GHP Newsletter November 2016

American Physical Society Topical Group on Hadronic Physics

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

Executive Officers

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1 Elections

Our bylaws state that: *the Nominating 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.*

The 2016 election, to select a new Vice-Chair and Member-at-Large, is commencing soon. It will close on 10$^{\text{th}}$ December 2016. We have excellent candidates for both offices. The best way for the membership to influence the GHP is to vote in the election for members of the Executive Committee. When informed of the election, please go to the election page to read the candidate's bios and statements. The candidates for Member-at-Large are:

- Zhongbo Kang (Los Alamos)
- Xiaochao Zheng (University of Virginia)

The candidates for Vice Chair are:

- Volker Crede (Florida State University)
- David Richards (Jefferson Lab)

This year's nominating committee is:

	Nominating Committee Peter Petreczky (*Chair*) petreczk@quark.phy.bnl.gov		
Christine Aidala caidala@umich.edu	Rosi Reed rosijreed@lehigh.edu	Eric Swanson swansone@pitt.edu	Larry Weinstein weinstein@odu.edu

In addition, as their terms on the GHP Executive expire, we thank Peter Petreczky and Leonard Gamberg for their heroic efforts in the GHP Executive on behalf of hadron physics and beyond.

2 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. The winner is invited to deliver a plenary presentation at the Biennial GHP Meeting in February 2017.

The winner of the 2016 Dissertation Award is Dr. Phiala Shanahan, currently a postdoctoral researcher at the Center for Theoretical Physics at MIT. Her citation reads: "For her outstanding achievements in elucidating the role of strangeness and charge symmetry breaking in nucleon structure using lattice quantum chromodynamics and effective field theory techniques." She was nominated by her adviser, Anthony W. Thomas.

Figure 1: Phiala Shanahan

She completed her undergraduate degree at the University of Adelaide (Australia) in 2011, graduating with a B.Sc. in high performance computational physics with first class honors and the University Medal. In 2015, she completed her Ph.D. in physics, also at the University of Adelaide, under the guidance of Tony Thomas and Ross Young. She was awarded the Postgraduate University Medal, the South Australian Ph.D. Research Excellence Award, and the Bragg Gold Medal for the best Ph.D. completion in physics in Australia. Throughout her studies, Dr. Shanahan was a member of the American Physical Society and served on the South Australian branch committee of the Australian Institute of Physics. Since 2015, Dr. Shanahan has been a postdoctoral research associate at the Massachusetts Institute of Technology (Cambridge). Her current research is focused on understanding the gluonic structure of hadrons relevant to the proposed Electron-Ion Collider, and on explorations of nuclear structure using first-principles lattice quantum chromodynamics techniques.

We are grateful for the Dissertation Award Committee for their timely and difficult work. The members were:

	Dissertation Award Committee Raju Venugopalan (*Chair*) raju@bnl.gov		
Silas Beane silas@uw.edu	Volker Crede crede@fsu.edu	Anna Stasto ams52@psu.edu	Xiaochao Zheng xiaochao@jlab.org

The GHP Executive would like to urge GHP members to begin thinking about suitable candidates for the Fourth GHP Dissertation Award, nominations for which will close on

Monday 8 October, 2018

The nominations should be sent to Tanja Horn, who will be GHP Chair at that time. At a suitable time, Tanja will invite four other GHP members to join her 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

Peter Bosted (left) and Maarten Golterman (right), GHP's 2016 Fellows.

(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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3 Fellowship

We take this opportunity to congratulate Peter Bosted (Thomas Jefferson National Accelerator Facility) and Maarten Golterman (San Francisco State University), both of whom were elected to Fellowship in the APS under the auspices of the GHP in 2016:

Peter "For invaluable contributions to unraveling the structure of the proton and neutron via elastic, inelastic, and spin-dependent electron scattering from nucleons and nuclei.;"

and Maarten "For important contributions to hadronic physics and lattice gauge theory, including the properties of staggered fermions, chiral effective theories, large-N methods, duality, localization, and hadronic contributions to electromagnetic processes.".

We remind the GHP membership 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 neighborhood of 500 members, we are allocated TWO Regular nominations.

The Executive urges members of GHP to be prepared in 2017 to nominate colleagues who have made advances in knowledge through original research and publication or made significant and innovative contributions in the application of physics to science and technology. They may also have made significant contributions to the teaching of physics or service and participation in the activities of the Society.

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

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

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

Monday 1st June 2017

The APS will subsequently forward the nominations to the GHP Fellowship Committee, which will be formed by the GHP's next Vice-Chair.

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4 APS April Meeting, 2017

28 – 31 January, Washington, DC
http://www.aps.org/meetings/april/

4.1 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 2017 APS April meeting is

	Program Committee Paul Reimer (*Chair*) reimer@anl.gov	
Christine Aidala caidala@umich.edu	Helen Caines helen.caines@yale.edu	Alexei Prokudin prokudin@jlab.org

The Program Committee has prepared an exceptional program for the April 2017 meeting. There will be four co-sponsored invited sessions: two with DNP, one with DPF and one with DCOMP. The invited sessions are:

GHP/DNP: Investigating Parton Dynamics with Drell-Yan-like Processes
Session J16, Washington 3, Sunday 29 January 10:45-12:33, Chair: Paul Reimer (ANL)

- Alessandro Bacchetta (INFN Pavia) *The Sivers Distribution from Drell-Yan Measurements*
- Salvatore Fazio (BNL) *Transverse Single-Spin Asymmetries of Weak Bosons and Drell-Yan Production at STAR*
- Vincent Andrieux (University of Illinois Urbana-Champaign) *Drell-Yan Measurement at COMPASS: A Place to Test the TMD PDFs Universality*

GHP/DPF: Exotic Hadrons from the LHC and B-Factories
Session K10, Roosevelt 2, Sunday 29 January 13:30-14:42, Chair: Ramona Vogt (LLNL and UC Davis)

- Bryan Fulsom (PNNL) *Exotic Hadrons from B-Factories*
- Claudia Patrignani (Universita´ di Bologna and INFN Bologna) *Exotic Hadrons at the LHC*

GHP/DCOMP: Pushing the Boundaries of Lattice QCD
Session S8, Delaware A, Monday 30 January 13:30-15:18, Chair: Peter Petreczky (BNL)

- Martha Constantinou (Temple University) *Advances in Hadronic Structure from Lattice QCD*
- Balint Joo (Jefferson Lab) *Lattice Calculations of the Hadron Spectrum*
- Patrick Steinbrecher (BNL) *Lattice Calculations at Finite Temperature*

DNP/GHP: Hadron Spectroscopy
Session Y16, Washington 3, Tuesday 31 January 13:30-15:18, Chair: Curtis Meyer (Carnegie Mellon University)

- Volker Crede (Florida State University) *Recent Progress in Understanding the Baryon Resonance Spectrum*
- Justin Stevens (College of William and Mary) *Light Quark Meson Spectroscopy: First Results from GlueX*
- Tomasz Skwarnicki (Syracuse University) *Exotic Heavy-Quark Spectroscopy*

This year there are several mini-symposia of interest to our members, two of which GHP co-sponsors. The mini-symposia are sessions with a fixed theme that are led off by an invited speaker. The sessions are:

DNP/GHP: Spin Structure of the Nucleon
Session E13, Roosevelt 5, Saturday 28 January 15:30-17:18, Chair: Xiaochao Zheng (University of Virginia)
Invited Speaker: Vladimir Pascalutsa (University of Mainz) *Chiral effective-field theory of the nucleon spin structure*

DNP/GHP: Physics Beyond Collinear Factorization
Session K13, Roosevelt 5, Sunday 29 January 13:30-14:54, Chair: Renee Fatemi (University of Kentucky)
Invited Speaker: Duff Neill (LANL) *Beyond Collinear Factorization*

DNP: Compton Scattering and the Polarizabilities
Session U12, Roosevelt 4, Monday 30 January 15:30-1:, Chair: Evangeline Downie (George Washington University)
Invited Speaker: Philippe Marte (Universität Mainz) *Polarized Compton Scattering Experiments at the Mainz Microtron*

We also share five contributed sessions with DNP:

DNP/GHP: Hadron Tomography
Session B12, Roosevelt 4, Saturday 28 January 10:45-12:33, Chair: Ian Cloët (ANL)

DNP/GHP: Hadron Structure and Form Factors
Session C12, Roosevelt 4, Saturday 28 January 13:30-15:18, Chair: Rolf Ent (Jefferson Lab)

DNP/GHP: Instrumentation for Hadron Structure Studies
Session E12, Roosevelt 4, Saturday 28 January 15:30-17:18, Chair: Tanja Horn (Catholic University of America)

DNP/GHP: Heavy Flavor Hadrons
Session M12, Roosevelt 4, Sunday 29 January 15:30-17:18, Chair: Greg Kalcy (Catholic University of America)

DNP/GHP: Light Mesons and Baryons
Session S12, Roosevelt 4, Monday 30 January 13:30-15:18, Chair: William Briscoe (George Washington University)

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

DCOMP/DPF: Lattice QCD and the Physics Beyond the Standard Model
Session H10, Roosevelt 2, Sunday, 29 January 8:30-10:18, Chair: Stephen Gottlieb (Indiana University)

- Marina Artuso (Syracuse University) *Lattice QCD and Physics Beyond the Standard Model: An Experimentalist's Perspective*
- Thomas Blum (University of Connecticut) *Hadronic Contribution to Muon $g-2$ from Lattice QCD*
- Carleton DeTar (University of Utah) *Lattice QCD Calculations of Weak Matrix Elements*

DPB/DPF: Future High Energy Hadron Colliders and Physics
Session R16, Washington 3, Monday, 30 January 10:45-12:33, Chair: Joseph Incandela (University of California, Santa Barbara)

- Giorgio Apollinari (FNAL) *HL-LHC and HE-LHC Upgrade Plans and Opportunities for US Participation*
- Frank Zimmerman (CERN) *Progress Towards Next-Generation Hadron Colliders: FCC-hh, HE-LHC and SPPC*
- Stephen Gourlay (LBNL) *Superconducting Magnet Technology for Future High Energy Proton Colliders*

4.2 April 2018

Moving to 2018, **Tanja Horn**, who will be GHP Chair-Elect, will serve as Chair of the GHP's 2018 Program Committee. Following the 2017 April meeting, Tanja can begin to form her four-person committee and begin planning for April 2018. Note that this time the April Meeting will actually be held in April. The dates are:

14-17 April 2018 in Columbus, OH
http://www.aps.org/meetings/meeting.cfm?name=APR18

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5 GHP 2017: 7th Workshop of the GHP

The Seventh Workshop of the APS Topical Group on Hadron Physics will be held over the three days immediately following the April APS meeting:

1-3 February 2017
Marriott Wardman Park
2660 Woodley Rd. NW
Washington, DC 20008

Registration is now open. The topics covered by the meeting include: Light- and heavy-quark

mesons and baryons; Exotic hadrons; Hadron tomography and hadronization; QCD effects in nuclei; EFT approaches in hadron physics; Lattice QCD and other non-perturbative approaches; Physics of the quark-gluon plasma; Physics of gluon saturation; and Future facilities.

The deadline for abstract submission is 16 December 2016. The deadline for reserving a room at the Marriott Wardman Park at the APS-negotiated price is 4 January 2017 and the deadline for the GHP workshop registration is 6 January 2017. There will be a social dinner on 2 February 2017 at Lilies Restaurant, 2915 Connecticut Ave NW, Washington, D.C. 20008, within walking distance of the venue. The cost of the dinner is $40/person. Payments must be made during registration.

The Executive has designed a structured system of registration fees: $100 for regular GHP members and $120 for non-GHP members. For students the rates are $20 for GHP members and $40 for non-GHP members. Since the price of membership is only $8, it is more cost effective to join GHP and reap the benefits of membership rather than pay the non-member price for current APS members.

The Program Committee is chaired by Paul Reimer and Tanja Horn, and includes the GHP Executive Committee and selected members of GHP: Ian Cloët (Argonne National Lab, icloet@anl.gov); Sean Fleming (University of Arizona, spf@email.arizona.edu); Leonard Gamberg (Penn State Berks, lpg10@psu.edu); Tanja Horn (Catholic Univ of America, hornt@jlab.org) (chair); Huey-Wen Lin (Michigan State University, hwlin@pa.msu.edu); Peter Petreczky (Brookhaven National Lab, petreczk@quark.phy.bnl.gov); Paul E Reimer (Argonne National Lab, reimer@anl.gov) (chair); Susan Schadmand (Forschungszentrum Juelich, s.schadmand@fz-juelich.de); Raju Venugopalan (Brookhaven National Lab, raju@bnl.gov); and Ramona Vogt (Lawrence Livermore National Lab and UC Davis, rlvogt@lbl.gov).

The meeting website, with links to the registration, can be found at https://www.jlab.org/indico/event/160/page/5 – once again established and maintained by Susan Schadmand, to whom we are extremely grateful.

The plenary sessions will include talks by recent GHP Fellows: Xiaochao Zheng (2015), Richard Lebed (2015), Peter Bosted (2016) and Maarten Goltermann (2016), as well as by Phalia Shanahan (GHP Dissertation Award, 2016).

The GHP will hold its annual Business Meeting on Wednesday evening, following the sessions. Please stay to hear our news.

The 8th GHP Workshop will very probably take place prior to the 2019 April APS meeting. *N.B.* In this instance, the "April" meeting will actually take place concurrent with the March meeting as the 120$^{\text{th}}$ Anniversary Meeting of the American Physical Society (March & April Meetings combined). The meeting will take place 4-8 March 2019 at the Boston Convention and Exhibition Center (BCEC) Boston, MA (http://www.aps.org/meetings/meeting.cfm?name=APSAM19).

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6 Changes to the GHP Bylaws Approved

The vote on the changes to the GHP Bylaws closed in early June 2016 and was approved. We thank all the GHP members who voted in the special election. The new Bylaws can be found on the GHP webpage under http://www.aps.org/units/ghp/governance/bylaws.cfm.

7 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.

8 Meeting Summaries

8.1 QWG 16: The 11$^{\text{th}}$ International Workshop on Heavy Quarkonium

(Communicated by Bryan Fulsom <bryan.folsom@pnnl.gov>.)

The 11$^{\text{th}}$ edition of the International Workshop on Heavy Quarkonium ("QWG 2016") was hosted by the Pacific Northwest National Laboratory from June 6-10. Approximately 90 participants attended the event, with a roughly equal number of plenary talks and round table discussions featuring the latest theoretical and experimental developments in the field. The five-day program explored quarkonium production and decay mechanisms, spectroscopy, properties in media, Standard Model measurements and beyond, and future experimental opportunities. A few of the highlights from the meeting are summarized here.

The quarkonium production sessions centered on recent LHC and RHIC results, and the challenges encountered by the NRQCD theoretical description of quarkonium production and (apparent lack of) polarization. Discussions focused in particular on the first η_c production results from LHCb, and ways towards resolution of their mismatch with theory. The latest experimental results on quarkonium production suppression in heavy ion collisions were also presented. Current theoretical approaches were reviewed, and the role of higher-order, regenerative, cold nuclear matter, and other effects was described.

The XYZ states are always a hot topic of the QWG workshops. At this edition, COMPASS presented a preliminary analysis of μ^+N collision data that showed hints of a new production mechanism of the $X(3872)$ in association with a pion. LHCb unveiled a new study of $B \to J/\psi\phi K$ decays aimed at settling the status of controversial exotic states in the $\phi J/\psi$ system. Their comprehensive high-statistics angular analysis found $>4\sigma$ evidence supporting four states with masses ranging from 4140 – 4700 MeV/c^2, and $J^{PC} = 1^{++}$ and 0^{++} quantum numbers. There were several talks from the e^+e^- collider experiments, BES-III and Belle, summarizing many recent results concerning both conventional and exotic states, such as the charged $Z_c^{\pm}$ and $Z_b^{\pm}$ they respectively discovered. Lattice QCD is beginning to offer insight into the nature of these states, and many phenomenological perspectives were also presented. Both approaches provided possible interpretations of these multiquark states, such meson molecules, QCD hybrids, tetraquark bound objects, and kinematic effects, and included mass and decay predictions of additional states to guide further experimental searches.

Theoretical discussion in the Standard Model session described calculations of the charm and bottom quark mass, which have reached the NNNLO level in precision, while increasingly

accurate measurements of the J/ψ and $\psi(2S)$ masses and R scans in the 2 – 5 GeV energy range were presented by KEDR and BES-III. Pathways beyond the Standard Model via quarkonium connections to the "dark sector" of new types of photon and light-mass particles were reviewed both theoretically, and experimentally by studies at Belle and potentially in Belle II. Along this thread, new to this edition was a session dedicated to future experimental opportunities, including the start of Belle II next year, plans for BES-III and upgrades of BEPC, plans for the Electron Ion Collider, and what to look forward to in the latest run at the LHC.

Information on QWG 2016 (including slides) is available at http://events.pnnl.gov/default.aspx?topic=QWG2016. The next edition of the workshop is being planned for late 2017.

8.2 Confinement XII: Quark Confinement and the Hadron Spectrum

(Communicated by Y. Foka <yiota.foka@cern.ch>, Grigori Feofilov <feofilov@hiex.phys.spbu.ru> and Pasquale DiNezza <pasquale.dinezza@lnf.infn.it>.)

The conference series "Quark Confinement and the Hadron Spectrum, inaugurated in 1994 by Giovanni Prosperi and Nora Brambilla initially with strong focus on theory aspects, has been well established by now as an important forum expanding on all aspects of strong interaction physics and attracting theoretical and experimental physicists alike.

The XII edition of the conference was held in Thessaloniki, Greece, from the 29th of August to the 3rd of September 2016 https://indico.cern.ch/e/conf12 and was organized by Yiota Foka, with the assistance of a diverse international Organising Committee. It attracted about 360 participants, ranging from students to world experts that enjoyed a rich scientific programme and was hosted in the beautiful venue of Makedonia Palace conference centre. It provided an ideal setting for intellectual debates, situated in the heart of a dynamic modern city with a 2500 year history. The conference coincided with Aristotle's celebratory year. Aristotle had his school in the area and taught Alexander the Great, among others.

Quark confinement, a striking fundamental phenomenon that prevents colour charged particles from being isolated singularly, was the general point at issue of the conference. Different aspects of strong interactions physics and related fields were covered by 40 invited plenary overview presentations complemented by 267 parallel talks and 33 posters. World leading scientists reported on the most up-to-date topics of interest and discussed a variety of open issues.

A few highlights are mentioned here. Novel methods to compute the parton distributions, the proton charge radius and the neutron electric dipole moment were presented by Constantia Alexandrou.

Recent progress on the theoretical understanding of the deconfinement and chiral symmetry restoration phase transitions was presented in the report by Edward Shuryak – three complementary views were discussed. Open challenges in heavy flavor and quarkonium production in $p + p$ and p+Pb collisions at the LHC were reported by Ramona Vogt. Several theoretical production schemes, including color singlet model, nonrelativistic QCD approach, the color evaporation model and k_T factorization, were discussed. It is important to note that "the production of quarkonium is still not settled after more than 40 years as Ramona put it.

A detailed overview of experimental studies "Probing the QuarkGluon Plasma at the LHC with heavy flavor observables was presented by Johanna Stachel pointing at a strong

indication of charm quark thermalization and clear evidence of a new production mechanism for charmonia at LHC. The following question was also formulated by Johanna: "Does beauty thermalize in a QGP? Significant progress in understanding is expected with new data from all four experiments in Run 2 and Run 3 at the LHC.

Experimental perspectives for the study of QCD matter at high net-baryon densities were discussed by Volker Friese. The relevant running experiments, STAR-BES at RHIC, HADES at SIS-18 and NA61/SHINE at SPS search for the critical point. The future facilities CBM and HADES at FAIR, MPD and BM at NICA, future programmes of Beam Energy Scan (BES II) at RHIC, as well as plans of NA60+ dimuon experiment at SPS and perspectives at J-PARC were also highlighted. A search for a possible mixed phase of quark matter and baryon rich hadronic matter as a consequence of a first order phase transition is under preparation at the NICA accelerator complex at JINR.

The future perspectives of the heavy-ion program at the LHC were presented by Wei Li, pointing out that a strongly-coupled QGP was discovered in heavy-ion experiments at the LHC, which shows striking behavior as a nearly perfect fluid. New opportunities for heavy-ion physics will open up in the near future after the ongoing upgrades of ALICE, ATLAS, CMS and LHCb setups.

The predictive power of the "Flow Paradigm for soft particle correlations and corresponding observables (with minimal assumptions from hydrodynamics) were illustrated by Jean-Yves Ollitrault for symmetric cumulants and elliptic flow fluctuations. Higher-order correlations have to be further explored, as was pointed out in his summary.

Another hot topic, "Initial conditions in AA and pA collisions, was touched upon by Tuomas Lappi in the Color Glass Condensate picture of AA collisions. Nonperturbatively strong, classical gauge fields were shown to be related to the anisotropic system of gluons. It was concluded that correlations (v_n) observed in small systems could be the result of the interplay between initial and final state collective effects.

The strong interaction is closely related a large number of physical problems from astrophysics to strongly coupled, complex condensed-matter physics, as described by Dmitri Kharzeev: "The Chiral Magnetic Effect: from quark-gluon plasma to Dirac/Weyl semimetals where real-world particle physics applications are considered.

The complexity and diversity of QCD, the theory of strong interactions, as well as its relevance to other related fields, were reflected by seven parallel sections: Vacuum Structure and Confinement, Emergent Gauge Fields and Chiral Fermions, Light Quarks, Heavy Quarks, Deconfinement, QCD and New Physics, Nuclear and Astroparticle Physics, and Strongly Coupled Theories. They addressed current theoretical developments and recent experimental results covering topics from typical QCD theory to nuclear and astroparticle physics and searches for new physics. In addition, newly included parallel sessions enriched the programme with presentations on Statistical Methods for Physics Analysis organized by Tommaso Dorigo of CMS, as well as on Upgrades and Instrumentation organized by Pasquale Di Nezza of ALICE and Christian Sturm of CBM. Both sessions were well attended and provided a link between theoretical ideas and the challenges of reality addressed by experimentalists who work in the data analysis front and push detector technology frontiers.

This edition had several new features. The conference was preceded by introductory lectures for students on different topics of QCD also highlighting general relativity, gravitational waves and the recent discovery of LIGO-VIRGO experiments. The conference was further expanded with an extra plenary session on Saturday morning, addressing Future Perspectives and

summarizing the main experimental and theoretical developments and directions of the field.

Several round-table discussions stimulated scientific debates and were complemented by lively conversations between participants enjoying the views to the Mediterranean Sea and breath-taking sunsets during the coffee breaks.

Flash talks of the best posters were also presented in the plenary session. These included"Irregularities at chemical freeze-out of hadrons as evidence of quark-gluon plasma formation (Dr. Violetta Sagun, best poster award), "Quasi-exotic open flavor mesons (Dr. Thomas Hilger and Dr. Andreas Krassnigg) and "Studies of $_c$ production in pp and p+Pb collisions with ALICE at the LHC (Dr. Elisa Meninno). In addition, the best graphical design award was presented to the poster "Chiral magnetic effects and anomalous transport from real-time lattice simulations by Dr. Soeren Sclichting and Dr. Sayantan Sharma. Dr. Boris Tomasik won a special mention for the best poster by a senior physicist for his poster on "Event shape sorting.

In the closing talk, Alvaro De Rjula amused the participants by presenting "the main aspects of QCD in its infancy in his talk entitled "The November Revolution.

The conference was followed by the workshop "Accelerators revealing the QCD secrets for 3-5 September 2016 https://indico.cern.ch/e/AcceleratorWorkshop. The workshop, organized by Yiota Foka and Oliver Kester, of GSI, and Emmanuel Tsesmelis, of CERN, focused on the requirements for future accelerators for QCD studies. It was attended by a mixed community of theorists, experimentalists and machine leading experts, who enjoyed the agenda with topics spanning "from theory to reality. There was opportunity to exchange views on future developments and directions. The Saturday afternoon session also celebrated the 70$^{\text{th}}$ birthday of Peter Braun-Munzinger, the Chair of the ALICE Collaboration Board. Some 60 participants joined a boat trip and the birthday dinner by the beach.

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9 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:

- https://phys.cst.temple.edu/poetic-cteq-2016/ Joint CTEQ Mtg. and POETIC 7 7$^{\text{th}}$ *Int. Conf. on Physics Opportunities at an Electron-Ion-Collider* (Philadelphia, PA, 14-18 November 2016)
- https://www.jlab.org/conferences/YSTAR2016/ YSTAR2016 *Workshop on Excited Hyperons in QCD Thermodynamics at Freeze-Out* (Newport News, VA, 16-17 November 2016)
- http://qm2017.phy.uic.edu/ Quark Matter 2017: *26*$^{\text{th}}$ *International Conference on Ultrarelativistic Heavy-Ion Collisions* (Chicago, IL, 6-11 February 2017)
- https://www.bnl.gov/qcdfinite17/ RIKEN-BNL Workshop on QCD in Finite Temperature and Heavy-Ion Collisions (BNL, Upton, NY, 13-15 February 2017)

- http://www.int.washington.edu/PROGRAMS/17-65w/ Probing QCD in Photon-Nucleus Interactions at RHIC and LHC: the Path to EIC (INT, Seattle, WA 13-17 February 2017)
- http://www.dpg-physik.de/dpg/pbh/index.html?lang=en& PWA9/ATHOS4: *Workshop on Partial Wave Analyses and Advanced Tools for Hadron Spectroscopy* (Bad Honnef, Germany, 13-17 March 2017)
- INT-17-1b: Precision Spectroscopy of QGP Properties with Jets and Heavy Quarks (INT, Seattle, WA, 1 May - 6 June 2017)
- QCD Evolution Workshop 2017 (JLab, Newport News, VA, 22-26 May 2017)
- http://wdb.ugr.es/ lattice2017 Lattice 2017: *35*$^{\text{th}}$ *International Symposium on Lattice Field Theory* (Grenada, Spain, 18-24 June 2017)
- http://hadron2017.usal.es/ HADRON 2017: *17*$^{\text{th}}$ *International Conference on Hadron Spectroscopy and Structure* (Salamanca, Spain, 25-29 September 2017)
- INT-17-3: Spatial and Momentum Tomography of Hadrons and Nuclei (INT, Seattle, WA, 28 August - 29 September 2017)
- http://www.pa.msu.edu/conf/Lattice2018/ Lattice 2018: *36*$^{\text{th}}$ *International Symposium on Lattice Field Theory* (East Lansing, MI, 22-28 July 2018)

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

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