project/star/jthaeder/eicug2016/index.php?id=0)

Major sponsors of the meeting were the UC Berkeley Department of Physics and Brookhaven National Lab.

The Scientific Advisory Committee consisted of Barbara Jacak (LBNL & UC Berkeley), Christine Aidala (Michigan) Elke Aschenauer (BNL), Abhay Deshpande (Stony Brook), Kawtar Hafidi (ANL), Rolf Ent (JLAB), Spencer Klein (LBNL), Bob McKeown (JLab), Richard Milner (MIT), Berndt Mueller (BNL), Zein-Eddine Meziani (Temple), Jianwei Qiu (BNL), Ernst Sichtermann (LBNL), Thomas Ullrich (BNL), Christian Weiss (JLab) and Feng Yuan (LBNL). The local organizing committee members Barbara Jacak (LBNL & UC Berkeley), Ernst Sichtermann (LBNL), Daniel Cebra (UC Davis), Tom Gallant (LBNL), Huan Huang (UCLA), Peter Jacobs (LBNL), Spencer Klein (LBNL), Ming Liu (LANL), Richard Seto (UC Riverside), Ron Soltz (LLNL), Jochen Thder (LBNL) and Feng Yuan (LBNL).

The focus of the meeting was to discuss future plans for the Electron Ion Collider, particularly refining and strengthening the physics case, and discussing the technical plans for the collider and detectors. A particular emphasis was bring together both the hadron physics and heavy ion physics communities for this future QCD machine. Approximately 130 registered participants attended the meeting.

On Wednesday, the meeting began with the plenary session, Introductory Lectures on EIC Science which covered QCD theory and the EIC (Yuri Kovechegov), and experimental talks on detectors and accelerator frontiers and challenges (Elke-Caroline Aschenauer and Uli Wielands). This was followed by a session entitled Physics and the Long Range Plan which covered the view from the DOE (Tim Hallman) and perspective on the next 10 years (Don Geesaman and Jianwei Qiu) and eRHIC and JLEIC Machine Status updates (Thomas Roser and Fulvia Pilat) and EIC users group aims (Charles Hyde). The Lab Management Views from BNL and JLab were given by Bernt Mueller and Bob McKeown on Friday in the session on the EIC Users Group Organization.

A session on the Physics beyond the White Paper took place on Thursday: Rolf Ent, Bowen Xiao, Jakub Wagner, Huey-Wen Lin, Ivan Vitev, Ulrich Heinz. The talks covered, international participation in an EIC, Jets at an EIC, Lattice QCD, TMDs and saturation and topics related to eA and pA physics. A session on Detectors at an EIC included talks by Pawel Nadel-Turonski, Kawtar Hafidi, Alexander Kiselev, Nils Feege, Mike Sullivan, and Misak Sargsyan). On Friday morning a session on the EIC Users Group Organization included talks by Abhay Deshpande and Richard Milner.

On Friday afternoon there were 3 parallel sessions consisting of 29 talks: Detector R&D studies-software needs and development for the EIC (conveners: Klaus Dehmelt and Carlos Munoz-Camacho), Collective behavior of partons in nucleons and nuclei (conveners: Leonard Gamberg and Christine Aidala) and hadron structure, nuclear environment and nuclear binding (conveners: Will Horowitz, Tanja Horn and Kawtar Hafidi).

On Saturday, the Meeting closed with two plenary sessions: Physics beyond the White Paper/LRP: Klaus Dehmelt, Carlos Munoz-Camacho, Yancie Mehtar-Tani, Sonny Mantry, Justin Stevens, Christian Weiss, and Nestor Armesto followed by a session entitled Moving Forward with talks by Yuji Gato on the EIC Physics Discussions in Japan and a closing talk by Zein Eddine Meziani on the Next Steps: EICUG activities toward CD0.

The meeting achieved two major goals. First, it brought users of the future EIC together to

initiate discussions and activities, which will help get the EIC to the next stage. This included discussions with further development of the science case beyond the White Paper and Long Range Plan, and the detectors and R&D. Second, the structures and the general framework proposed for the EIC Users Group was voted on and accepted by by a show-of-hands vote after the morning session on January 8. The EIC Users Group was formally established, visit /http://www.eicug.org/

11.2 Next-generation nuclear physics with JLab12 and EIC

Communicated by Christian Weiss weiss@jlab.org and Misak Sargsian sargsian@fiu.edu

A topical workshop "Next-generation nuclear physics with JLab12 and EIC" was held at Florida International University, Miami, FL, 10–13 February 2016. The event brought together 55 researchers in experimental and theoretical nuclear physics from the U.S. and abroad (Australia, France, Germany, Israel, Italy, Japan, Russia), including 10 graduate students. The scientific organization was provided by W. Brooks (U. Santa Maria, Valparaiso, Chile), R. Dupre (CNRS/IN2P3, Orsay, France), C. Hyde (Old Dominion U.), M. Sargsian (Florida International U.) and Ch. Weiss (Jefferson Lab).

The workshop assessed the scientific opportunities in high-energy electron scattering from nuclei with the Jefferson Lab 12 GeV Upgrade and a future Electron-Ion Collider (EIC). Specific goals were: to develop a common physics perspective on nuclear measurements with JLab 12 GeV and EIC (synergies, complementarity); to bring together researchers pursuing high-energy scattering experiments with light ions (neutron structure, polarization, short-range correlations) and heavy ions (medium modification, nuclear partons, hadronization, jets); and to discuss novel measurements enabled by partial or full detection of the nuclear final states (spectator nucleon tagging, coherent nuclear processes).

High-energy nuclear physics is entering a very exciting time, with two future facilities expanding the reach and precision of experiments with electromagnetic probes (energy, luminosity, polarization, detection of final states). The Jefferson Lab 12 GeV Upgrade has just started operations and will enable a rich program in fixed-target $eA/\gamma A$ scattering at luminosities up to $10^{37}\,\mathrm{cm}^{-2}\,\mathrm{s}^{-1}$, using a range of nuclear targets, including polarized nuclei, and advanced detectors (high-resolution spectrometers, large-acceptance devices). An Electron–Ion Collider with a center-of mass energy $\sqrt{s_{eN}} \sim 20 - 100\,\mathrm{GeV}$ and luminonsity up to $10^{34}\,\mathrm{cm}^{-2}\,\mathrm{s}^{-1}$ has been recommended for future construction in the 2015 NSAC Long-Range Plan and will be the object of intense R&D efforts in the coming years. It would enable the first eA collisions at collider energies and dramatically expand the reach of present nuclear deep-inelastic experiments. Unique capabilities for nuclear experiments include polarized nuclear beams (deuteron, 3He) and the detection of spectator nucleons and coherent nuclear recoil using forward detectors.

Scientific discussion at the workshop was organized around four physics topics:

(A) Short–range nuclear structure: High-momentum components in nuclei, short-range NN correlations, connection with QCD;

(B) Neutron structure and spin: Extraction of free neutron structure functions, spectator nucleon tagging, polarized nuclei;

(C) Nuclear modifications and coherent effects: Nuclear parton densities, EMC effect, antishadowing, shadowing, saturation;

(D) Parton propagation and hadronization: Color transparency, parton propagation in medium, hadronization, jets.

Within each topic the presentations addressed the fundamental physics questions, the scope and impact of JLab 12 GeV experiments, the opportunities with a future EIC, and the requirements for EIC machine and detector parameters. Content is available at the workshop webpage.

In short-range nuclear structure, the workshop reviewed the physics of short-range NN correlations (spin/isospin dependence, role in nuclear structure, connection with QCD) and the unique impact of the JLab 6 and 12 GeV experiments using exclusive $A(e,e'N)X$ and $A(e,e'NN)X$ measurements and inclusive $A(e,e')X$ measurements at $x > 1$. New opportunities with EIC would be the direct exploration of the quark-gluon structure of the correlations using deep-inelastic scattering with spectator nucleon tagging, including novel studies of non-nucleonic short-range components of the nucleus (e.g. $\Delta\Delta$ configurations in the deuteron).

In neutron structure and spin, the challenges in extracting free neutron structure functions from inclusive nuclear deep-inelastic scattering were reviewed (dilution, nuclear binding, neutron polarization) and the potential of measurements with deuteron targets and detection of the spectator proton were emphasized (spectator tagging). At JLab 12 GeV such tagged measurements are carried out on the unpolarized deuteron in the valence quark region ($x > 0.1$). Much more precise and extensive experiments with spectator tagging will be possible at the EIC using dedicated forward detectors and polarized deuteron beams, enabling precision measurements of free neutron spin structure in the sea quark and gluon region ($x < 0.1$). The workshop discussed the theoretical and experimental requirements for such measurements and the impact of neutron data on our knowledge of the quark/gluon densities.

In nuclear modifications and coherent effects, the workshop reviewed the rich physical landscape of quarks and gluons in nuclei: the EMC effect at $x > 0.2$, antishadowing at $x \sim 0.1$, nuclear shadowing at $x < 0.01$, and gluon saturation at small x; and summarized the open questions regarding the dynamical mechanism at work in the different regions. Experiments with JLab 12 GeV aim to determine the spin/isospin dependence of the EMC effect of valence quarks at $x > 0.1$, and its possible connection to short-range NN correlations, using a variety of inclusive and tagged measurements. The EIC would for the first time allow researchers to determine the nuclear modification of sea quarks and gluons, enabling a new level of understanding of the fundamental quark/gluon structure of nuclei. Through tagged measurements the EIC would also provide direct insight into the dynamical mechanisms causing the nuclear modifications (tagged EMC effect). At small x the EIC would permit definitive studies of shadowing and the approach to the regime of high gluon densities, linking up with recent results from AA/pA collisions at the LHC.

In parton propagation and hadronization, basic physics questions are the interaction of small-size color singlet configurations with nuclei (color transparency); the interactions of an energetic open color charge with the nucleus (energy loss, transverse momentum broadening); and the conversion of color charge to hadrons (hadronization, fragmentation). Experiments at JLab 12 GeV addresses these questions in measurements at rest-frame energies $\nu \sim$ few GeV, where hadronization typically takes place inside the nucleus. The role of EIC in this field would be transformative, enabling measurements at rest-frame energies up to $\nu \sim 10^2$–10^3 GeV and scales $Q^2 \sim$ several $10\,\mathrm{GeV}^2$. This would allow one to select kinematic regions where hadronization happens inside or outside the nucleus and permit detailed studies of the QCD mechanisms governing parton propagation and hadronization. The workshop also discussed

the possibility of using jets in eA at EIC as a new probe of QCD in nuclei, realizing synergies with jets in heavy–ion physics.

Overall, the workshop captured the excitement about the long–term prospects for high-energy nuclear physics with electromagnetic probes and summarized the intellectual challenges in the field. The JLab 12 GeV experiments are starting and will deliver results in the next few years. To realize the potential of a future EIC, a concerted effort by the nuclear physics community will be necessary over the same time and beyond.

The workshop was supported financially by the Jefferson Science Associates Initiative Fund and by Jefferson Lab.

---

12 State of the Laboratories

12.1 RHIC Run 16

(Communicated by Jamie Dunlop – dunlop@bnl.gov.)

The 16th run of RHIC began with collisions for physics measurements on February 7$^{\text{th}}$ this year, and will continue until June. The main focus this year is to finish the 3-year program at RHIC on the physics of heavy flavor in hot QCD matter, along with continued studies of how small can be a droplet Quark-Gluon Plasma while still acting as a liquid.

The run will start with a high-statistics followup to the extremely successful Au+Au run at 200 GeV in Run 14, expected to greatly increase the statistical reach of these measurements, in some cases by an order of magnitude due to a combination of increased detector and collider performance.

PHENIX will continue its measurements using the silicon VTX tracker, greatly improving the precision of the first measurements, submitted for publication in 2015, on the separate production of charm and beauty from their semi-leptonic decays.

The STAR Muon Telescope Detector will finish its originally proposed program at 200 GeV, gathering sufficient integrated luminosity to separate the excited from the ground state of the Υ, to probe the size and binding-energy dependence of Quarkonium suppression in hot QCD matter. After its first run in Run 14, for the baseline $p+p$ and $p+A$ measurements of Run 15 the STAR Heavy Flavor Tracker was refurbished and improved by a replacement of its copper readout wires with lighter aluminum ones, which improve its ability to resolve heavy flavor at low transverse momentum by large factors.

In Run 16, these improvements will be used in Au+Au collisions, which besides increasing the statistical reach of the first measurements from Run 14 of the flow of hadrons containing charm quarks, potentially allow for measurements of charmed baryons, a critical test of whether charmed hadrons are produced via coalescence of quarks in the latter stages of the evolution of the fireball created in these collisions.

The Au+Au run will be followed by a beam energy scan of d+Au collisions. This scan is a direct followup to the recent measurements in p+Pb at the LHC and in the three systems p+Au, d+Au, and ^{3}He+Au at RHIC, which have shown signatures of flow in these systems, signals which were originally not thought to be possible in systems so small. The plan is to run at four center-of-mass energies, from 20 to 200 GeV, to see if it is possible to "turn off the

spigot", and make the flow disappear.

The run is expected to end with dedicated time for a proof-of-principle experiment on Coherent Electron Cooling. This new collider technology, essentially an extremely high bandwidth approach to the successful stochastic cooling technology already implemented at RHIC, forms a key piece of the current thinking behind the possible implementation of the Electron Ion Collider using the RHIC complex. In order to prove its use in a collider environment, a prototype system has been built and installed at one of the unused interaction points at RHIC. This system is planned to be used both this year and next, in a realistic environment, in order to prove the principles of its operation, and to use lessons learned in the experiment as input into the design of the full system envisioned for an Electron Ion Collider.

12.2 The Year 2015 at Jefferson Lab

(Communicated by Bob McKeown – bmck@jlab.org)

The 12 GeV upgrade project is marching towards completion at Jefferson Lab. During 2015, the upgraded accelerator was commissioned for multi-hall operation at the full design energy of 12 GeV (to Hall D) and 11 GeV (to Hall A). Work is ongoing to improve reliability and establish stable running conditions.

12 GeV Upgrade Status

The final detector subsystems for the 12 GeV project have been completed, wrapping up with two of the four Cerenkov counters built for Halls B and C. Effort has shifted to installing the downstream detectors in these two Halls and connecting them to their electronics and DAQ systems. The Forward Carriage in Hall B has been populated, including the calorimeters, time of flight systems and one of two Cerenkov counters, and the downstream part of the detector package for the SHMS in Hall C has been installed, including the shower counters, hodoscopes and one of two Cerenkov counters. The electronics and DAQ/online systems have been put through their paces, with one last batch of custom trigger/readout modules due to arrive for Hall B in early Spring.

The other major remaining effort for these two Halls is completion of the various spectrometer magnets. Two of the five for the SHMS in Hall C have been installed, taken to full operating current and mapped; these are the Horizontal Bender septum magnet and the first Quadrupole, Q1, of the triplet for the SHMS. The final three magnets for the SHMS, including the last two Quadrupoles and the analyzing Dipole, are in final assembly at the vendor, with the completed coils being fixed into their cryostats and connected to the required cryogenic controls. This effort will then be followed by cool down and power testing, expected to conclude in Fall 2016. On the Hall B side, the large Torus magnet is in place in the Hall and having its cryogenic control circuits connected, with pump down, cool down and then power tests planned to continue until early Summer. The final magnet, the Solenoid, which will surround the target region in Hall B, is presently having its very last coil wound at the vendor, after which all of its five coils will be connected and placed in a cryostat, with delivery to JLab expected in the Fall.

Hall A

Two experiments are currently running in Hall A at Jefferson Lab. One, Experiment E12-06-114, will measure the absolute helicity-dependent and helicity-independent cross sections for the Deeply Virtual Compton Scattering (DVCS) process as functions of four momentum transfer Q^2 for several values of the deep inelastic scaling variable Bjorken x, with

$\sim 4\%$ systematic uncertainty and similar statistical uncertainty. The current run will cover the first Phase of this experiment. This data will provide stringent scaling tests of the real and imaginary parts of the DVCS amplitude over a much larger kinematic domain than has previously been achieved. The DVCS amplitude provides access to the Generalized Parton Distribution (GPD) functions, which in turn allow the exciting possibility of determining the spatial distribution of quarks and gluons in the nucleon as a function of their wavelength. In parallel, another experiment is running to precisely map the protons magnetic form factor up to the highest values of Q^2 achievable at JLab.

Hall D

The commissioning of the Hall D equipment started in the Fall of 2014. Since then, all the major systems have become operational. The runs of 2014 (at 10 GeV endpoint) and of 2015 (at 5.5 GeV endpoint) allowed the detector systems to be checked out and a preliminary calibration made. The software for the offline data analysis was also ready, and various physics signals and reactions were quickly extracted from the data. The first 12 GeV run started in February 2016 with the goals of finishing the detector calibration, getting fully prepared for the first physics run of the GlueX experiment scheduled for Fall 2016, and collecting enough high quality data to produce publishable physics results. So far, at the midpoint of the run, the program is well on track. The detector's parameters have reached the design specifications, including the DAQ system which now is collecting data at 20-30 kHz with a few percent dead time. The last items to be tested - the diamond radiators - have been partly commissioned and are already in use. Such radiators provide linear polarization of the produced photon beam. Since there are few world data on polarized photoproduction at the energy range of about 9 GeV, the data collected in Spring 2016 would provide the GlueX collaboration with the opportunity to produce early physics results.

Schedule

During the next two years, the Lab will transition the 12 GeV CEBAF and remaining experimental equipment from construction to commissioning to physics production running. Subject to the availability of sufficient operating funds, t he Lab anticipates the schedule shown in Fig. 2 for the next three years.

Other Projects

The Super BigBite Spectrometer construction is proceeding well, with anticipated completion on schedule in FY17.

The Heavy Photon Search (HPS) experiment in Hall B has completed installation and is receiving 2.2 GeV beam on weekends for its engineering run.

Prad, the proton radius experiment, will be installed this Spring for a possible run during Summer 2016.

The SoLID (Solenoidal Large Intensity Device) collaboration had a Directors Review Feb. 23-24, 2015. The collaboration continues to work to improve the science case and is addressing the recommendations of the review panel.

DIRC bars from the Babar experiment at SLAC will become available for GlueX. This will enable GlueX to enhance its particle identification capability.

Construction of the first sector of the RICH detector for CLAS12 is almost complete and construction of a second sector is about to start as a result of additional funding from INFN.

Phase 1 construction of the DarkLight experiment was funded by an NSF MRI and

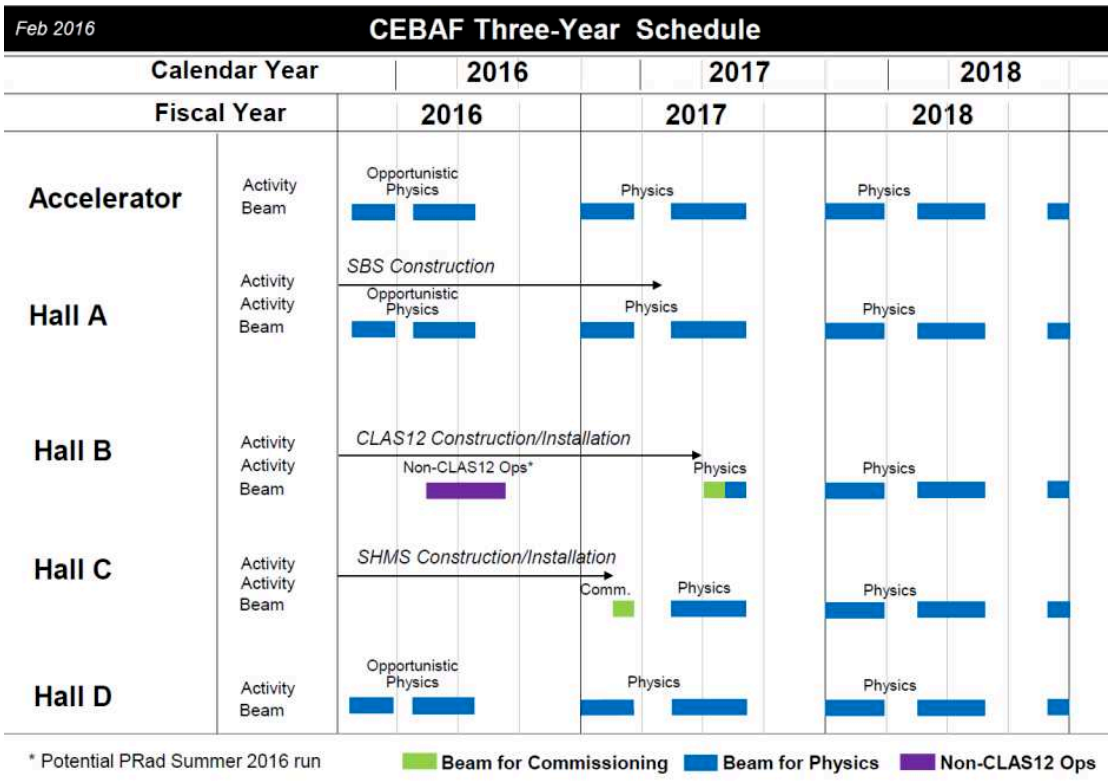

Figure 2: The current three year schedule for CEBAF.

installation at the Low Energy Recirculator Facility (formerly FEL) is expected in FY16.

The magnet and infrastructure for a Neutral-Particle Spectrometer that augments the capabilities for precision coincidence experiments in Hall C to neutral particles (gammas and neutral-pions) was approved by an NSF MRI and is presently under construction.

The science case for the MOLLER experiment was reviewed by an expert panel in 2014, with a very favorable endorsement. The collaboration continues to develop the technical design of the experiment with pre-project R&D activities.

Program Advisory Committee

PAC44 will be held the week of July 25, 2016, and will review newly-submitted proposals, letters of intent, and previously conditionally-approved proposals. Proposals are due 8:00 a.m. EDT (Eastern Daylight Time) on Monday, June 6, 2015.

Acknowledgment: I would like to thank Thia Keppel, Eugene Chudakov, Glenn Young, Rolf Ent and Patrizia Rossi for their assistance in preparing this report.

---

13 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:

- DIS 2016: 24$^{\text{th}}$ International Workshop on Deep-Inelastic Scattering and Related Subjects (Hamburg, Germany, 11-15 April 2016)
- Parton transverse momentum distributions at large-x: a window into parton dynamics in nucleon structure within QCD (ECT$*$ Trento, 11-15 April 2016)
- 11$^{\text{th}}$ International Workshop on High-p_T Physics in the RHIC-LHC Era (Upton, NY, 12-15 April 2016)
- Probing transverse nucleon structure at high momentum transfer (ECT$*$ Trento, 18-22 April 2016)
- APS April Meeting (Salt Lake City, UT 16-19 April 2016)
- Workshop on Precision Radiative Corrections for Next Generation Experiments (Newport News, VA, 16-19 May 2016)
- Baryons 2016: 14$^{\text{th}}$ International Conference on the Structure of Baryons (Tallahassee, FL, 16-20 May 2016)
- QCD Evolution 2016 (NIKHEF, Amsterdam, The Netherlands, 30 May - 3 June 2016)
- Meson 2016: 14$^{\text{th}}$ International Conference on Meson Production, Properties, and Interactions (Krakow, Poland, 2-7 June 2016)
- QWG 11: 11$^{\text{th}}$ International Workshop on Heavy Quarkonium (PNNL, Richland, WA, 6-10 June 2016)
- BEACH 2016: 12$^{\text{th}}$ International Conference on Beauty, Charm, and Hyperons in Hadronic Interactions (Fairfax, VA, 12-18 June 2016)
- The proton radius puzzle (ECT$*$, Trento, 20-24 June 2016)
- MENU 2016: 14$^{\text{th}}$ International Conference on Meson-Nucleon Physics and the Structure of the Nucleon (Kyoto, Japan, 25-30 July 2016)
- ICHEP 2016: 38$^{\text{th}}$ International Conference on High-Energy Physics (Chicago, IL, 3-10 August 2016)
- Gordon Research Conference: Photonuclear Reactions (Holderness, NH, 7-12 August 2016)
- Confinement XII: 12$^{\text{th}}$ International Conference on Quark Confinement and the Hadron Spectrum (Thessaloniki, Greece 29 August - 3 September 2016)
- CHARM 2016: 8$^{\text{th}}$ International Workshop on Charm Physics (Bologna, Italy, 5-9 September 2016)
- INPC2016: International Conference on Nuclear Physics (Adelaide, Australia, 11-16 September 2016)
- Erice International School of Nuclear Physics: Nuclear Matter Under Extreme Conditions - Relativistic Heavy-Ion Collisions (Erice, Sicily, 16-24 September 2016)

- INT-16-3: Exploring the QCD Phase Diagram through Energy Scans (INT, Seattle, 19 September - 14 October 2016)
- Hard Probes 2016: 8^{th} International Conference on Hard and Electromagnetic Probes of High Energy Nuclear Collisions (Wuhan, China, 22-27 September 2016)
- SPIN 2016: 22nd International Symposium on Spin Physics (Urbana-Champaign, IL, 25-30 September 2016)
- APS DNP Meeting (Vancouver, BC, 12-15 October 2016)
- NPQCD2016: 3rd Wksp. on Nonperturbative QCD and Hadro-Particle Physics (Sevilla, Spain, 17-21 October 2016)
- POETIC2016 Held jointly with CTEQ Workshop (Temple University, Philadelphia, PA, 14-18 November 2016)
- INT-16-62W: Spectrum and Structure of Excited Nucleons from Exclusive Electroproduction (INT, Seattle, WA, 14-18 November 2016)
- Quark Matter 2017: 26^{th} International Conference on Ultrarelativistic Heavy-Ion Collisions (Chicago, IL, 6-11 February 2017)
- INT-17-1b: Precision Spectroscopy of QGP Properties with Jets and Heavy Quarks (INT, Seattle, WA, 1 May - 6 June 2017)
- INT-17-3: Spatial and Momentum Tomography of Hadrons and Nuclei (INT, Seattle, WA, 28 August - 29 September 2017)

GHP members might also be interested in other conferences and workshops listed at the following sites:

- ECT* ... www.ectstar.eu
- INT ... www.int.washington.edu/PROGRAMS/programs_all.html
- JLab ... www.jlab.org/conferences

This GHP Newsletter was edited by Ramona Vogt for the Executive Committee.