UK Nuclear Activity

March 2019 Issue 69

In this issue,

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1. Nuclear Physics Publications for March*

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.

Phys. Rev. D, 99, 012016 (2019) https://journals.aps.org/prd/abstract/10.1103/PhysRevD.99.012016
Charged jet cross section and fragmentation in proton-proton collisions at $\sqrt{s}$ = 7 TeV
ALICE Collaboration, UK Authors: H. A. Andrews, L. S. Barnby, M. Borri, M. Chartier, D. Evans, K. L. Graham, C. Hills, J.P. Iddon, O. Jevons, P. G. Jones, A. Jusko, M. Krivda, J. Kvapil, R. C. Lemmon, R. Lietava, S. W. Lindsay, O. Villalobos Baillie, E. Willsher, N. Zardoshti
*Published 31 January 2019

J. High Energ. Phys. 2019:12 (2019) https://link.springer.com/article/10.1007/JHEP02%282019%29012
Study of J/ψ azimuthal anisotropy at forward rapidity in Pb-Pb collisions at $\sqrt{s_{NN}}$ = 5.02 TeV
ALICE Collaboration, UK Authors: H. A. Andrews, L. S. Barnby, M. Borri, M. Chartier, D. Evans, K. L. Graham, C. Hills, J.P. Iddon, O. Jevons, P. G. Jones, A. Jusko, M. Krivda, J. Kvapil, R. C. Lemmon, R. Lietava, S. W. Lindsay, O. Villalobos Baillie, E. Willsher, N. Zardoshti
*Published 4 February 2019

Phys. Rev. C 99, 024906 (2019) https://journals.aps.org/prc/abstract/10.1103/PhysRevC.99.024906
Multiplicity dependence of light-flavor hadron production in pp collisions at $\sqrt{s}$ = 7 TeV
ALICE Collaboration, UK Authors: H. A. Andrews, L. S. Barnby, M. Borri, M. Chartier, D. Evans, K. L. Graham, C. Hills, J.P. Iddon, O. Jevons, P. G. Jones, A. Jusko, M. Krivda, J. Kvapil, R. C. Lemmon, R. Lietava, S. W. Lindsay, O. Villalobos Baillie, E. Willsher, N. Zardoshti
*Published 8 February 2019

*Also including missed publications from previous months

Edited by Elizabeth Cunningham, STFC Particle and Nuclear Physics Outreach Officer.
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Phys. Rev. C 99, 024905 (2019) https://journals.aps.org/prc/abstract/10.1103/PhysRevC.99.024905
Suppression of Λ(1520) resonance production in central 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, J.P. Iddon, O. Jevons, P. G. Jones, A. Jusko, M. Krivda, J. Kvapil, R. C. Lemmon, R. Lietava, S. W. Lindsay, O. Villalobos Baillie, E. Willsher, N. Zardoshti
*Published 8 February 2019

Phys. Lett. B, 789, 308 (2019) https://www.sciencedirect.com/science/article/pii/S0370269318308815
Direct photon elliptic flow 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, J.P. Iddon, O. Jevons, P. G. Jones, A. Jusko, M. Krivda, J. Kvapil, R. C. Lemmon, R. Lietava, S. W. Lindsay, O. Villalobos Baillie, E. Willsher, N. Zardoshti
*Published 10 February 2019

Phys. Rev. C 99, 024001 (2019) https://journals.aps.org/prc/abstract/10.1103/PhysRevC.99.024001
p-p, p-Λ and Λ-Λ correlations studied via femtoscopy in pp reactions at $\sqrt{s}$ = 7 TeV
ALICE Collaboration, UK Authors: H. A. Andrews, L. S. Barnby, M. Borri, M. Chartier, D. Evans, K. L. Graham, C. Hills, J.P. Iddon, O. Jevons, P. G. Jones, A. Jusko, M. Krivda, J. Kvapil, R. C. Lemmon, R. Lietava, S. W. Lindsay, O. Villalobos Baillie, E. Willsher, N. Zardoshti
*Published 13 February 2019

Phys. Rev. C 99, 024002 (2019) https://journals.aps.org/prc/abstract/10.1103/PhysRevC.99.024002
Measurement of dielectron production in central 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, J.P. Iddon, O. Jevons, P. G. Jones, A. Jusko, M. Krivda, J. Kvapil, R. C. Lemmon, R. Lietava, S. W. Lindsay, O. Villalobos Baillie, E. Willsher, N. Zardoshti
*Published 14 February 2019

NIM A 927, 293 (2019) https://www.sciencedirect.com/science/article/pii/S0168900219302311
Characterisation of a small electrode HPGe detector
C.Unsworth[a], A.J.Boston[a], H.C.Boston[a], L.J.Harkness-Brennan[a], D.S.Judson[a], P.J.Nolan[a], O.S.Thomas[a], J.P.Wright[a], A.S.Adekola[b], J.Colaresi[b], W.F.Mueller[b], J.Simpson[c]
*Published *online* 25 February 2019

Phys. Rev. Lett. 122, 092701 (2019) https://journals.aps.org/prl/abstract/10.1103/PhysRevLett.122.092701
Approaching the Gamow Window with Stored Ions: Direct Measurement of ^{124}Xe(p,γ) in the ESR Storage Ring
J. Glorius[1,*], C. Langer[2], Z. Slavkovská[2], L. Bott[2], C. Brandau[1,3], B. Brückner[2], K. Blaum[4], X. Chen[5], S. Dababneh[6], T. Davinson[7], P. Erbacher[2], S. Fiebiger[2], T. Gaßner[1], K. Göbel[2], M. Groothuis[2], A. Gumberidze[1], G. Gyürky[8], M. Heil[1], R. Hess[1], R. Hensch[2], P. Hillmann[2], P.-M. Hillenbrand[1], O. Hinrichs[2], B. Jurado[9], T. Kausch[2], A. Khodaparast[1,2], T. Kisselbach[2], N. Klapper[2], C. Kozhuharov[1], D. Kurtulgil[2], G. Lane[10], C. Lederer-Woods[7], M. Lestinsky[1], S. Litvinov[1], Yu. A. Litvinov[1], B. Löher[11,1], F. Nolden[1], N. Petridis[1], U. Popp[1], T. Rauscher[12,13], M. Reed[10], R. Reifarth[2], M. S. Sanjari[1], D. Savran[1], H. Simon[1], U. Spillmann[1], M. Steck[1], T. Stöhlker[1,14], J. Stumm[2], A. Surzhykov[15,16], T. Szücs[8], T. T. Nguyen[2], A. Taremi Zadeh[2], B. Thomas[2], S. Yu. Torilov[17], H. Törnqvist[1,11], M. Träger[1], C. Trageser[1,3], S. Trotsenko[1], L. Varga[1], M. Volknandt[2], H. Weick[1], M. Weigand[2], C. Wolf[2], P. J. Woods[7], and Y. M. Xing[5,1]
Published 7 March 2019

Phys. Lett. B, 790, 22 (2019) https://www.sciencedirect.com/science/article/pii/S0370269318309602
Measuring K^0_S-$K^{\pm}$ interactions using pp collisions at $\sqrt{s}$ = 7 TeV
ALICE Collaboration, UK Authors: H. A. Andrews, L. S. Barnby, M. Borri, M. Chartier, D. Evans, K. L. Graham, C. Hills, J.P. Iddon, O. Jevons, P. G. Jones, A. Jusko, M. Krivda, J. Kvapil, R. C. Lemmon, R. Lietava, S. W. Lindsay, O. Villalobos Baillie, E. Willsher, N. Zardoshti
Published 10 March 2019

Phys. Lett. B, 790, 35 (2019) https://www.sciencedirect.com/science/article/pii/S0370269318309833
Centrality and pseudorapidity dependence of the charged-particle multiplicity density in Xe–Xe collisions at $\sqrt{s_{NN}}$ = 5.44 TeV
ALICE Collaboration, UK Authors: H. A. Andrews, L. S. Barnby, M. Borri, M. Chartier, D. Evans, K. L. Graham,

C. Hills, J.P. Iddon, P. G. Jones, A. Jusko, M. Krivda, R. C. Lemmon, R. Lietava, S. W. Lindsay, O. Villalobos Baillie, E. Willsher, N. Zardoshti
Published 10 March 2019

Phys. Lett. B, 790, 89 (2019) https://www.sciencedirect.com/science/article/pii/S0370269318309973
ϒ suppression at forward rapidity in Pb–Pb collisions at $\sqrt{s_{NN}}$ = 5.02 TeV
ALICE Collaboration, UK Authors: H. A. Andrews, L. S. Barnby, M. Borri, M. Chartier, D. Evans, K. L. Graham, C. Hills, J.P. Iddon, O. Jevons, P. G. Jones, A. Jusko, M. Krivda, J. Kvapil, R. C. Lemmon, R. Lietava, S. W. Lindsay, O. Villalobos Baillie, E. Willsher, N. Zardoshti
Published 10 March 2019

Phys. Lett. B 790, 237 (2019) https://www.sciencedirect.com/science/article/pii/S0370269319300334
Improved astrophysical rate for the $^{18}O(p,\alpha)^{15}N$ reaction by underground measurements
C.G.Bruno[a], M.Aliotta[a], P.Descouvemont[b], A.Best[c], T.Davinson[a], D.Bemmerer[d], A.Boeltzig[ef1], C.Broggini[g], A.Caciolli[h], F.Cavanna[i], T.Chillery[a], G.F.Ciani[e], P.Corvisiero[ij], R.Depalo[h], A.Di Leva[c], Z.Elekes[k], F.Ferraro[ij], A.Formicola[f], Zs.Fülöp[k], G.Gervino[l], A.Guglielmetti[m], C.Gustavino[n], Gy.Gyürky[k], G.Imbriani[c], M.Junker[f], M.Lugaro[o], P.Marigo[gh], R.Menegazzo[h], V.Mossa[p], F.R.Pantaleo[p], D.Piatti[h], P.Prati[ij], K.Stöckel[dq], O.Straniero[fr], F.Strieder[s], T.Szücs[dk], M.P.Takács[dq], D.Trezzi[m]
Published 10 March 2019

Phys. Lett. B 790, 458 (2019) https://www.sciencedirect.com/science/article/pii/S037026931930070X
Measurement of $^{73}Ge(n,\gamma)$ cross sections and implications for stellar nucleosynthesis
C.Lederer-Woods[ab], U.Battino[a], P.Ferreira[c], A.Gawlik[d], C.Guerrero[e], F.Gunsing[fg], S.Heinitz[h], J.Lerendegui-Marco[e], A.Mengoni[i], R.Reifarth[b], A.Tattersall[a], S.Valenta[j], C.Weiss[gm], O.Aberle[g], J.Andrzejewski[d], L.Audouin[k], V.Bécares[l], M.Bacak[m], J.Balibrea[l], M.Barbagallo[n], S.Barros[c], F.Bečvář[j], C.Beinrucker[b], F.Belloni[f], E.Berthoumieux[f], J.Billowes[o], D.Bosnar[p], M.Brugger[g], M.Caamaño[q], F.Calviño[r], M.Calviani[g], D.Cano-Ott[l], F.Cerutti[g], E.Chiaveri[g], N.Colonna[n], G.Cortés[r], M.A.Cortés-Giraldo[e], L.Cosentino[s], L.A.Damone[nt], K.Deo[u], M.Diakaki[fv], M.Dietz[a], C.Domingo-Pardo[w], R.Dressler[h], E.Dupont[f], I.Durán[q], B.Fernández-Domínguez[q], A.Ferrari[g], P.Finocchiaro[s], R.J.W.Frost[o], V.Furman[x], K.Göbel[b], A.R.García[l], I.Gheorghe[y], T.Glodariu[y], I.F.Gonçalves[c], E.González-Romero[l], A.Goverdovski[z], E.Griesmayer[m], H.Harada[aa], T.Heftrich[b], A.Hernández-Prieto[gr], J.Heyse[ab], D.G.Jenkins[ac], E.Jericha[m], F.Käppeler[ad], Y.Kadi[g], T.Katabuchi[ae], P.Kavrigin[m], V.Ketlerov[z], V.Khryachkov[z], A.Kimura[aa], N.Kivel[h], I.Knapova[j], M.Kokkoris[v], M.Krtička[j], E.Leal-Cidoncha[q], H.Leeb[m], M.Licata[afag], S.Lo Meo[iaf], R.Losito[g], D.Macina[g], J.Marganiec[d], T.Martínez[l], C.Massimi[afag], P.Mastinu[ah], M.Mastromarco[n], F.Matteucci[aiaj], E.Mendoza[l], P.M.Milazzo[ai], F.Mingrone[af], M.Mirea[y], S.Montesano[g], A.Musumarra[sak], R.Nolte[al], F.R.Palomo-Pinto[e], C.Paradela[q], N.Patronis[am], A.Pavlik[an], J.Perkowski[d], J.I.Porras[gao], J.Praena[e], J.M.Quesada[e], T.Rauscher[apaq], A.Riego-Perez[r], M.Robles[q], C.Rubbia[g], J.A.Ryan[o], M.Sabaté-Gilarte[ge], A.Saxena[u], P.Schillebeeckx[ab], S.Schmidt[b], D.Schumann[h], P.Sedyshev[x], A.G.Smith[o], A.Stamatopoulos[v], S.V.Suryanarayana[u], G.Tagliente[n], J.L.Tain[w], A.Tarifeño-Saldivia[w], L.Tassan-Got[k], A.Tsinganis[v], G.Vannini[afag], V.Variale[n], P.Vaz[c], A.Ventura[af], V.Vlachoudis[g], R.Vlastou[v], A.Wallner[ar], S.Warren[o], M.Weigand[b], T.Wright[o], P.Žugec[p]
Published 10 March 2019

Eur. Phys. J. C 79:236 (2019) https://link.springer.com/article/10.1140/epjc/s10052-019-6711-x
Relative particle yield fluctuations 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, J.P. Iddon, 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 14 March 2019

Phys. Rev. C 99, 034614 (2019) https://journals.aps.org/prc/abstract/10.1103/PhysRevC.99.034614
Pickup coupling contribution to the optical model potential for 30.3 MeV protons and neutrons on ^{40}Ca
N. Keeley*, R. S. Mackintosh†
Published 21 March 2019

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2. News to Report

a. Beta decay gets the ab initio treatment
News & Views, Nature Physics, 12 March 2019
The theoretical modelling of nuclei and their different decay modes is a challenging field. Take β decay, for example, which affects the vast majority of radioactive isotopes. For years, the most accurate theoretical calculations of nuclear structure, which agreed with experiments on masses and shell structure, predicted β-decay half-lives that were not in agreement with experiments. Practitioners had to introduce a correction

factor, a 'quench' of their calculations by about 25% to reproduce experimental values. The origin of this 'quenching puzzle' remained elusive for decades. Now, writing in Nature Physics, Peter Gysbers and colleagues have provided a solution to the puzzle based on first-principles simulations [Gysbers, P. et al. *Nat. Phys.* https://doi.org/10.1038/s41567-019-0450-7 (2019)].
Article continues here.
Contribution by Arnau Rios Huguet
a.rios@surrey.ac.uk (Surrey)

b. 24th European Conference on Few-Body Problems in Physics
This year, University of Surrey will host the next European Conference on Few-Body Problems in Physics which will take place from **2-6 September 2019** in Guildford. This event is promoted by the European Few-Body Physics Research Committee, which started in 1972 in Budapest. The previous conference took place in Aarhus (2016).
The European Few-Body Conferences represent a wonderful opportunity for European scientists and colleagues from countries across the world, to come together to discusss and update their knowledge of the current state-of-the-art in the research field of few-body systems — that is, systems which can be understood in terms of a few effective degrees of freedom, both from theoretical and experimental prospective. Although the origin of the Few-Body Conferences is closely related to the study of few-nucleon systems', their scope is nowadays much wider, ranging from particle physics (mesons and baryons described in terms of their constituents), to atomic, molecular, and even solid state physics. This *interdisciplinary character* is an essential part of the culture of the few-body community.
The UK involvement in few-body research, within the STFC remit, is represented by studies of hadron structure and spectroscopy, short-range nuclear structure, nuclear halos and clustering phenomena and the dynamics of few-body reactions. The upcoming 24th conference in Guildford will provide an opportunity for the UK community to make themselves visible at this multidisciplinary event.
The abstract submission is open until 15th April and the Early Birds fees are applicable until 27th May. University of Surrey will provide low-cost accommodation on campus to those who request it before 27th of May.
Please visit our web site at
https://indico.cern.ch/event/789163/
Contribution by Natasha Timofeyuk (Chair of the Local Organizing Committee)
n.timofeyuk@surrey.ac.uk (Surrey)

c. Summer School in Nuclear Physics and its Applications
The 75th SUSSP and 20th STFC Summer School in Nuclear Physics and its Applications will be held at the University of St Andrews, 5th-17th August 2019. This edition of the summer school is a satellite event to the International Nuclear Physics Conference (INPC), the largest in its field, which runs in Glasgow until the 2nd August.
The two-week residential school, targeted at PhD students, aims to broaden the participants' knowledge by providing lectures, delivered by leading international researchers, and skills-based practical sessions across a wide range of topics at the forefront of fundamental nuclear and hadron physics research and its applications. It will include sessions on careers and on nuclear physics outreach and will offer all participants the opportunity to present their research in a talk.
Generous sponsorship from STFC, SUSSP and SUPA allows a number of bursaries to be offered, while the IoP will provide prizes for the best student talks. The school is also supported by Kromek and Mirion Technologies.
We invite you to register by the 31st of May.
More information is available on the school website:
https://sites.google.com/a/york.ac.uk/uknpss2019/
Contribution by Daria Sokhan
Daria.Sokhan@glasgow.ac.uk (Glasgow)

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3. Outreach Activity

IRIS three-year anniversary evening
On 18th March Dr Chantal Nobs from the Culham Centre for Fusion Energy was invited to the IRIS three-year anniversary evening at the Francis Crick Institute to talk as an alumnus of IRIS to current students and stakeholders.
IRIS, the Institute for Research in Schools, is a charitable trust that works primary and

secondary schools across the UK to make cutting-edge research projects accessible to schools so students and teachers can experience real scientific research. Since IRIS was launched in March 2016 a number of projects have been established, some of which are led by universities and research institutes, and the number of partner schools has climbed rapidly to well over 200 schools. Chantal was involved in IRIS while she was an A-level student at the Simon Langton Grammar School for Boys, before IRIS became the formal organisation it is today. At that time Becky Parker MBE, now the Director of IRIS, was Chantal's A-level physics teacher, and following a school trip to CERN Becky supported students in starting the LUCID project (Langton Ultimate Cosmic Ray Intensity Detector). Using Timepix chips from the Medipix Collaboration this device was to be designed by generations of students collaboratively with CERN, and ultimately sent into space to measure cosmic rays. During the anniversary evening at the Crick Institute Chantal talked to those currently involved in IRIS about the project she was involved with at the Langton, and how direct exposure to scientific research through the LUCID project encouraged her to study physics at University and helped shape her career path as a scientific researcher. Talks were also given by primary and secondary school students from 5 schools across the UK who presented details and results of the projects they have been involved with, followed by a poster exhibition involving about 10 different schools.
Further details regarding IRIS can be found at: http://www.researchinschools.org/
Contribution by Chantal Nobs
chantal.nobs@ukaea.uk (CCFE)

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4. Media Interactions

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