UK Nuclear Activity

August 2016 Issue 38

In this issue,

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

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1. Nuclear Physics Publications for August*

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 06 (2016) 050 http://link.springer.com/article/10.1007/JHEP06(2016)050
Centrality dependence of ψ(2S) suppression in p-Pb collisions at $\sqrt{s_{NN}}$ = 5.02 TeV
ALICE Collaboration, UK Authors: D. Alexandre, L.S. Barnby, M. Borri, M. Chartier, D. Evans, M.A.S. Figueredo, K.L. Graham, P.G. Jones, A. Jusko, M. Krivda, G.R. Lee, R.C. Lemmon, R. Lietava, J. Norman, O. Villalobos Baillie, N. Zardoshti
*Published 8 June 2016

Phys. Lett. B 758 (2016) 389-401 http://www.sciencedirect.com/science/article/pii/S0370269316301745
Multi-strange baryon production in p-Pb collisions at $\sqrt{s_{NN}}$ = 5.02 TeV
ALICE Collaboration, UK Authors: D. Alexandre, L.S. Barnby, M. Borri, M. Chartier, D. Evans, M.A.S. Figueredo, K.L. Graham, P.G. Jones, A. Jusko, M. Krivda, G.R. Lee, R.C. Lemmon, R. Lietava, J. Norman, O. Villalobos Baillie, N. Zardoshti
*Published 10 July 2016

Phys. Rev. C 94, 014910 (2016) https://journals.aps.org/prc/abstract/10.1103/PhysRevC.94.014910
Near-side azimuthal and pseudorapidity correlations using neutral strange baryons and mesons in d + Au, Cu + Cu, and Au + Au collisions at $\sqrt{s_{NN}}$ = 200 GeV
STAR Collaboration, UK Authors: L.S. Barnby, M. Bombara, L. Gaillard, P.G. Jones
*Published 28 July 2016

Phys. Rev. Lett. 117, 062501 (2016) http://journals.aps.org/prl/abstract/10.1103/PhysRevLett.117.062501
Superdeformed and Triaxial States in ^{42}Ca
K. Hadyńska-Klęk[1,2,3], P. J. Napiorkowski[1], M. Zielińska[5,1], J. Srebrny[1], A. Maj[6], F. Azaiez[7], J. J. Valiente Dobón[4],

*Also including missed publications from previous months.

M. Kicińska-Habior[2], F. Nowacki[8], H. Naïdja[8,9,10], B. Bounthong[8], T. R. Rodríguez[11],G. de Angelis[4], T. Abraham[1], G. Anil Kumar[6], D. Bazzacco[12,13], M. Bellato[12], D. Bortolato[12], P. Bednarczyk[6], G. Benzoni[14], L. Berti[4], B. Birkenbach[15], B. Bruyneel[15], S. Brambilla[14], F. Camera[14,16],J. Chavas[5], B. Cederwall[17], L. Charles[8], M. Ciemała[6], P. Cocconi[4], P. Coleman-Smith[18], A. Colombo[12], A. Corsi[14,16], F. C. L. Crespi[14,16], D. M. Cullen[19], A. Czermak[6], P. Désesquelles[20,21], D. T. Doherty[5,22], B. Dulny[6], J. Eberth[15], E. Farnea[12,13], B. Fornal[6], S. Franchoo[7], A. Gadea[23], A. Giaz[14,16], A. Gottardo[4], X. Grave[7], J. Grębosz[6], A. Görgen[3], M. Gulmini[4], T. Habermann[9], H. Hess[15],R. Isocrate[12,13], J. Iwanicki[1], G. Jaworski[1], D. S. Judson[24], A. Jungclaus[25], N. Karkour[21], M. Kmiecik[6],D. Karpiński[2], M. Kisieliński[1], N. Kondratyev[26], A. Korichi[21], M. Komorowska[1,2], M. Kowalczyk[1], W. Korten[5], M. Krzysiek[6], G. Lehaut[27], S. Leoni[14,16], J. Ljungvall[21], A. Lopez-Martens[21], S. Lunardi[12,13],G. Maron[4], K. Mazurek[6], R. Menegazzo[12,13], D. Mengoni[12], E. Merchán[9,28], W. Męczyński[6], C. Michelagnoli[12,13], J. Mierzejewski[1], B. Million[14], S. Myalski[6], D. R. Napoli[4], R. Nicolini[14], M. Niikura[7],A. Obertelli[5], S. F. Özmen[1], M. Palacz[1], L. Próchniak[1], A. Pullia[14,16], B. Quintana[29], G. Rampazzo[4], F. Recchia[12,13], N. Redon[27], P. Reiter[15], D. Rosso[4], K. Rusek[1], E. Sahin[4], M.-D. Salsac[5], P.-A. Söderström[30], I. Stefan[7], O. Stézowski[27], J. Styczeń[6], Ch. Theisen[5], N. Toniolo[4], C. A. Ur[12,13], V. Vandone[14,16], R. Wadsworth[22], B. Wasilewska[6], A. Wiens[15], J. L. Wood[31], K. Wrzosek-Lipska[1], and M. Zięblński[6]
Published 1 August 2016

Phys. Rev. C 94, 024303 (2016) http://journals.aps.org/prc/abstract/10.1103/PhysRevC.94.024303
β decay of semi-magic ^{130}Cd: Revision and extension of the level scheme of ^{130}In
A. Jungclaus[1], H. Grawe[2], S. Nishimura[3], P. Doornenbal[3], G. Lorusso[3,4,5], G. S. Simpson[6], P.-A. Söderström[3], T. Sumikama[7], J. Taprogge[1,8,3], Z. Y. Xu[9], H. Baba[3], F. Browne[10,3], N. Fukuda[3], R. Gernhäuser[11], G. Gey[6,12,3], N. Inabe[3], T. Isobe[3], H. S. Jung[13,*], D. Kameda[3], G. D. Kim[14], Y.-K. Kim[14,15], I. Kojouharov[2], T. Kubo[3], N. Kurz[2], Y. K. Kwon[14], Z. Li[16], H. Sakurai[3,9], H. Schaffner[2], Y. Shimizu[3], K. Steiger[11], H. Suzuki[3], H. Takeda[3], Zs. Vajta[17,3], H. Watanabe[3], J. Wu[16,3], A. Yagi[18], K. Yoshinaga[19], G. Benzoni[20], S. Bönig[21], K. Y. Chae[22], L. Coraggio[23], J.-M. Daugas[24], F. Drouet[6], A. Gadea[25], A. Gargano[23], S. Ilieva[21], N. Itaco[23,26], F. G. Kondev[27], T. Kröll[21], G. J. Lane[28], A. Montaner-Pizá[25], K. Moschner[29], D. Mücher[11], F. Naqvi[30], M. Niikura[9], H. Nishibata[18], A. Odahara[18],R. Orlandi[31,32], Z. Patel[5], Zs. Podolyák[5], and A. Wendt[29]
Published 1 August 2016

Phys. Rev. C 94, 024306 (2016) http://journals.aps.org/prc/abstract/10.1103/PhysRevC.94.024306
No-core configuration-interaction model for the isospin- and angular-momentum-projected states
W. Satuła[1,2], P. Bączyk[1], J. Dobaczewski[1,2,3,4], and M. Konieczka[1]
Published 4 August 2016

Rev. C 94, 024314 (2016) http://journals.aps.org/prc/abstract/10.1103/PhysRevC.94.024314
Direct observation of the ^{114}Ba→^{110}Xe→^{106}Te→^{102}Sn triple α-decay chain using position and time correlations
L. Capponi[1,2,*], J. F. Smith[1,2,†], P. Ruotsalainen[3,‡], C. Scholey[3], P. Rahkila[3], K. Auranen[3,§], L. Bianco[4],A. J. Boston[5], H. C. Boston[5], D. M. Cullen[6], X. Derkx[1,2,‖], M. C. Drummond[5], T. Grahn[3], P. T. Greenlees[3], L. Grocutt[1,2], B. Hadinia[7], U. Jakobsson[3,¶], D. T. Joss[5], R. Julin[3], S. Juutinen[3], M. Labiche[8], M. Leino[3], K. G. Leach[7,**], C. McPeake[5], K. F. Mulholland[1,2], P. Nieminen[3], D. O'Donnell[1,2],E. S. Paul[5], P. Peura[3,††], M. Sandzelius[3], J. Sarén[3], B. Saygi[5], J. Sorri[3], S. Stolze[3], A. Thornthwaite[5],M. J. Taylor[6], and J. Uusitalo[3]Phys.
Published 10 August 2016

Phys Lett B 759, 417 (2016) http://www.sciencedirect.com/science/article/pii/S0370269316302489
Shell evolution approaching the *N* = 20 island of inversion: Structure of ^{26}Na
G.L. Wilson[a], W.N. Catford[a,*], N.A. Orr[b], C.Aa. Diget[c], A. Matta[a], G. Hackman[d], S.J. Williams[d], I.C. Celik[a], N.L. Achouri[b], H. Al Falou[d], R. Ashley[e], R.A.E. Austin[f], G.C. Ball[d], J.C. Blackmon[g], A.J. Boston[e], H.C. Boston[e], S.M. Brown[a], D.S. Cross[d], M. Djongolov[d], T.E. Drake[h], U. Hager[d,i], S.P. Fox[c], B.R. Fulton[c],N. Galinski[d], A.B. Garnsworthy[d], D. Jamieson[j], R. Kanungo[f], K.G. Leach[j,1], J.N. Orce[d,k], C.J. Pearson[d],M. Porter-Peden[i], F. Sarazin[i], E.C. Simpson[a], S. Sjue[d], D. Smalley[i], C. Sumithrarachchi[d], S. Triambak[d,l],C. Unsworth[e,d], R. Wadsworth[c]
Published 10 August 2016

Phys. Rev. C 94, 025802 (2016) http://journals.aps.org/prc/abstract/10.1103/PhysRevC.94.025802
Pairing in high-density neutron matter including short- and long-range correlations
D. Ding[1], A. Rios[2], H. Dussan[1], W. H. Dickhoff[1], S. J. Witte[1,3], A. Carbone[4], and A. Polls[5]
Published 11 August 2016

JHEP 08 (2016) 078 http://link.springer.com/article/10.1007/JHEP08(2016)078
Measurement of D-meson production versus multiplicity in p-Pb collisions at $\sqrt{s_{NN}}$ = 5.02 TeV

ALICE Collaboration, UK Authors: D. Alexandre, L.S. Barnby, M. Borri, M. Chartier, D. Evans, M.A.S. Figueredo, K.L. Graham, P.G. Jones, A. Jusko, M. Krivda, G.R. Lee, R.C. Lemmon, R. Lietava, J. Norman, R. Romita, O. Villalobos Baillie, N. Zardoshti
Published 11 August 2016

Phys. Rev. Lett. 117, 082502 (2016) http://journals.aps.org/prl/abstract/10.1103/PhysRevLett.117.082502
Isospin Symmetry at High Spin Studied via Nucleon Knockout from Isomeric States
S. A. Milne[1], M. A. Bentley[1], E. C. Simpson[2], T. Baugher[3,4], D. Bazin[4], J. S. Berryman[4], A. M. Bruce[5], P. J. Davies[1], C. Aa. Diget[1], A. Gade[3,4], T. W. Henry[1], H. Iwasaki[3,4], A. Lemasson[4,6], S. M. Lenzi[7], S. McDaniel[3,4], D. R. Napoli[8], A. J. Nichols[1], A. Ratkiewicz[3,4], L. Scruton[1], S. R. Stroberg[3,4,9], J. A. Tostevin[10], D. Weisshaar[4], K. Wimmer[4,11], and R. Winkler[4]
Published 15 August 2016

Phys. Rev. C 94, 024325 (2016) http://journals.aps.org/prc/abstract/10.1103/PhysRevC.94.024325
First in-beam γ-ray study of the level structure of neutron-rich ^{39}S
R. Chapman[1,*], Z. M. Wang[1], M. Bouhelal[2], F. Haas[3], X. Liang[1], F. Azaiez[4], B. R. Behera[5], M. Burns[1], E. Caurier[3], L. Corradi[5], D. Curien[3], A. N. Deacon[6], Zs. Dombrádi[7], E. Farnea[8], E. Fioretto[5], A. Gadea[5], A. Hodsdon[1], F. Ibrahim[4], A. Jungclaus[9], K. Keyes[1], V. Kumar[1], S. Lunardi[8], N. Mărginean[5,10], G. Montagnoli[8], D. R. Napoli[5], F. Nowacki[3], J. Ollier[1,11], D. O'Donnell[1], A. Papenberg[1], G. Pollarolo[12], M.-D. Salsac[13], F. Scarlassara[8], J. F. Smith[1], K. M. Spohr[1], M. Stanoiu[10], A. M. Stefanini[5], S. Szilner[5,14], M. Trotta[5], and D. Verney[4]
Published 17 August 2016

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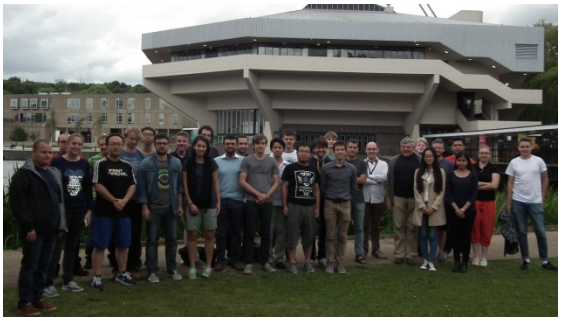
2. News to Report

a. 2016 DFT TALENT course at York

Between 18 July and 5 August, the Nuclear Physics Group hosted one of this year's nuclear theory TALENT courses. The topic was nuclear density functional theory (DFT), which is a powerful method for calculating properties across the entire range of atomic nuclei. Altogether we had 27 MSc. and PhD. students, including 4 from York and 1 from Surrey, with the remainder coming from 16 different oversees institutions. The in-depth course covered all aspects of the state-of-the-art nuclear DFT, such as DFT foundations, Hartree-Fock approximation, pairing, spontaneous symmetry breaking, collective motion, configuration mixing, applications, implementations, phenomenology, and computational aspects. In total, 45 hours of morning lectures were delivered by four lecturers: Jacek Dobaczewski and Alessandro Pastore from York, Andrea Idini from Surrey, and Nicolas Schunck from the Livermore National Laboratory, USA. All lectures were videotaped and will be available to students and the wider public through a dedicated web page along with about 200 pages of lecture note handouts. The afternoon sessions were devoted to training in building self-consistent solvers from scratch. Students worked in small groups and programmed solutions of DFT equations for simple functionals using either coordinate-space or harmonic-oscillator representations.



The course was funded through an STFC grant and supported by contributions from 13 of the students' home institutions. Lodging and catering were provided through the excellent services of York Conferences and the lecture room and computer lab were set up by efficient and helpful technical staff at York working under Ian Helliwell's direction. Spirits were high, friends were made, collaboration patterns emerged – we all have had a lot of fun in learning and doing the physics we like.
Contribution by Jacek Dobaczewski Jacek.Dobaczewski@fuw.edu.pl (York)

b. Workshop on Physics and Engineering Opportunities at the Electron-Ion Collider 2016

You are warmly invited to the first UK workshop on the US-based Electron-Ion Collider (EIC), which will be held on 13 - 14th October 2016 near Glasgow. The EIC has been flagged as the "highest priority for new facility construction following the completion of FRIB" in the US 2015 NSF Long Range Plan for Nuclear Science, and will be built either at Jefferson Lab or Brookhaven National Laboratory in the 2020s. The purpose of the

workshop is to introduce the UK scientific community to the EIC and the range of emerging opportunities for new collaborations and R&D projects, and to provide the opportunity for discussion with the current international leaders of the EIC effort.
https://ukeicworkshop2016.wordpress.com/
Contribution by Daria Sokhan
Daria.Sokhan@glasgow.ac.uk (Glasgow)

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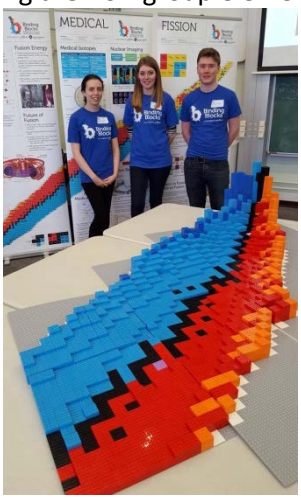
3. Outreach Activity

Building Blocks
On Monday 1st August, a group of fourteen Y10 girls travelled to the University of York for the start of the second annual Girls in Physics event. One of their first activities of the week was hosted by 3 members of the Binding Blocks team. Firstly, we explained atomic and nuclear structure so that different types of decay could be described with the different colours of the chart. They actively listened to and understood all the details and once the group was happy with the concept, they engaged with building the partial chart up to and including the iron-group elements.



After the LEGO chart was completed, fusion inside stars was explained by rolling a tennis ball down the chart and pointing out that it landed at the lowest part - or most stable point - of the chart's valley. This led on to discussing the applications of fusion on Earth which links into the other activities they had planned throughout the week, including a trip to Culham Centre for Fusion Energy. Medical physics applications were expanded upon by pointing out the radioactive isotopes in pink LEGO on the chart. To follow this up, a demonstration on every day background radiation was carried out with some rock samples and a Geiger counter. Feedback from the girls during the chart build reflected that they found it to be a positive, educational and fun experience.
Contribution by Suzy Beanland
srb534@york.ac.uk (York)

Teach the Teachers – Nuclear Energy
On June 22nd Bangor University hosted a Teach the Teachers event on Nuclear Energy. The twenty teachers that attended heard presentations from Dr John Roberts from The University of Manchester, Sasha Wynn Davies of Horizon Nuclear Power and Iwan Thomas of the North Wales Economic Ambition Board. The teachers came from schools that teach in english and welsh so all the presentations and handouts were all available in both languages.
Contribution by John Roberts
j.w.roberts@manchester.ac.uk (Manchester)

Nuclear Summer School
From August 1st to the 5th the Nuclear Institute, in collaboration with the Nuclear Physics Group at The University of Manchester, hosted a Nuclear Summer School for eight Arkwrights Scholars. The Scholars are supported throughout their sixth form studies and the Summer School took place between their lower and upper sixth years. During the week they visited the Urenco fuel enrichment plant at Capenhurst, Heysham Nuclear Power Plant and the University of Manchester for lectures on nuclear energy and nuclear laboratory experiments. They also heard presentations from representatives of NuGeneration, the National Nuclear Laboratory and the United Kingdom Atomic Energy Authority.
Contribution by John Roberts
j.w.roberts@manchester.ac.uk (Manchester)

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4. Media Interactions

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