GHP Newsletter December 2015

American Physical Society Topical Group on Hadron Physics

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

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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/.

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1 Elections

Elections for three posts in the GHP Executive (Vice-Chair, Secretary/Treasurer, Member-at-Large) closed on 30th November 2015. 38% of GHP members voted and the new Executive Committee is listed at the top of this newsletter: we are pleased to welcome Tanja Horn (Vice-Chair), Ramona Vogt (Sect./Treas.) and Ian Cloët (member-at-large).

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

In addition, as their terms on the GHP Executive expire, we thank Matthias Burkardt, Craig Roberts and Christine Aidala for their efforts in the GHP Executive on behalf of hadron physics and beyond.

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2 2015 Long Range Plan for Nuclear Science

In mid-October the Nuclear Science Advisory Committee released "Reaching for the Horizon", a Long Range Plan for Nuclear Science, which is available at:

http://science.energy.gov/np/nsac/

It makes interesting reading and is well worth a look.

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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 3 October, 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.

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4 Fellowship

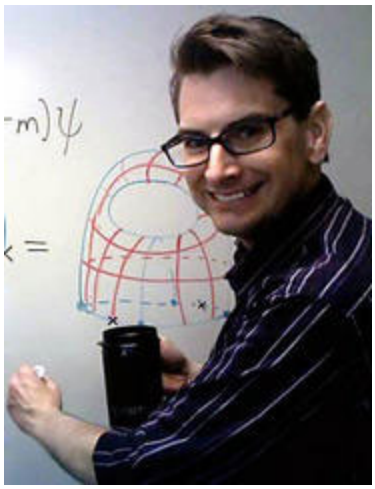
We take this opportunity to congratulate Richard Lebed (Arizona State University) and Xiaochao Zheng (University of Virginia), both of whom in 2015 were elected to Fellowship in the APS under the auspices of the GHP:

Richard "For contributions to the understanding of the properties of hadrons and, in particular, for the application of techniques of large-N QCD to the physics of hadrons;"

and Xiaochao "For advancing the measurement of parity violating asymmetry in electron-nucleon deep inelastic scattering".

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 2016 to nominate colleagues who have made advances in knowledge through original research and publication or made



Richard Lebed (left) and Xiaochao Zheng (right), GHP's 2016 Fellows.

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:

  Monday 1st June 2016

The APS will subsequently forward the nominations to the GHP Fellowship Committee, which will soon be formed by Tanja Horn, GHP's newly elected Vice-Chair.

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5 GHP 2015: 6th Workshop of the GHP

The Sixth Workshop of the APS Topical Group on Hadron Physics was held over the three days that immediately preceded the April APS meeting:

April 8-10, 2015
Hilton Baltimore
4 West Pratt Street
Baltimore, MD 21201

As with GHP13, we made and effort to increase student attendance, *e.g.* through a carefully structured system of registration fees and providing an opportunity for poster presentation, because the GHP meeting is an excellent opportunity to get an overview of the field, with presentations going into more depth than typical APS talks. Partly as a consequence, GHP15 attracted 105 participants, including 16 graduate students, with approximately 60 attending the banquet.

The Programme Committee was chaired by Peter Petreczky and Raju Venugopalan, and included the GHP Executive Committee and selected members of GHP:

Programme committee: Christine Aidala (caidala@bnl.gov); John Arrington (johna@anl.gov); Matthias Burkardt (burkardt@msu.edu); Leonard Gamberg (lpg10@psu.edu); Ken Hicks (hicks@phy.ohiou.edu); Craig Roberts (cdroberts@anl.gov); Peter Petreczky (petreczk@quark.phy.bnl.gov); Susan Schadmand (s.schadmand@fz-juelich.de); Paul Reimer (reimer@anl.gov); Raju Venugopalan (raju@bnl.gov); Ramona Vogt (rlvogt@lbl.gov); and Feng Yuan (fyuan@lbl.gov).

The program, with links to the abstracts, can be found on the workshop web page, http://www.jlab.org/indico/event/GHP2015 – once again established and maintained by Susan Schadmand, to whom we are extremely grateful.

The plenary sessions included talks by recent GHP Fellows: Bob Mawhinney (2013), Bolek Wyslouch (2013), Stepan Stepanyan (2014) and Colin Morningstar (2014), as well as by APS prize recipients: Larry McLerran (Feschbach Prize, 2014) and Daniel Pitonyak (GHP Dissertation Award, 2014). Additional plenary talks were presented by Guy Ron, Elke-Caroline Aschenauer, Alexei Prokudin, Jian-Ping Chen, Jianwei Qiu, Christian Hoelbling, Ralf Gothe, Michael Williams, Ian Cloët, Diane Schott and Renee Fatemi. They covered various topics, including hadron spectroscopy, hadron structure, proton radius, spin physics, recent lattice QCD results, and the physics of the future electron ion collider. GHP15 also featured topical parallel sessions on hadron structure, hadron spectroscopy, heavy quarks, relativistic heavy ion physics and general theory.

Our thanks to everyone who participated in this interesting and highly successful workshop!

The 7th GHP Workshop will very probably take place prior to the 2017 "April" APS meeting. *N.B.* In this instance, the "April" meeting will actually take place 28-31 January 2017, in Washington DC (http://www.aps.org/meetings/meeting.cfm?name=APR17).

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6 Unit Convocation and Capitol Hill Visits

N.B. In 2016, the Leadership Convocation will be three weeks earlier than in past years, *viz.* 28-30 January 2016. It is timed to coincide with awarding of the new APS Medal for Exceptional Achievement in Research. As usual, in association with the Convocation, there will be visits to Capitol Hill scheduled for Thursday 28 January 2016.

6.1 Unit Convocation

The APS Convocation is the gathering of unit officers from both Divisions and Topical Groups. It provides for familiarization with the ways of the APS. This year, the Convocation was held at the American Center for Physics (APS Headquarters) in College Park, Maryland, on Friday and Saturday, February 20th & 21st, 2015. As in recent years, the Convocation provided an opportunity for new and continuing unit officers to meet and interact with the APS Executive Board. This year, three members of the GHPs Executive took part: Matthias Burkardt (Past Chair), Paul Reimer (Vice Chair), and Leonard Gamberg (Member-at-Large).

The Convocation began with a plenary session. Kate Kirby, Executive Officer of the APS, delivered a brief welcome address. She then filled-in for APS President Sam Aronson, who had a travel delay; and gave an overview of the Executive Structure of the APS and introduced attending members of the APS staff. She reviewed the implementation of the recently approved governance changes that affect internal operations and relations between the members, and the leadership of the Society. By a large margin, members of the APS voted to adopt new Articles of Incorporation and a revised Constitution & Bylaws. Of members who voted, 94.1% voted in favor of governance changes, while 5.9% were opposed. A total of 8,101 ballots were cast, which represents a membership participation of 16.74%, similar to past APS general elections, http://www.aps.org/about/reform/. This was followed by a review of APS membership & finances. As of December 2014, the APS currently has 51,523 members, up from 50,578 in December 2013. The total assets as of December 2014 were valued at $138.7M, compared with $133.5M at the end of 2013.

Gene Sprouse, Editor in Chief of APS research journals, gave an overview of publications. Amongst other topics, he spoke about Physical Review Applied, the Society's newest journal, which debuted in 2014. Its mission is to publish high quality papers at the intersection of physics and engineering that are of interest to a large group of physicists. He also spoke about Physical Review X (PRX), emphasizing that PRX would remain a small, selective journal, offering authors a high-visibility open-access option for publishing key individual articles of longer length. He described efforts underway to maintain PRLs high publication standards by enforcing rigorous acceptance criteria, which began in 2011. Nan Phinney, Speaker of the APS Council, continued with a presentation on the "Vision for the new Council of Representatives", which covered matters of science and membership, and approval of policy

statements and science strategy of the Society.

There were further Program Presentations on International Affairs, Education & Diversity, Public Affairs, Public-Outreach. Theodore Hodapp, Director of Education and Diversity, gave an extensive presentation on the Department's programs, which included PhysTEC, and the APS Bridge Program. PhysTEC is a partnership between the APS and the American Association of Physics Teachers (AAPT). The mission of PhysTEC is to improve and promote the education of future physics teachers in secondary schools by engaging university physics departments in preparing physics teachers. Since 2001, PhysTEC has helped universities develop their physics teacher education programs into national models. The project is funded primarily by the National Science Foundation, and has received significant funds from the APS's 21st Century Campaign. Hodapp emphasized that less than one-half of high school classes in physics are taught by teachers with a physics degree. This is to be compared with 73% of biology classes and about 80% of humanities classes. As reported, the United States has a severe, long-term shortage of qualified physics teachers. In 2013, the National Task Force on Teacher Education reported that "the need for qualified physics teachers is greater now than at any previous time in U.S. history." (http://www.phystec.org/webdocs/shortage.cfm) In their 2014 report, the American Association for Employment in Education found that the teacher shortage in physics is number one among 59 education fields. The NSF supported program has had an impact in increasing the number of physics teacher certifications. PhysTEC recently announced the initial inductees into "The 5+ Club", a group of institutions that has graduated five-or-more physics teachers in a given year. The number of physics departments has doubled from 2011 to 2014. For details, see "PhysTEC Recognizes Leaders in Physics Teacher Preparation", available here.

Hodapp reviewed the graduation rates of under-represented groups in both undergraduate and graduate programs in physics. He noted that while the US college-age minority population has grown from 27 to 32% in the period 1995-2010, only 9-10% of BS degrees in physics are granted to under-represented groups. To address this situation, the APS Bridge Program was created in an effort to increase the number of physics PhDs awarded to under-represented minority (URM) students, including African-American, Hispanic-American, and Native-American students. The program is creating sustainable transition programs and a national network of doctoral granting institutions to mentor students to successfully complete PhD programs. The project incorporates support structures that predict academic success of URM students, and establishes links between minority-serving institutions and doctorate-granting institutions through research activities, collaboration, and personal contact. The program aims to assist these students by providing intensive, advanced-undergraduate and entry-level graduate course work, coaching on preparing graduate admissions, and mentoring continuing through graduate school. In the second year of the program, while the project goal was to recruit approximately 10 students for the program, they succeeded in placing approximately 30 students, up from 10 students in 2013. This year's expectations were approximately 15 and placement was near 30. More information is available here.

On Friday evening there was a Reception with the APS Executive Board. Kate Kirby introduced outgoing APS President Malcolm Beasley, who gave a retrospective talk on his time at the helm of APS. He spoke about high points in his career both as physicist and administrator at Stanford, tying it back to issues of heading the Task Force for Development for the APS, and carrying out recommendations of the Strategic Plan (SP) of the APS. The SP was implemented during his tenure as APS President

Saturday morning, Sam Aronson delivered the APS President's Address. His subject was the new governing structure of APS, which focused on implementing the reforms that were

supported in a recent vote on the new Constitution and Bylaws. This involves organizing the operations under a chief executive officer and giving new roles to the former Executive Board, now the Board of Directors, and to the Council of Representatives. There were discussions with participants on the effect the reorganization will have on Unit- and Topical Group-Council communication.

There were breakout sessions for Topical Groups and Divisions. Leonard and Paul met with the Group on Few Body Systems (GFB) and the Group on Shock Compression of Condensed Matter (SHOCK). Discussions centered on strategies for increasing membership of topical groups. Upcoming workshops for the GHP, the joint Topical Group on Precision Measurements and Fundamental Constants (GPMFC), and the GFB were also discussed.

6.2 Capitol Hill

The Congressional Visit Day (CVD) took place on Thursday, 19th February, one day before the APS Convocation. Participants were, Matthias, Burkardt, Paul Reimer, Leonard Gamberg. Prior to the CVD in early February, Tyler Glembo, Government Relations Specialist at the APS, organized a series of webinars to prepare CVD participants for the Congressional visits.

The webinars covered a variety of topics including how to navigate Capitol Hill, how to have an effective meeting with congressional aides, and current issues on science funding in Congress. Relevant materials ranging form science policy issues to spreadsheet listing participants, their state and their representative, were provided. Guest access to The National Journal was provided to CVD participants as a tool enabling to them browse political information about a members biography, voting records, and how liberal/conservative they lean on issues. On Wednesday evening at the Greenbelt Marriott, participants met with APS staff: Michael Lubell, Director of Public Affairs, and Tyler Glembo for an initial briefing. Topics included: Background information, message to convey, leave-behind packets for visits, and advice for effective meetings.

Owing to the small size of the Pennsylvania and Maine delegations, Leonard was paired with Thomas Baumgarte from Maine, Treasurer of the Topical Group on Gravitation (TGG), and Krista Freeman, PhD student at Carnegie Mellon University & member of the APS Forum on Graduate Student Affairs. This group met with the Congressional Aides (CAs) to: Sen. Angus King (I) - ME, Sen. Susan Collins - ME (R), Rep. Chellie Pingree - ME (D), Rep. Ryan Costello - PA (R), Rep. Mike Doyle - PA (D) , Rep. Chaka Fattah - PA (D), Rep. Charles Dent - PA (D). Matthias was with a fairly large group from New Mexico. They also met with members from Oklahoma, owing to a lack of CVD participants. Meetings were held with CAs to Sen. Martin Heinrich - NM (D), Sen. James Lankford - OK (R), Rep. Markwayne Mullin - OK (R), Rep. Steven Pearce - NM (R), Rep. Ben Ray Lujan - NM (D) , Rep. Michelle Lujan Grisham - NM (D). Paul was with the the Illinois group, which had meetings with CAs to Sen. Mark Kirk - IL (R), Sen. Richard Durbin - IL (D), Rep. Bob Dold - IL (R), Rep. Danny Davis - IL (D), Rep. Bill Foster - IL (D), Rep. Rodney Davis - IL (R), Rep. Randy Hultgren - IL (R), Rep. Peter Roskam - IL (R). It was emphasized to the CVD participants that these staff aides are the conduits to the Members, and they provide essential information, which can influence how Congressional Members vote on Science policy.

A central message of the CVD was support for the NSF's anonymous peer review process. This has been challenged by the Chairman of the Science, Space, and Technology Committee, Representative L. Smith (R) - TX, because he considers that it leads to funding for objectionable research. (See No the GOP is not at war with science.) Another of the goals of

the CDV visits was to encourage Members to give a floor speech in support of the National Science Foundation merit review process; to emphasize that the research funded by the NSF is of the highest caliber; and that all NSF proposals undergo the same rigorous peer review process before being funded. A flyer summarizing the role of the PI, the review panel and program officer in the merit review process were provided to the participants. The flyer also emphasized that the anonymity of peer-reviewers allows them to focus solely on the science rather than potential social or political concerns. Studies have shown that the anonymous peer review provides more critical feedback than identifiable peer review. CDV participants also emphasized that this was similar to the merit review process for the Office of Science at the DOE. A second message urged Congress to prioritize real, sustained, and stable budget growth for science agencies. A flyer included the statement, that "Robust and predictable budgets will enable the United States to retain its competitive edge, as recognized by President Obama and Chairman Smith."

On the whole, Matthias, Leonard and Paul found that staffers were sympathetic to the thrust of the message on the NSF, to maintain the anonymity of the peer review process without interference from Congress. Inevitably the discussion turned to the effect sequestration is having on funding of basic research. In Leonards group, with one exception, the aides were supportive of sustainable federal funding for basic science research. In all cases the aides were knowledgeable about the impact these restrictions were imposing on funding. However there was a significant divide on how to operate in this constrained funding environment. For example, the CA to Rep. Costello - PA (R), proposed that we should be seeking funding from private sources and that the model of funding basic research from federal funds will need to change. Needless to say, we had a spirited conversation on why this was not a good model. By contrast, the CA to Rep. Dent - PA (D), was more hopeful on moving beyond sequestration, to a point from where bi-partisan initiatives that support increased funding for basic science can move forward in Congress. In the afternoon, Leonards group was joined by Aline McNaull, Public Policy Associate with the American Institute of Physics, when they met with Brenden Chainey, the aide to Rep. Chaka Fattah - PA (D). Aline and Brenden agreed to setup a meeting to speak with Fattah on giving a floor speech in support of the NSF. Not long after the CVD, on March 17, 2015, a hearing of the House Appropriations Subcommittee on Commerce, Justice, and Science examined the NSF's proposed budget for FY 2016. The proposed budget is $7.7 billion, a 5.2% increase over FY 2015. Both Chairman John Culberson (R-TX) and Ranking Member Chaka Fattah (D-PA) showed strong support for the sciences, to keep the U.S. at the forefront of innovation and discovery, even in extremely difficult budget times. More information is available at http://washingtonupdate.faseb.org/1325/.

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7 APS April Meeting, 2016

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

7.1 GHP Program

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 GHP-only session will focus on transverse momentum dependent parton distribution functions (TMDs). Our GHP-DNP joint session, entitled "30 years of J/Ψ suppression", will celebrate the 30th anniversary of the highly cited paper by Matsui and Satz on this topic. It will include an historical overview and also latest results from experiment and theory. In addition, the GHP-DPF joint session, entitled "Recent advances in hadron spectroscopy", will feature a presentation on the LHCb pentaquark publication, another on recent experimental results from JLab and COMPASS, and a discussion of contemporary results from lattice-QCD. Thus far, confirmed speakers include: Elke Aschenauer; Jozef Dudek; Paul Eugenio; Zhong-bo Kang; Frithjof Karsch; Caroline Reidl; Enrico Scomparin; and Michael Strickland.

7.2 April 2017

Moving to next year, **Paul Reimer**, GHP Chair-Elect, will serve as Chair of the GHP's 2016 Program Committee. Now that elections are complete, Paul can begin to form his 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.
https://www.aps.org/units/psaps/meetings/meeting.cfm?name=APR17

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8 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.

However, both these sources are currently out-of-date in expressing optimism following what seemed to be a budget deal agreed in October. The nation is now running toward the end of a stop-gap funding bill that expires at midnight on 11. Dec. As this is being written, there appears to be the real risk of a government shutdown as Democrats and Republicans struggle to reach an agreement.

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9 Meeting Summaries

9.1 Light-Cone 2015: Theory and Experiment for Hadrons on the Light Front

(Compiled from information communicated by Barbara Pasquini <pasquini@pv.infn.it>, Daniele Binosi <binosi@ectstar.eu>, Chueng Ji <crji@ncsu.edu> and Giovanni Salmé <Salmeg@roma1.infn.it>.)

The 2015 edition of the Light-Cone meeting took place at the INFN National Laboratories in Frascati, Italy, on 21-26 September (http://www.roma1.infn.it/conference/light_cone_2015/).

The local organizing committee was composed of B. Pasquini (Co-Chair, Pavia U. and INFN Pavia) and G. Salmé (Co-Chair, INFN Roma1), M. Battaglieri (INFN Genova), D. Binosi (ECT∗, Trento), M. Boglione (Torino U. and INFN Torino), U. DAlesio (Cagliari U. and INFN Cagliari), M.P. Lombardo (LNF, INFN Frascati), M. Mirazita (LNF, INFN Frascati), S. Scopetta (Perugia U. and INFN Perugia), with D. Pierluigi providing administrative support. This series of meetings is held under the auspices of the International Light Cone Advisory Committee (ILCAC), Inc. (http://www.ilcacinc.org). The Workshop was supported in part by generous contributions from INFN, and the Jefferson Science Association (JSA). In particular, the support from JSA allowed ILCAC to award this year's McCartor Fellowships to four young physicists, enabling them to attend the conference and present the results of their research. This year saw a remarkable the number of applications for the McCartor Fellowships, and 8 awards were made.

LIGHT-CONE 2015 had 79 registered participants, and was also attended by several researchers working at LNF. The program of the workshop consisted in a total of 65 talks and 6 posters. Each participant was invited to vote for the two best posters. The presenters of the two most voted posters (L. Bellantuono and C. Mondal) were given the opportunity to present a written contribution that will be published in the proceedings of the conference. Emphasis on the interface between theory, phenomenology and experiment in hadron physics was a feature of this year's meeting, with several experimental talks from Jefferson Lab (H. Avakian, M. Battaglieri, R. De Vita, S. Malace, S. Pisano, P. Rossi), COMPASS at CERN (F. Bradamante), and HERMES (L. Pappalardo), discussing recent results and future perspectives of hadron physics at their facilities. In addition we had an overview talk about the future perspectives at an EIC (A. Deshpande).

The workshop covered many topics in hadron phenomenology related to the deep inelastic processes under study at several facilities, including nucleon generalized parton distributions (GPDs) (D. Mueller, H. Moutarde) and Compton form factors (B. Bakker), transverse momentum dependent distributions (TMDs) (M. Anselmino, A. Bacchetta, M. Echevarria, L. Mantovani, A. Signori), and double parton distributions (W. Broniowski, J. Gaunt, M. Rinaldi). There was discussion of flavor asymmetries in the nucleon sea (C.-R. Ji), the spin and orbital angular momentum structure of the nucleon (M. Burkardt, C. Lorcé, S. Pisano, J. Zhang), hadron reaction models and spectroscopy (A. Szczepaniak), and results from lattice-QCD studies relating to these different topics (C. Alexandrou, S. Ryan, G. Bali). Recent progress towards bridging the gap between continuum-QCD and *ab initio* predictions of hadron observables was also presented (J. Papavassiliou), along with applications of this work in Faddeev equation studies of nucleon elastic and transition form factors (G. Eichmann, J. Segovia).

A variety of other, more formal theoretical topics in QCD and QED were also discussed, *e.g.*

contemporary themes involving the Bethe-Salpeter and Dyson-Schwinger equations (J. Carbonell, W. De Paula, T. Frederico, V. Karmanov, G. Salmé), light-front models (H. Choi, T. Pena), and issues involving bound states and zero-modes (W. Polyzou). Recent progress in light-front holography and AdS/QCD (Guy de Teramond, S. Cotogno, V. Lyubovitskij, A. Vega), as well as computational developments in many-body dynamics (J. Vary) were also highlighted. The closing presentation was given by S. Brodsky. 0 A half-day excursion was made to Villa Adriana in Tivoli and was followed by the Workshop dinner. During the dinner, Chueng Ji, ILCAC Chair, together with B. Pasquini and G. Salmé, Chairs of LC2015, presented awards to the eight McCartor Fellowship recipients: Arkadiusz Trawinski (Warsaw U.), Xiaonu Xiong (Pavia U.), Kelly Chiu (SLAC), Frederik Van der Veken (CERN), Matteo Rinaldi (Perugia U.), Henry Lamm (Arizona State U.), Sabrina Cotogno (Nikhef and Amsterdam U.), and Andrea Signori (Nikhef and Amsterdam U.).

The Proceedings of the workshop will be refereed and published as a special issue of Few Body Systems. The detailed program and all the presentations can be found at the work-shop website, http://www.roma1.infn.it/conference/light_cone_2015/sc_program.html/.

9.2 Nucleon Resonances: From Photoproduction to High Photon Virtualities

(Communicated by D. S. Carman <carman@jlab.org>, R. W. Gothe <gothe@sc.edu> and V. I. Mokeev <mokeev@jlab.org>.)

The topical workshop "Nucleon Resonances: From Photoproduction to High Photon Virtualities" took place at the European Center for Theoretical Studies in Nuclear Physics and Related Areas, Trento, Italy, in the week 12-16 October 2015. The organizing committee consisted of R.W. Gothe (Chair, USC), V.I. Mokeev (Jefferson Lab), and E. Santopinto (INFN). The Workshop had approximately 40 participants and was supported in part by generous contributions from JSA/Jefferson Lab, the University of South Carolina and INFN. The detailed program and all presentations can be found at the workshop website: http://boson.physics.sc.edu/ gothe/ect*-15/program.html

Studies of the spectrum and structure of excited nucleon (N^*) states offer unique information on many facets of the non-perturbative strong interaction because they provide access to states with many different quantum numbers. The workshop explored this theme, concentrating on the production of (N^*) states via electromagnetic excitation of the nucleon in exclusive meson production. It focused on: (a) the baryon spectrum exposed in exclusive meson photoproduction, (b) the search for new baryon states in the combined studies of exclusive photo- and electroproduction at small and moderate photon virtualities (Q^2), (c) electro-excited N^* states and their structure for Q^2 up to $5\,\mathrm{GeV}^2$, and (d) the extension of these studies in future experiments with CLAS12 at JLab up to $12\,\mathrm{GeV}^2$.

The current status of studies of the spectrum and structure of N^* states from exclusive meson photo- and electroproduction data, as well as the challenges and prospects in this field, were reviewed in a keynote talk by V.D. Burkert (JLab), which helped to shape the Workshop discussions and outcome. The experimental studies of exclusive meson photoproduction off the nucleon at the JLab/CLAS, ELSA, and MAMI facilities continue their rapid progress, with results presented in talks by S. Strauch (USC) and A. D'Angelo (Rome U.). These experiments provide detailed information on all exclusive meson photoproduction channels relevant in the resonance region, including differential cross sections, and single, double, and triple polarization asymmetries: the data on exclusive photoproduction off the nucleon with more

than one meson in the final states keeps growing. The status and prospects of advanced reaction models for the extraction of resonance parameters from these data were presented in talks by L. Tiator (Mainz U.), I. Danilkin (JPAC at JLab), H. Haberzettl (GWU), J. Nys (Ghent U.), A. Sarantsev (Bonn U. and Petersburg Nucl. Phys. Inst.) and H. Kamano (Osaka U.). Analyses of the aforementioned experimental data have considerably extended our knowledge of the N^* spectrum. Several candidate N^* states were included to the 2014 edition of the PDG as an outcome of these efforts. The search for manifestations of these new N^* states in future exclusive electroproduction data at low Q^2 will allow us to firmly establish their existence.

The CLAS detector at JLab has produced the largest part of available worldwide data on all relevant meson electroproduction channels off the nucleon in the resonance region for Q^2 up to $5.0\,\mathrm{GeV}^2$. Recent results from these studies were presented in talks by K. Park (JLab) and D. S. Carman (JLab). Analyses of the data on $N\pi$, $N\eta$ and $\pi^+\pi^- p$ exclusive electroproduction off the proton have provided the world's only available results on the Q^2 evolution of the helicity amplitudes for the transitions between the initial photon-proton and the final N^* states, *i.e.* the $\gamma_{\mathrm{v}}NN^*$ electrocouplings, which allow us to explore N^* internal structure. Efforts on the extraction of the $\gamma_{\mathrm{v}}NN^*$ electrocouplings were reviewed in the talk by V.I. Mokeev (JLab). The $\gamma_{\mathrm{v}}NN^*$ electrocouplings have become available for most excited nucleon states in the mass range up to 1.8 GeV at photon virtualities up to $5.0\,\mathrm{GeV}^2$ (up to $7.5\,\mathrm{GeV}^2$ for $\Delta(1232)3/2^+$ and up to $7.05\,\mathrm{GeV}^2$ for $N(1535)1/2^-$) . Current results on resonance electrocouplings have been collected at: https://userweb.jlab.org/~mokeev/resonance_electrocouplings/.

Physics analyses of these results have revealed the structure of N^* states for $Q^2 < 5.0\,\mathrm{GeV}^2$ as a complex interplay between an inner core of three dressed quarks and the external meson-baryon cloud. For the first time, results on exclusive $\pi^- p$ electroproduction off bound neutrons have become available and were presented by R.W. Gothe (USC). Impressive progress in advanced reaction models, allowing us to account for $\pi^- p$ final state interactions and Fermi-motion of the neutron-target inside the deuteron, decribed by T-S.H. Lee (ANL), opens up the prospects for extracting $\gamma_{\mathrm{v}}NN^*$ electrocouplings off the neutron.

The development of theoretical approaches capable of relating the non-perturbative strong interaction mechanisms behind the formation of N^* states to results on the N^* spectrum and the $\gamma_{\mathrm{v}}NN^*$ electrocouplings, reviewed in the colloquium talk by C.D. Roberts (ANL) and the presentation by V.M. Braun (Regensburg U.), represent a key part in the synergetic efforts between experimentalists and theorists in the study of N^* states. The Dyson-Schwinger Equations of QCD (DSEQCD) successfully reproduced the data on nucleon elastic form factors and the transitions $N \to \Delta(1232)3/2^+$, $N \to N(1440)1/2^+$ on $Q^2 > 2.5\,\mathrm{GeV}^2$, using a single dressed-quark mass function, demonstrating the relevance of dressed quarks in the structure of the ground and excited nucleons and the capability of accessing this fundamental quantity from the data on nucleon elastic and $N \to N^*$ transition form factors. These important results, achieved via close collaborative efforts between experimentalists and theorists and offering access to the essence of the non-perturbative strong interaction, were presented in the talk by J. Segovia (Tech. U. Munich). The current status and the prospects for N^* studies using the DSEQCD framework were presented by G. Eichmann (Giessen U.), S.-X. Qin (ANL), B. El-Benich (Cruzeiro do Sul U. & Sao Paulo, IFT), A. Bashir (Michoacán U.), P. Rodríguez-Quintero (Huelva U.), and D. Binosi (ECT*), demonstrating very impressive progress in this field.

A novel approach, presented by N. Offen (Regensburg U.), provides insight into N^* partonic structure, allowing us to constrain the quark-parton distribution amplitudes of the

$N(1535)1/2^-$ resonance, relating them to the resonance electrocouplings determined via light cone sum rules. The moments of the quark distribution amplitudes can be computed using lattice-QCD and compared with those derived from the $\gamma_v NN^*$ electrocoupling values. A successful description of CLAS results on $N(1535)1/2^-$ electrocouplings demonstrated the promising potential of this approach for interpreting $\gamma_v NN^*$ electrocouplings in QCD.

Plans for evaluation of the $\gamma_v NN^*$ electrocouplings at intermediate photon virtualities using lattice-QCD were presented in talks by D.G. Richards (JLab) and R. Briceno (JLab). They outlined an approach that may account for all relevant components in N^* structure and thus treat N^* states as unstable particles.

Constituent quark models remain an effective phenomenological tool in studies of N^* structure; and recent results from advanced quark models were presented in talks by G. de Teramond (Univ. of Costa Rica), I.T. Obukhovsky (Moscow State U.), G. Ramalho (Univ. of Rio Grande), H. Garcia (INFN), J. Feretti (INFN), Y. Yamaguchi (INFN), M.M. Giannini (U. Genova), and E. Santopinto (INFN). New results on resonance electrocouplings on $Q^2 < 12\,\mathrm{GeV}^2$ from these approaches are urgently needed.

After completion of the JLab 12 GeV Upgrade, CLAS12 will be the only facility worldwide capable of exploring $\gamma_v NN^*$ electrocouplings at small Q^2 ($\in [0.05, 0.3]\,\mathrm{GeV}^2$); and also at the highest Q^2 ever achieved in exclusive reactions up to $12\,\mathrm{GeV}^2$. The search for new types of baryon matter, the so-called hybrid baryons with glue as a structural component, represents a flagship experiment in N^* studies at small/intermediate Q^2 with CLAS12. Plans for the preparation of this experiment were presented by L. Lanza (INFN). The two approved experiments aimed at obtaining the $\gamma_v NN^*$ electrocouplings of most N^* states in the mass-range up to 2.0 GeV with $Q^2 \in [5, 12]\,\mathrm{GeV}^2$ from exclusive $N\pi$, $\pi^+\pi^- p$ and KY electroproduction data will start in May 2017. Further development of reaction models that incorporate quark degrees of freedom is urgently needed in order to enable extraction of the resonance electrocouplings at high Q^2. The prospects for development of such an approach were outlined by P. Kroll (U. Wuppertal and U. Regensburg). Resonance electroexcitation will be explored in these experiments at distance-scales throughout which the quark core dominates, for the first time offering direct access to dressed quarks and their non-perturbative strong interaction. The dressed quark mass function will be probed at those distance scales whereupon the transition between the quark-gluon confinement and pQCD regimes takes place. This will enable us to address some of the most challenging, open problems in the Standard Model; namely, to expose the origin of the bulk of a hadron's mass and the nature of quark-gluon confinement; and explain their emergence from QCD. Synergetic efforts between experimentalists and theorists are critical in order to achieve these challenging goals. The workshop invigorated efforts that are already underway and created new opportunities for growth.

9.3 2nd Sino-Americas Workshop and School on the Bound-State Problem in Continuum QCD

(Communicated by Defu Hou <houdf@mail.ccnu.edu.cn>, Yu-Xin Liu <yxliu@pku.edu.cn>, Craig Roberts <cdroberts@anl.gov> and Hong-Shi Zong <zonghs@nju.edu.cn>.)

The second meeting in this series (DSE2015) took place in the week 16-20 November 2015, on the campus of Central China Normal University (CCNU), in Wuhan, the capital of Hebei Province. It was coordinated by a local organising committee whose members were drawn from eight research centres across China: Xiang-Song Chen (Huazhong University of Science

and Technology, Wuhan); Mei Huang (Institute of High Energy Physics of the Chinese Academy of Sciences, Beijing – IHEP); De-fu Hou (CCNU); Ya-Dong Yang (CCNU); Yu-xin Liu (Peking University, Beijing); Qun Wang (University of Science and Technology – China, Hefei); Qiang Zhao (IHEP); Hong-Shi Zong (Nanjing University, Nanjing); Bing-Song Zou (Institute of Theoretical Physics of the Chinese Academy of Sciences, Beijing); and Pengfei Zhuang (Tsinghua University, Beijing).

This 2nd Workshop and School drew approximately 100 participants, about half of whom were students, and involved them in an exciting programme of lectures delivered during five very full days. Thirty Senior researchers from across China, North and South America, and Europe each delivered one-hour presentations, with 15 minutes set aside for questions from the audience. These lectures occupied the first two-thirds of each day. The remaining time was reserved for thirty-minute (25+5) presentations by early-career researchers based in China: fifteen such lectures were delivered during the course of the Workshop and School. This format, following that of the first event at USTC in Hefei, cultivated an atmosphere of interaction and learning, which brought the participants together and paved the way for numerous new collaborative projects. The lectures covered a wide range of topics, including: AdS/CFT and novel approaches to QCD; bridging the gap between theoretical predictions and experimental data; Dyson-Schwinger equations, the functional renormalisation group, and hadron physics; models of hadron structure; and QCD sum rules. Transparencies from the lectures will soon be made available on the Workshop website: (DSE2015).

The Workshop and School was made possible by financial and other support from Peking University (Beijing), Central China Normal University (Wuhan), the Institute of High Energy Physics of the Chinese Academy of Sciences (Beijing), the Institute of Theoretical Physics of the Chinese Academy of Sciences (Beijing), the University of Science and Technology – China (Hefei), and Huazhong University of Science and Technology (Wuhan).

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10 State of the Laboratories

10.1 PANDA remains part of FAIR

(Communicated by Ulrich Wiedner – ulrich.wiedner@ruhr-uni-bochum.de.)

The realization of the international FAIR facility was decided in 2010 when the partner countries signed the international contract in the form of the FAIR convention. The four main pillars are experiments with radioactive beams, pursued by the NUSTAR collaboration, atomic and plasma physics experiments (APPA), heavy-ion experiments at highest baryon densities (CBM) and finally, for hadron physics, the PANDA experiments utilizing antiprotons. The planning and R&D phase for all these efforts started immediately and in the case of PANDA the construction of expensive key elements, like the electromagnetic calorimeter, started in 2012. The assumption was that experiments could start in 2018. Despite the initial rapid progress at the FAIR construction site, it became clear in the course of 2014 that the finishing date could not be kept and that the estimated costs for civil construction of FAIR would increase, partly owing to changed regulations for the construction of such buildings in Germany.

These circumstances triggered the Supervisory Body of GSI to ask for a review of the consequences, which was performed under the leadership of Rolf Heuer, member of the

Supervisory Body and Director General of CERN. The review committee complained mainly about the management of the FAIR project. Concerning PANDA, the committee concluded that despite an interesting physics case, it would loose its cutting-edge status owing to the delays, falling behind other experiments that are either currently running or starting soon. PANDA was therefore ranked as the lowest priority amongst all FAIR experiments.

The PANDA collaboration was stunned. After all, PANDA is the only experiment worldwide that will utilize antiprotons in this energy range – so how could it not be competitive? Even more disturbing, the evaluation reported only referred to three specific points of a PANDA physics program that has at least ten major topics. Two weeks after these conclusions were drawn and without entering into a discussion with the PANDA collaboration, the FAIR council was presented with the report and a request to implement its severe recommendations at their next meeting, in June 2015. The worldwide hadron physics community reacted with great spirit and force. Over 100 leading physicists in the field, many of them GHP members and including participants in experiments competing with PANDA, sent letters of protest to the German Ministry and GSI's leadership. The letters pointed to a complete misjudgement of the science case by a committee that did not contain a single genuine hadron physicist.

In the June meeting the Scientific Councils of FAIR and GSI concluded that "It is clear that the ordering of the experiments was resource load driven" and does not reflect the scientific value of the experiments. Subsequently, the FAIR Council postponed its decision on the scope of FAIR to a special Council Meeting at the end of September. In that meeting, the member countries of FAIR pledged additional resources to build FAIR with ALL major experiments. The PANDA community, as well as the international hadron physics community, was relieved that a future flagship experiment was not cancelled. The PANDA collaboration must now work to re-establish funding that was put on-hold in several countries in order to have the detector ready for the envisaged start of FAIR in 2022, at the latest.

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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:

- EIC User Group Meeting (Berkeley, CA) Jan. 6-9, 2016
- KL2016: Workshop on Physics with Neutral Kaon Beam at JLab (Newport News, VA) Feb. 1-3, 2016
- Workshop on Next-generation Nuclear Physics with JLab12 and EIC (Miami, FL) Feb. 10-13, 2016
- Workshop on Theoretical Aspects of Neutrino Physics (Ladek Zdroj, Poland) Feb. 14-21, 2016
- LEAP 2016: 12th International Conference on Low Energy Antiproton Physics (Kanazawa, Japan) Mar. 6-11, 2016

- DIS 2016: 24th International Workshop on Deep-Inelastic Scattering and Related Subjects (Hamburg, Germany) Apr. 11-15, 2016
- Parton transverse momentum distributions at large-x: a window into parton dynamics in nucleon structure within QCD (ECT$*$ Trento, 11-15 April 2016. Organizers: Alessandro Bacchetta, Jian-Ping Chen, Hayan Gao, Zein-Eddine Meziani, Paul Souder)
- Probing transverse nucleon structure at high momentum transfer (ECT$*$ Trento, 18-22 April 2016. Organizers: Evaristo Cisbani, Ian Cloët, David Hamilton, Seamus Riordan, Bogdan Wojtsekhowski)
- APS April Meeting (Salt Lake City, UT) Apr. 16-19, 2016
- Baryons 2016: 14th International Conference on the Structure of Baryons (Tallahassee, FL) May 16-20, 2016
- BEACH 2016: 12th International Conference on Beauty, Charm, and Hyperons in Hadronic Interactions (Fairfax, VA) Jun. 12-18, 2016
- Gordon Research Conference: Photonuclear Reactions (Holderness, NH) Aug. 7-12, 2016
- INPC2016: International Conference on Nuclear Physics (Adelaide, Australia) Sep. 11-16, 2016
- INT-16-3: Exploring the QCD Phase Diagram through Energy Scans (INT, Seattle) September 19 - October 14, 2016
- APS DNP Meeting (Vancouver, BC) Oct. 12-15, 2016
- Spectrum and Structure of Excited Nucleons from Exclusive Electroproduction (INT-16-62W), November 14 - 18, 2016 (INT, Seattle. Organizers: V.D. Burkert, R.W. Gothe, C.D. Roberts, A.P. Szczepaniak)
- Spatial and Momentum Tomography of Hadrons and Nuclei (INT-17-3), August 28 - September 29, 2017 (INT, Seattle. Organizers: I. Cloët, K. Hafidi, Z.-E. Meziani, B. Pasquini)

GHP's 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
