UK Nuclear Activity

October 2017 Issue 52

In this issue,

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

Nuclear Physics Public Engagement Website: www.stfc.ac.uk/NuclearPhysicsForYou

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1. Nuclear Physics Publications for October*

If you are publishing a paper that you think would be of media value please contact Wendy Ellison, STFC Press Officer. 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.

Eur. Phys. J. C (2017) 77:658 https://link.springer.com/article/10.1140/epjc/s10052-017-5222-x
Measurement of deuteron spectra and elliptic flow in Pb–Pb collisions at √sNN = 2.76 TeV at the LHC
ALICE Collaboration, UK Authors: H. A. Andrews, L. S. Barnby, M. Borri, M. Chartier, D. Evans, K. L. Graham, C. Hills, P. G. Jones, A. Jusko, M. Krivda, R. C. Lemmon, R. Lietava, S. W. Lindsay, J. Norman, O. Villalobos Baillie, E. Willsher, N. Zardoshti
Published October 2017

Phys. Rev. C 96, 041302(R) (2017) https://journals.aps.org/prc/abstract/10.1103/PhysRevC.96.041302
Dipole and quadrupole moments of $^{73-78}$Cu as a test of the robustness of the Z=28 shell closure near ^{78}Ni
R. P. de Groote[1,*], J. Billowes[2], C. L. Binnersley[2], M. L. Bissell[2], T. E. Cocolios[1], T. Day Goodacre[3], G. J. Farooq-Smith[1], D. V. Fedorov[4], K. T. Flanagan[2], S. Franchoo[5], R. F. Garcia Ruiz[2], Á. Koszorús[1], K. M. Lynch[6], G. Neyens[1,6], F. Nowacki[7], T. Otsuka[1,8,9,10], S. Rothe[2,3], H. H. Stroke[11], Y. Tsunoda[10], A. R. Vernon[2], K. D. A. Wendt[12], S. G. Wilkins[2], Z. Y. Xu[1], and X. F. Yang[1]
Published 4 October 2017

Phys. Rev. A 96, 040501(R)(2017) https://journals.aps.org/pra/abstract/10.1103/PhysRevA.96.040501
Saturation properties of helium drops from a leading-order description
A. Kievsky[1], A. Polls[2], B. Juliá-Díaz[2], and N. K. Timofeyuk[3]
Published 9 October 2017

Phys. Lett. B 773, 492 (2017) http://www.sciencedirect.com/science/article/pii/S0370269317306998
Shell evolution beyond $Z = 28$ and $N = 50$: Spectroscopy of ^{81,82,83,84}Zn
C.M.Shand[a] Zs.Podolyák[a] M.Górska[b] P.Doornenbal[c] A.Obertelli[cd] F.Nowacki[e] T.Otsuka[fg] K.Sieja[e] J.A.Tostevin[a] Y.Tsunoda[f] G.Authelet[d] H.Baba[c] D.Calvet[d] A.Château[d] S.Chen[hc] A.Corsi[d] A.Delbart[d] J.M.Gheller[d] A.Giganon[d] A.Gillibert[d] T.Isobe[c] V.Lapoux[d] M.Matsushita[f] S.Momiyama[cg] T.Motobayashi[c] M.Niikura[g] H.Otsu[c] N.Paul[dc] C.Péron[d] A.Peyaud[d] E.C.Pollacco[d] J.-Y.Roussé[d] H.Sakurai[cg] C.Santamaria[cd] M.Sasano[c] Y.Shiga[ci] D.Steppenbeck[c] S.Takeuchi[c] R.Taniuchi[cg] T.Uesaka[c] H.Wang[c] K.Yoneda[c] T.Ando[cg] T.Arici[b] A.Blazhev[j] F.Browne[k] A.M.Bruce[k] R.J.Carroll[a] L.X.Chung[l] M.L.Cortés[bm] M.Dewald[j] B.Ding[n] Zs.Dombrádi[o] F.Flavigny[p] S.Franchoo[p] F.Giacoppo[qrb] A.Gottardo[p] K.Hadyńska-Klęk[q] A.Jungclaus[s] Z.Korkulu[o] S.Koyama[cg] Y.Kubota[cf] J.Lee[t] M.Lettmann[m] B.D.Linh[l] J.Liu[t] Z.Liu[n] C.Lizarazo[bm] C.Louchart[m] R.Lozeva[eu] K.Matsui[cg] T.Miyazaki[cg] K.Moschner[j] M.Nagamine[cg] N.Nakatsuka[cv] S.Nishimura[c] C.R.Nita[w] C.R.Nobs[k] L.Olivier[p] S.Ota[f] R.Orlandi[x] Z.Patel[a] P.H.Regan[a] M.Rudigier[a] E.Şahin[q] T.Saito[cg] P.-A.Söderström[c] I.Stefan[p] T.Sumikama[y] D.Suzuki[p] Zs.Vajta[o] V.Vaquero[s] V.Werner[m] K.Wimmer[cg] J.Wu[ch] Z.Y.Xu[t]
Published 10 October 2017

Phys. Lett. B, 773, 68 (2017) http://www.sciencedirect.com/science/article/pii/S0370269317306160
Linear and non-linear flow mode in Pb–Pb collisions at $\sqrt{s_{NN}}$ = 2.76 TeV
ALICE Collaboration, UK Authors: H. A. Andrews, L. S. Barnby, M. Borri, M. Chartier, D. Evans, K. L. Graham, C. Hills, P. G. Jones, A. Jusko, M. Krivda, R. C. Lemmon, R. Lietava, S. W. Lindsay, J. Norman, O. Villalobos Baillie, E. Willsher, N. Zardoshti
Published 10 October 2017

Phys. Rev. C 96, 044315 (2017) https://journals.aps.org/prc/abstract/10.1103/PhysRevC.96.044315
β-delayed fission of ^{230}Am
G. L. Wilson[1,2], M. Takeyama[3,4], A. N. Andreyev[1,5,6], B. Andel[7], S. Antalic[7], W. N. Catford[8], L. Ghys[9,10], H. Haba[3], F. P. Heßberger[11,12], M. Huang[3], D. Kaji[3], Z. Kalaninova[7,13], K. Morimoto[3], K. Morita[3,14], M. Murakami[3,15], K. Nishio[5], R. Orlandi[5], A. G. Smith[16], K. Tanaka[3,17], Y. Wakabayashi[3], and S. Yamaki[3,18]
Published 13 October 2017

Phys. Rev. C 96, 044317 (2017) https://journals.aps.org/prc/abstract/10.1103/PhysRevC.96.044317
Evidence for ^{15}O+α resonance structures in ^{19}Ne via direct measurement
D. Torresi[1,2,3], C. Wheldon[1,*], Tz. Kokalova[1], S. Bailey[1], A. Boiano[4], C. Boiano[5], M. Fisichella[2], M. Mazzocco[6,7], C. Parascandolo[4], D. Pierroutsakou[4], E. Strano[6,7], M. Zadro[8], M. Cavallaro[2], S. Cherubini[2,3], N. Curtis[1], A. Di Pietro[2], J. P. Fernández Garcia[2], P. Figuera[2], T. Glodariu[9], J. Gręboszˊ[10], M. La Cognata[2], M. La Commara[4], M. Lattuada[2,3], D. Mengoni[11], R. G. Pizzone[7,2], C. Signorini[11], C. Stefanini[6], L. Stroe[9], and C. Spitaleri[2,3]
Published 18 October 2017

Phys. Rev. C 96, 044324 (2017) https://journals.aps.org/prc/abstract/10.1103/PhysRevC.96.044324
Probing the 31Ga ground-state properties in the region near Z=28with high-resolution laser spectroscopy
G. J. Farooq-Smith[1,2,*], A. R. Vernon[2], J. Billowes[2], C. L. Binnersley[2], M. L. Bissell[2], T. E. Cocolios[1,2], T. Day Goodacre[2,3,†], R. P. de Groote[1], K. T. Flanagan[2], S. Franchoo[4], R. F. Garcia Ruiz[1,2], W. Gins[1], K. M. Lynch[5], B. A. Marsh[3], G. Neyens[1], S. Rothe[2,3], H. H. Stroke[6], S. G. Wilkins[2], and X. F. Yang[1]
Published 23 October 2017

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2. News to Report

a. Signal Processing for Radiation Detectors
John Wiley and Sons, USA, 23 October 2017,
ISBN: 978-1-119-41014-0
Ionizing radiation is widely used in various applications in our modern life. Example application areas include, but not limited to, medical and biomedical imaging, environmental monitoring, homeland security, industrial process control, nuclear power industry, nuclear safeguard, oil and gas exploration, space research, material science and nuclear and particle physics research. Radiation detectors are the essential part of such systems by producing output electric signals whenever radiation interacts with the detectors. The output signals carry various information on the incident radiation, and thus, must be properly processed to extract the information of interest. This requires a good knowledge of radiation detectors output signals and their processing techniques. This book aims at providing an easily readable source of material for this purpose. It puts great emphasis on the characteristics of pulses from various types of detectors and offers a full overview on the basic electronic

concepts required to understand detector signal processing systems and pulse processing techniques. All of the important aspects of signal processing, including energy spectroscopy, timing measurements, position-sensing, pulse-shape discrimination, and radiation intensity measurement are covered. In addition, this resource:

- Describes both analog and digital techniques of signal processing
- Presents a complete compilation of digital pulse processing algorithms
- Extrapolates content from more than 700 references covering classic papers as well as those of today
- Demonstrates concepts with more than 340 original illustrations

Signal Processing for Radiation Detectors is useful for researchers, graduate students and engineers working in disciplines such as nuclear physics and engineering, environmental and biomedical engineering, and medical physics and radiological science by providing the knowledge to design their own systems, optimize available systems or to set up new experiments.
Contribution by Mohammad Nakhostin m.nakhostin@surrey.ac.uk (Surrey)

b. Finnish Science 100 symposium
This one-day symposium on Saturday 4 November at Imperial College London is part of the official centenary programme of Finland's independence. It will showcase Finnish science and promote scientific collaboration between Finland and the United Kingdom and discuss its future.
The event consists of talks by leading scientists and policy-makers, and an exhibition of posters and stands.
The event is free to attend, but to help planning we ask participants to register in advance: http://finnishscience100.eventbrite.co.uk.
Lunch will be provided for registered participants.
The event is followed a by a dinner from 6pm at 170 Queen's Gate, which needs a separate registration by Friday 27 October. To reserve a place at the dinner, click here.
The event is supported by the Finnish Academy of Science and Letters, the Finnish Science Society in the United Kingdom, and the Embassy of Finland,
Contribution by Jacek Dobaczewski jacek.dobaczewski@york.ac.uk (York)

c. Halo Nuclei
Morgan & Claypool Publishers, October 2017, ISBN: 978-1-6817-4580-0
While neutron halos were discovered 30 years ago, this is the first book written on the subject of this exotic form of nuclei that typically contain many more neutrons than stable isotopes of those elements. It provides an introductory description of the halo and outlines the discovery and evidence for its existence. It also discusses different theoretical models of the halo's structure as well as models and techniques in reaction theory that have allowed us to study the halo. This is written at the graduate student (starting at PhD) level.
Contribution by Jim Al-Khalili j.al-khalili@surrey.ac.uk (Surrey)

d. 19th STFC Nuclear Physics Summer School
The 19th STFC Nuclear Physics Summer School took place in Queen's University Belfast from the 21st August to 2nd September 2017. The school was attended by 47 student delegates (including 2 students from outside the UK), 5 early career researcher tutors and 11 lecturers (including 1 from industry and 1 from the NHS). The topics covered were chosen to reflect and support the breadth of the UK nuclear physics programme. STFC have agreed to provide website space to keep all the Lecture materials of UK Nuclear Physics Summer Schools as a community resource in the future. The 2017 school material can now be found at: http://www.stfc.ac.uk/research/nuclear-physics/np-summer-schools/

The School was delivered by a diverse team at the Director, Lecturer and Tutor levels. In addition to the standard lecture, tutorial and Q&A sessions, we organised a 1h session dedicated to public engagement of science and a careers session, where academic and

non-academic post-PhD career paths were discussed. Student talks were actively attended by all delegates and chaired by lecturers. The preparation, delivery and question responses of all students were outstanding. The tutors selected two prizes for the best talks of the 2017 Summer School:

● Best 1st Year PhD student talk: Ryan Llewellyn (York)

● Best 2nd Year PhD student talk: Lucy McAreavey (Liverpool)

The winners received a £100 prize in cash awarded by the IoP Nuclear Physics Group and their talks will be selected for 20 minute presentations at the 2018 IoP Nuclear Physics Conference.

Finally, there was ample time for social activities too, including football, badminton, excursions including Game of Thrones locations and, most popular of all, petanque. The Liverpool group is now in possession of the "UK nuclear petanque set" that will hopefully be a fixture of all Summer Schools to come!

Contribution by Arnau Rios Huguet a.rios@surrey.ac.uk (Surrey) & Laura Harkness-Brennan laura.harkness@liverpool.ac.uk (Liverpool)

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3. Outreach Activity

STEM Big Bang Festival Worthing College

On 19th October local school students, from year groups 9-13, attended the Big Bang STEM festival at Worthing College. This event allowed students to engage with A-level STEM students, local employers and universities to find out more about the opportunities a career in STEM can provide.

Throughout the day representatives from the South Central Branch Committee, Chantal Nobs, Peter Bromley and Ian Galloway, and volunteers from Worthing College provided an interactive stall, giving away lots of IoP freebies and resources. The activities included amazing marshmallows, balloon kebabs and straw oboes, organised by Chantal, and Ian shared an array of physics puzzles to challenge both students and parents. The stall was very popular throughout the event, and saw over 220 young people interact with the activities.

Committee member, Chantal Nobs, also took part in two “People like me” workshops, with about 30 students in each workshop. Young women from local schools, considering taking a STEM subject at A-level had the opportunity to talk to women, like Chantal, who have a career in STEM. The students also completed a light-hearted personality test to highlight the benefits of finding a job that suits the way you like to work, and the huge variety of jobs available with a background in STEM.

http://www.worthing.ac.uk/single-post/2017/09/22/The-Big-Bang-Worthing-College

Contribution by Chantal Nobs chantal.nobs@ukaea.uk (Culham Centre for Fusion Energy)

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4. Media Interactions

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