UK Nuclear Activity

June 2015 Issue 24

In this issue,

Newsletter archive: http://npg.dl.ac.uk/OutreachNewsletter/index.html

Nuclear Physics Public Engagement Website: www.stfc.ac.uk/NuclearPhysicsForYou
Nuclear Physics Outreach Poster – order hardcopies from STFC free of charge here

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1. Nuclear Physics Publications for June*

If you are publishing a paper that you think would be of media value please let Wendy Ellison wendy.ellison@stfc.ac.uk , STFC Press Officer, know. She can help with press releases and publicity. If you get in touch with her before publication she can also get material ready in advance for the day of publication.

JHEP, 05 (2015) 097 http://link.springer.com/10.1007/JHEP05(2015)097
Forward-backward multiplicity correlations in pp collisions at √s = 0.9, 2.76 and 7 TeV
J. Adam et al. (ALICE Collaboration), UK Authors: D. Alexandre, L.S. Barnby, M. Borri, M. Chartier, D. Evans, M.A.S. Figueredo, L.D. Hanratty, P.G. Jones, A. Jusko, M. Krivda, G.R. Lee, R. Lietava, R.C. Lemmon, J. Norman, R. Romita, O. Villalobos Baillie
Published 20 May 2015*

Eur. Phys. J. C 75, 226 (2015) http://link.springer.com/article/10.1140/epjc/s10052-015-3422-9
Measurement of pion, kaon and proton production in proton–proton collisions at √s = 7 TeV
J. Adam et al. (ALICE Collaboration), UK Authors: D. Alexandre, L.S. Barnby, M. Borri, M. Chartier, D. Evans, M.A.S. Figueredo, L.D. Hanratty, P.G. Jones, A. Jusko, M. Krivda, G.R. Lee, R. Lietava, R.C. Lemmon, J. Norman, R. Romita, O. Villalobos Baillie
Published 27 May 2015*

Phys. Rev. C 91, 057301 (2015) http://journals.aps.org/prc/abstract/10.1103/PhysRevC.91.057301
Persistence of collective behavior at high spin in the *N*=88 nucleus ^{153}Tb
D. J. Hartley[1], M. A. Riley[2], X. Wang[2,*], S. Miller[2], R. V. F. Janssens[3], E. S. Paul[4], J. M. Rees[4], J. Simpson[5], L. L. Riedinger[6], A. D. Ayangeakaa[7,†], M. P. Carpenter[3], C. J. Chiara[3,8,9,‡], U. Garg[7], P. Hampson[4], C. R. Hoffman[3], F. G. Kondev[9], T. Lauritsen[3], P. J. R. Mason[5], J. T. Matta[7], P. J. Nolan[4], J. Ollier[5], M. Petri[10,§], D. C. Radford[11], J. P. Revill[4], S. Zhu[3], and I. Ragnarsson[12]
Published 29 May 2015*

*Also including missed publications from previous months.

Phys. Rev. C 91, 064905 (2015) https://journals.aps.org/prc/abstract/10.1103/PhysRevC.91.064905
Centrality dependence of particle production in p-Pb collisions at $\sqrt{s_{NN}}$ = 5.02 TeV
J. Adam et al. (ALICE Collaboration), UK Authors: D. Alexandre, L.S. Barnby, M. Borri, M. Chartier, D. Evans, M.A.S. Figueredo, L.D. Hanratty, P.G. Jones, A. Jusko, M. Krivda, G.R. Lee, R. Lietava, R.C. Lemmon, J. Norman, R. Romita, O. Villalobos Baillie
Published 8 June 2015

JHEP, 06 (2015) 055 http://link.springer.com/article/10.1007/JHEP06(2015)055
Rapidity and transverse-momentum dependence of the inclusive J/ψ nuclear modification factor in p-Pb collisions at $\sqrt{s_{NN}}$ = 5.02 TeV
J. Adam et al. (ALICE Collaboration), UK Authors: D. Alexandre, L.S. Barnby, M. Borri, M. Chartier, D. Evans, M.A.S. Figueredo, L.D. Hanratty, P.G. Jones, A. Jusko, M. Krivda, G.R. Lee, R. Lietava, R.C. Lemmon, J. Norman, R. Romita, O. Villalobos Baillie
Published 9 June 2015

NIM A 786, 12 (2015) http://www.sciencedirect.com/science/article/pii/S0168900215003526
Characterisation of a SAGe well detector using GEANT4 and LabSOCS
R. Britton[a, b] and A.V. Davies[a]
Published 21 June 2015

Phys. Rev. C 91, 064313 (2015) http://journals.aps.org/prc/abstract/10.1103/PhysRevC.91.064313
Collectivity in the light radon nuclei measured directly via Coulomb excitation
L. P. Gaffney[1,2,*], A. P. Robinson[3,4], D. G. Jenkins[3], A. N. Andreyev[1,3,5], M. Bender[6,7], A. Blazhev[8], N. Bree[1], B. Bruyneel[8], P. A. Butler[2], T. E. Cocolios[4,9], T. Davinson[10], A. N. Deacon[4], H. De Witte[1], D. DiJulio[11], J. Diriken[1], A. Ekström[11], Ch. Fransen[8], S. J. Freeman[4], K. Geibel[8], T. Grahn[12,13], B. Hadinia[14], M. Hass[15], P.-H. Heenen[16], H. Hess[8], M. Huyse[1], U. Jakobsson[12,13,†], N. Kesteloot[1,17], J. Konki[9,12,13], Th. Kröll[18], V. Kumar[15], O. Ivanov[1], S. Martin-Haugh[3], D. Mücher[19], R. Orlandi[5,14], J. Pakarinen[9,12,13], A. Petts[2], P. Peura[12,13], P. Rahkila[12,13], P. Reiter[8], M. Scheck[2,14,20], M. Seidlitz[8], K. Singh[15], J. F. Smith[14], J. Van de Walle[9], P. Van Duppen[1], D. Voulot[9], R. Wadsworth[3], N. Warr[8], F. Wenander[9], K. Wimmer[19,‡], K. Wrzosek-Lipska[1,21], and M. Zielińska[21,22]
Published 22 June 2015

Phys. Rev. C 91, 061304(R) (2015) http://journals.aps.org/prc/abstract/10.1103/PhysRevC.91.061304
Lifetime measurement of the first excited 2^+ state in ^{112}Te
M. Doncel[1], T. Bäck[1], D. M. Cullen[2], D. Hodge[2], C. Qi[1], B. Cederwall[1], M. J. Taylor[2], M. Procter[2], K. Auranen[3], T. Grahn[3], P. T. Greenlees[3], U. Jakobsson[1,3], R. Julin[3], S. Juutinen[3], A. Herzán[3], J. Konki[3], M. Leino[3], J. Pakarinen[3], J. Partanen[3], P. Peura[3], P. Rahkila[3], P. Ruotsalainen[3], M. Sandzelius[3], J. Sarén[3], C. Scholey[3], J. Sorri[3], S. Stolze[3], and J. Uusitalo[3]
Published 23 June 2015

Phys. Lett. B 746, 385 (2015) http://www.sciencedirect.com/science/article/pii/S0370269315003706
Measurement of dijet k_T in p–Pb collisions at $\sqrt{s_{NN}}$ = 5.02 TeV
J. Adam et al. (ALICE Collaboration), UK Authors: D. Alexandre, L.S. Barnby, M. Borri, M. Chartier, D. Evans, M.A.S. Figueredo, L.D. Hanratty, P.G. Jones, A. Jusko, M. Krivda, G.R. Lee, R. Lietava, R.C. Lemmon, J. Norman, R. Romita, O. Villalobos Baillie
Published 30 June 2015

Phys. Lett. B 746, 1 (2015) http://www.sciencedirect.com/science/article/pii/S0370269315002828
Measurement of jet suppression in central Pb-Pb collisions at $\sqrt{s_{NN}}$ = 2.76 TeV
J. Adam et al. (ALICE Collaboration), UK Authors: D. Alexandre, L.S. Barnby, M. Borri, M. Chartier, D. Evans, M.A.S. Figueredo, L.D. Hanratty, P.G. Jones, A. Jusko, M. Krivda, G.R. Lee, R. Lietava, R.C. Lemmon, J. Norman, R. Romita, O. Villalobos Baillie
Published 30 June 2015

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2. News to Report

a. Nuclear Physics in Astrophysics conference. The seventh edition of the Nuclear Physics in Astrophysics conference took place on 18-22 May in York, United Kingdom http://npa7.iopconfs.org/home. The conference, jointly organized by the Universities of York and Edinburgh (Chairs: Alison Laird and Marialuisa Aliotta), brought together over 100 participants from 18 different countries.

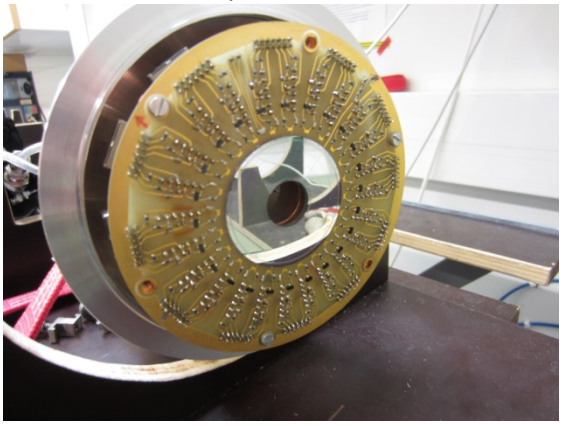
The conference provided an opportunity to review the latest advances in many different areas, from Big Bang Nucleosynthesis, to explosive scenarios, stellar evolution, nuclear structure and theory, as well as experimental tools, techniques and facilities.
Invited speakers were:
Carlos Bertulani (Texas A&M University - Commerce, USA), Rosanna Depalo (Universita' di Padova, and INFN Sezione di Padova, Italy), Iris Dillmann (TRIUMF, Canada), Brian Fields (University of Illinois, USA), Brad Gibson (University of Central Lancashire, UK), Falk Herwig (University of Victoria, Canada), Aldo Ianni (Laboratorio Subterráneo de Canfranc, Spain), Karlheinz Langanke (GSI, Germany), Georges Meynet (Geneva University, Switzerland), Anuj Parikh (Universitat Politecnica de Catalunya, Spain), René Reifarth (Goethe Universität Frankfurt, Germany), Fritz Roepke (Universität Würzburg, Germany), Stefan Typel (GSI, Germany).
The scientific programme consisted of plenary sessions as well as a poster session (with over 60 contributions) and it also included an industrial session with presentations on links between industry and academia and opportunities for both parties to engage in closer collaborations.
About 40% of participants were PhD students and young post-docs. Thus, the conference provided an excellent opportunity for them to meet and interact with more senior colleagues and leading figures in the field. All participants enjoyed having plenty of occasions to discuss about their research, both during coffee breaks and lunches, as these were held in the same rooms as the posters displays.
The best three posters by students received prizes kindly offered by the European Physical Society (top prize, to R Garg, University of York, UK) and the Institute of Physics Nuclear Physics Group (two runner ups, to F Ferraro, University of Genova, Italy; and to J Bliss, Technische Universitaet Darmstadt, Germany).
The social programme included a very enjoyable whisky tasting and an excellent tour to the Helmsley Castle and the Rievaulx Abbey.
The vast majority of feedback received after the event was extremely positive.
The conference was sponsored by Canberra, EDF, EPL, EPS, Hamamatsu, IoP, JINA, Kromek, Mesytech, Micron, NAVI, RAS, STFC, and SUPA. The organizers wish to thank Amy Light and Dawn Stewart from the Institute of Physics for their excellent support. Thanks are also due to the other members of the Local Organizing Committee: Charles Burton (York), Raphael Hirschi (Keele), Alex Murphy (Edinburgh).
The next conference of this series will be held in Catania (Italy) in 2017.
Contribution by Marialuisa Aliotta *maliotta@staffmail.ed.ac.uk (Edinburgh)*

b. Report on NUPECC meeting, June 2015, Basel. The 83rd meeting of the Nuclear Physics European Collaboration Committee was held in Basel, Switzerland, on the 12-13 June. As usual, it was preceded by a morning of presentations on the activities of the host nation. The Swiss nuclear physics community includes groups in theory and experiment, although these are mostly in relatively applied areas, such as ion beam development for accelerator mass spectrometry, proton beam therapy and the production of exotic radionuclides. Other presentations included work on muonic atoms and the proton radius problem, ultra cold neutrons and searches for neutron EDMs, and anti-hydrogen experiments.
The NuPECC meeting itself included several interesting discussions. The funding of the European Science Foundation had been planned to completely cease at the end of 2015, with its successor, Science Europe, having roles only in policy. However, it seems likely that ESF will be allowed to continue, to set up platform activities for the service of the community, including expert boards such as NuPECC, plus limited other tasks such as meetings, EU project management etc. There is a debate about whether the name of the ESF will change.
The reports from the main nuclear physics laboratories included updates form FAIR and GANIL. Sharkov reported that following an external review, FAIR is now considering a number of options. The main issue is a 200-

300 Meuro cost overrun on the civil costs which, if no additional funds can be found, could lead to experiments being delayed and the project de-scoped. PANDA is thought to be under most threat. Lewitowitcz reported that AGATA is operating very well at GANIL, giving improved results over previous instruments. SPIRAL 1 will have new beams from 2017 and the SPIRAL2 Phase 1 civil construction is complete. The LINAG will be ready during 2016 and S^3 will be ready at the end of 2016. DESIR Phase 1will be ready from 2020, pending an agreement with Germany. There is no timescale for further SPIRAL2 development. In other news, ENSAR2 is on the reserve list for EU funding and discussions concerning the next ESFRI list have started. Planning for the next NuPECC Long Range Plan formed the main item of the meeting. In the US, the Nuclear Science Advisory Committee (NSAC) has completed its LRP, with publication expected late this year, and in Canada, the NSERC Subatomic Physics Long Range plan is underway, to be completed by the end of 2016. The presently envisaged format (it may change!) for the NuPECC LRP is that it will be similar to the previous one, with major chapters on themes of Hadron Physics, Strong-Interaction matter, Nuclear Structure and Dynamics, Nuclear Astrophysics, and Fundamental Symmetries and Interactions. These will be complemented with sections on Tools and Applications for Society, and on Education and Training.
Working groups for each of these are being put together, to be decided by Sept 2015. Anybody interested in contributing should contact Alex Murphy or Paul Nolan by end July. The aim is to have a draft by Sept 2016 with a Town meeting in Jan 17. A final version is planned for Mar 17, with publication in summer 2017.
Contribution by Paul Nolan P.J.Nolan@liverpool.ac.uk (Liverpool) and Alexander Murphy a.s.murphy@ed.ac.uk (Edinburgh)

c. SPEDE in-beam tests complete. During the last 6 months, several in-beam tests have taken place at the University of Jyväskylä in Finland to commission SPEDE (SPectrometer for Electron DEtection), a 500 micron silicon detector for conversion electrons that will be coupled with the MINIBALL array for γ-rays at ISOLDE, CERN.

Most of the commissioning was run with ^{197}Au or ^{82}Kr beams incident on a ^{197}Au target, but other beam and target combinations were also employed including a ^{40}Ar beam as well as ^{58}Ni and ^{106}Cd targets. The energy of the beams used was around 3 MeV/nucleon, resulting in safe Coulomb excitation from the ground state of the nuclei involved. Six PIN diodes were arranged in the forward direction for heavy-ion detection in order to correct for the kinematic spread of the electron energies. The results will now be analysed to determine the performance of the detector in-beam, and SPEDE will be set up at ISOLDE this summer.



The SPEDE detector and PCB

Contribution by George O'Neill g.g.oneill@liv.ac.uk (Liverpool), on behalf of the SPEDE collaboration.

d. ALICE data taking resumes. On June 3rd the LHC restarted experiments with proton-proton (p-p) collisions with an increased centre-of-mass energy of 13 TeV.
This event received worldwide media coverage and Liverpool student Jamie Norman (below) who was on shift that morning in the ALICE control room featured in the publicity photographs http://run2-13tev.web.cern.ch/?page=3

(Image: Laurent Egli/CERN)

ALICE has upgraded its capabilities in several areas, including the Birmingham-led central trigger processor which has doubled its capacity to make decisions on which type of collision events will be recorded. The ability to trigger on up to 100 different configurations will be crucial in exploiting the increased luminosity of the LHC in the p-p run, and later Pb-Pb run, expected in the autumn. The large sample of p-p collisions will also enable ALICE to investigate the onset of collective effects since a fraction of the collisions produce a large number of hadrons. An example event display showing such a collision, collected on the morning of June 3rd, is shown here.

(Image: ALICE/CERN)

Contribution by Lee Barnby lbarnby@cern.ch (Birmingham)

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3. Outreach Activity

A Pint of Science

The annual Pint of Science festival took place in twelve cities across the country over the period 18-20 May.

This festival arranges programmes of science talks, pitched for the lay person, which are held in pubs.

As the Nuclear Physics in Astrophysics conference, jointly organised by Marialuisa Aliotta from Edinburgh and Alison Laird from York, was running in York that week, we took the opportunity to bring in one of the conference attendees to create an evening on "The Big Bang, Stars and Us". The talks were given by Professor Brian Fulton (York) and Professor Georges Meynet (Observatoire de Geneve) covering the Big Bang, nucleosynthesis and how stars work, which were followed by a talk by Professor Howard Wilson on the attempts to produce controlled fusion on Earth on the ITER tokamak. The event was extremely popular and was sold out several weeks before the evening and the appreciative audience were very pleased to have had an international guest speaker. The author is now the proud owner of a "Pint of Science" engraved pint glass and matching T-shirt.

Contribution by Brian Fulton brian.fulton@york.ac.uk (York)

Outreach talk

Zsolt Podolyak gave a talk at the largest meeting of the physics-teaching community in England at the 27th Annual Rugby Meeting on the 4th June 2015 at Rugby School. The title of the talk was: Nuclear astrophysics: synthesis of the chemical elements. There were ~130 teachers in the audience.

Contribution by Zsolt Podolyak z.podolyak@surrey.ac.uk (Surrey)

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4. Media Interactions

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