UK Nuclear Activity

September 2014 Issue 15

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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 September*

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.

Phys. Rev. C 90, 014320 (2014) http://journals.aps.org/prc/abstract/10.1103/PhysRevC.90.014320
Low-lying isomeric states in ^{80}Ga from the β^- decay of ^{80}Zn
R. Lică[1], N. Mărginean[1], D. G. Ghiţă[1], H. Mach[2,3], L. M. Fraile[2], G. S. Simpson[4,5,6], A. Aprahamian[7], C. Bernards[8,9], J. A. Briz[10], B. Bucher[7], C. J. Chiara[11,12], Z. Dlouhý[13,*], I. Gheorghe[1], P. Hoff[14], J. Jolie[8], U. Köster[15], W. Kurcewicz[16], R. Mărginean[1], B. Olaizola[2], V. Paziy[2], J. M. Régis[8], M. Rudigier[8], T. Sava[1], M. Stănoiu[1], L. Stroe[1], and W. B. Walters[11]
*Published 28 July 2014

Phys. Rev. Lett. 113, 092501 (2014) http://journals.aps.org/prl/abstract/10.1103/PhysRevLett.113.092501
Hindered Gamow-Teller Decay to the Odd-Odd N=Z ^{62}Ga: Absence of Proton-Neutron T=0 Condensate in A=62
E. Grodner[1,2], A. Gadea[2,3], P. Sarriguren[4], S. M. Lenzi[5,6], J. Grębosz[7], J. J. Valiente-Dobón[2], A. Algora[3,8], M. Górska[9], P. H. Regan[10], D. Rudolph[11], G. de Angelis[2], J. Agramunt[3], N. Alkhomashi[10], L. Amon Susam[12], D. Bazzacco[6], J. Benlliure[13], G. Benzoni[14], P. Boutachkov[9], A. Bracco[14,15], L. Caceres[9], R. B. Cakirli[12], F. C. L. Crespi[14], C. Domingo-Pardo[3,9], M. Doncel[16], Zs. Dombrádi[8], P. Doornenbal[9], E. Farnea[6,*], E. Ganioğlu[12], W. Gelletly[10], J. Gerl[9], A. Gottardo[2], T. Hüyük[3], N. Kurz[9], S. Leoni[14,15], D. Mengoni[5,6], F. Molina[3,17], A. I. Morales[14,15], R. Orlandi[4], Y. Oktem[12], R. D. Page[18], D. Perez[13], S. Pietri[9], Zs. Podolyák[10], A. Poves[19], B. Quintana[16], S. Rinta-Antila[18], B. Rubio[3], B. S. Nara Singh[20], A. N. Steer[20], S. Verma[13], R. Wadsworth[20], O. Wieland[14], and H. J. Wollersheim[9]
*Published 28 August 2014

*Also including missed publications from previous months.

J. Phys. G: Nucl. Part. Phys. Volume 41, Number 9, September 2014
http://iopscience.iop.org/0954-3899/41/9
Focus section: Open problems in nuclear reaction theory

J. Phys. G: Nucl. Part. Phys. 41 090301 http://iopscience.iop.org/0954-3899/41/9/090301/article
Open problems in nuclear reaction theory
Ron Johnson[1] and Filomena Nunes[2,3]

J. Phys. G: Nucl. Part. Phys. 41 094005 http://iopscience.iop.org/0954-3899/41/9/094005/article
Theory of the $A(d, p)B$ reaction as a tool for nuclear structure studies
R C Johnson

J. Phys. G: Nucl. Part. Phys. 41 094008 http://iopscience.iop.org/0954-3899/41/9/094008/article
Overlap functions for reaction theories: challenges and open problems
N K Timofeyuk

Prog. Part. Nucl. Phys., 78, 1 (2014) http://www.sciencedirect.com/science/article/pii/S0146641014000453
The Hoyle state in ^{12}C
M. Freer[a,*], H.O.U. Fynbo[b]
Published September 2014

Phys. Rev. C 90, 034301 (2014) http://journals.aps.org/prc/abstract/10.1103/PhysRevC.90.034301
Single-particle structure of silicon isotopes approaching ^{42}Si
S. R. Stroberg[1,2], A. Gade[1,2], J. A. Tostevin[3], V. M. Bader[1,2], T. Baugher[1,2], D. Bazin[1,2], J. S. Berryman[1], B. A. Brown[1,2], C. M. Campbell[4], K. W. Kemper[5], C. Langer[1,6], E. Lunderberg[1,2], A. Lemasson[1], S. Noji[1], F. Recchia[1], C. Walz[1], D. Weisshaar[1], and S. J. Williams[1]
Published 3 September 2014

Phys. Rev. A 90, 032504 (2014) http://journals.aps.org/pra/abstract/10.1103/PhysRevA.90.032504
N-boson spectrum from a discrete scale invariance
A. Kievsky[1], N. K. Timofeyuk[2], and M. Gattobigio[3]
Published 4 September 2014

Phys. Lett. B 736, 137 (2014) http://www.sciencedirect.com/science/article/pii/S0370269314004894
Neutron spectroscopic factors of ^{55}Ni hole-states from (p , d) (p,d) transfer reactions
A. Sanetullaev[a,1], M.B. Tsang[a,*], W.G. Lynch[a], Jenny Lee[a], D. Bazin[a], K.P. Chan[a,b], D. Coupland[a], V. Henzl[a], D. Henzlova[a], M. Kilburn[a], A.M. Rogers[a], Z.Y. Sun[a,c], M. Youngs[a], R.J. Charity[d], L.G. Sobotka[d], M. Famiano[e], S. Hudan[f], D. Shapira[g], W.A. Peters[h], C. Barbieri[i], M. Hjorth-Jensen[a,j], M. Horoi[k], T. Otsuka[l], T. Suzuki[m], Y. Utsuno[n]
Published 7 September 2014

Phys. Lett. B 736, 196 (2014) http://www.sciencedirect.com/science/article/pii/S0370269314004973
Production of charged pions, kaons and protons at large transverse momenta in pp and Pb–Pb collisions at $\sqrt{s_{NN}}$ = 2.76 TeV
B. Abelev et al. ALICE Collaboration, UK Authors: D. Alexandre, L.S. Barnby, D. Evans, M. A. S. Figueredo, L.D. Hanratty, P.G. Jones, A. Jusko, M. Krivda, G.R. Lee, R.C. Lemmon, R. Lietava, R. Romita, P.A. Scott, O. Villalobos-Baillie
Published 7 September 2014

Physical Review C 90, 034904 (2014) https://journals.aps.org/prc/abstract/10.1103/PhysRevC.90.034904
Azimuthal anisotropy of D-meson production in Pb-Pb collisions at $\sqrt{s_{NN}}$ = 2.76 TeV
B. Abelev et al. ALICE Collaboration, UK Authors: D. Alexandre, L.S. Barnby, D. Evans, M. A. S. Figueredo, L.D. Hanratty, P.G. Jones, A. Jusko, M. Krivda, G.R. Lee, R.C. Lemmon, R. Lietava, J. Norman, R. Romita, O. Villalobos-Baillie
Published 10 September 2014

Phys. Rev. C 90, 034310 (2014) http://journals.aps.org/prc/abstract/10.1103/PhysRevC.90.034310
Lifetime measurements of the yrast 8^+ and 9^+ states in ^{70}As
C. Morse[1,2], H. Iwasaki[1,2], A. Lemasson[1], T. Baugher[1,2], D. Bazin[1], J. S. Berryman[1], A. Dewald[3], C. Fransen[3], A. Gade[1,2], S. McDaniel[1,2], A. J. Nichols[4], A. Ratkiewicz[1,2], S. R. Stroberg[1,2], P. Voss[1,2,5], R. Wadsworth[4], D. Weisshaar[1], K. Wimmer[1], and R. Winkler[1]
Published 15 September 2014

Eur. Phys. J. C 74, 3054 (2014) http://link.springer.com/article/10.1140/epjc/s10052-014-3054-5
Transverse momentum dependence of inclusive primary charged-particle production in p–Pb collisions at $\sqrt{s_{NN}}$ = 5.02 TeV
B. Abelev et al. ALICE Collaboration, UK Authors: D. Alexandre, L.S. Barnby, D. Evans, M. A. S. Figueredo, L.D. Hanratty, P.G. Jones, A. Jusko, M. Krivda, G.R. Lee, R.C. Lemmon, R. Lietava, J. Norman, R. Romita, O. Villalobos-Baillie
Published 16 September 2014

Phys. Rev. C 90, 034317 (2014) http://journals.aps.org/prc/abstract/10.1103/PhysRevC.90.034317
Isomeric decay spectroscopy of the ^{217}Bi isotope
A. Gottardo[1,2,*], J. J. Valiente-Dobón[1], G. Benzoni[3], S. Lunardi[2,4], A. Gadea[5], A. Algora[5,6], N. Al-Dahan[7], G. de Angelis[1], Y. Ayyad[8], D. Bazzacco[4], J. Benlliure[8], P. Boutachkov[9], M. Bowry[7], A. Bracco[3,10], A. M. Bruce[11], M. Bunce[11], F. Camera[3,10], E. Casarejos[12], M. L. Cortes[9], F. C. L. Crespi[3,10], A. Corsi[3,10], A. M. Denis Bacelar[11], A. Y. Deo[7,13], C. Domingo-Pardo[9], M. Doncel[14], T. Engert[9], K. Eppinger[15], G. F. Farrelly[7], F. Farinon[9], E. Farnea[4], H. Geissel[9], J. Gerl[9], N. Goel[9], M. Górska[9], J. Grebosz[16], E. Gregor[9], T. Habermann[9], R. Hoischen[9,17], R. Janik[18], P. R. John[2,4], S. Klupp[15], I. Kojouharov[9], N. Kurz[9], S. M. Lenzi[2,4], S. Leoni[3,10], S. Mandal[19], R. Menegazzo[4], D. Mengoni[4], B. Million[3], V. Modamio[1], A. I. Morales[3], D. R. Napoli[1], F. Naqvi[9,20], R. Nicolini[3,10], C. Nociforo[9], M. Pfützner[21], S. Pietri[9], Zs. Podolyák[7], A. Prochazka[9], W. Prokopowicz[9], F. Recchia[4], P. H. Regan[7], M. W. Reed[7], D. Rudolph[17], E. Sahin[1], H. Schaffner[9], A. Sharma[9], B. Sitar[18], D. Siwal[19], K. Steiger[15], P. Strmen[18], T. P. D. Swan[7], I. Szarka[18], C. A. Ur[4], P. M. Walker[7], H. Weick[9], O. Wieland[3], and H-J. Wollersheim[9]
Published 23 September 2014

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2. News to Report

a. Workshop on Nuclear Data: Current Measurements, Uncertainties, Applications and Needs. This one day workshop will be held on Thursday 30th October 2014 at National Physical Laboratory and is sponsored by the IOP Nuclear Physics Group.
The recent STFC Nuclear Physics Showcase Event in September 2013 highlighted the contribution that nuclear physics makes to the UK and also the challenges in resourcing and co-ordination that the field faces.
Following on from this event, you are cordially invited to a workshop to debate one of the topics raised - the need to maintain and improve nuclear databases. The aims are to discuss the present status and future requirements.
Presentations will include:
Nuclear databases (national and international perspectives); Nuclear data needs for nuclear medicine, NORM, the nuclear industry and test-ban treaty verification; Total decay heat measurements; Decay data for exotic radionuclides.
The event is jointly Sponsored by the IOP Nuclear Physics Group, The IOP Nuclear Industry Group and the National Nuclear Laboratory. The meeting is free to attend but participants are kindly requested to register in advance using the online portal below:
http://www.npl.co.uk/events/30-oct-2014-nuclear-data
Speakers include representatives from academia, the National Nuclear Laboratory (NNL), the National Physical Laboratory (NPL), Argonne National Laboratory, AWE plc., the AEA and the UK nuclear industry, including:
Robert Mills (NNL, UK) - The JEFF/ENDSF/IAEA and other nuclear databases.
Andy Pearce (NPL, UK) - New nuclear data and decay characterisation needs for medical isotope evaluations.
Jonathan Wilson (IPN Orsay, France) - Nuclear data from (prompt) nuclear fission decays using LICORNE.
Zsolt Podolyak (U. Surrey, UK) – Decay data, instrumentation and measurement techniques for nuclear structure studies of exotic nuclei.
Filip Kondev (Argonne National Laboratory, USA) – Decay evaluations and actinide nuclear data requirements.
Alejandro Algora (Valencia, Spain) – Total decay heat measurements and average E_β and E_γ values from fission fragments and decay waste.
Tobias Wright (U. Manchester & nTOF collaboration, CERN) - Measurements of resonance capture cross-sections for neutrons on Uranium.
Contribution by Paddy Regan p.regan@surrey.ac.uk (NPL/Surrey)

b. Triangulating Carbon-12. Evidence for triangular D3h symmetry in ^{12}C was awarded the University of Birmingham, College of Engineering and Physical Sciences Best Publication Award:
http://www.birmingham.ac.uk/university/coll

eges/eps/news/college/2014/Triangulating-Carbon-12.aspx
See issue 13 (July 2014) of this newsletter for more details.
Contribution by Tzany Kokalova Wheldon t.kokalova@bham.ac.uk (Birmingham)

c. Boost for UK's nuclear physics research.
The UK's nuclear physics research capability will be strengthened significantly with the establishment of a new nuclear physics theory group at the University of York thanks to a special funding award from STFC. This award will pave the way for the appointment of a nuclear physics theory chair and PhD studentship, while in addition York will fund a nuclear physics theory lectureship.
The move is driven by a strategic need for theory and modelling support to the UK's national experimental programme which was identified in a 2012 Institute of Physics report. Professor Bob Wadsworth, from York's Department of Physics, said: "The fact that there are only a handful of UK academics working on nuclear physics theory has been highlighted as a serious issue for the status of nuclear physics research in the UK."
"At the moment, experimental nuclear physicists working in the UK frequently need to seek support from theorists in Europe, Japan or the United States. Having more theorists in the UK will be invaluable to the UK nuclear physics community."
Professor John Womersley, Chief Executive of STFC, welcomed the announcement, "Due to the nature of this opportunity to strengthen the UK programme in nuclear physics theory STFC has provided additional funding for the UK nuclear physics research community. This new collaboration between STFC and the University of York reinforces our commitment to help keep the UK at the forefront of nuclear physics research."
The new theory group will complement the work of York's experimental groups and will work closely with theory groups at Manchester and Surrey Universities, as well as other groups across Europe and beyond.
The new chair is expected to be in place by March 2015, the lecturer by June 2015 and the studentship will begin in October 2015.
STFC will fund the chair position for approximately three and a half years, after which time York will take on the funding of the post.

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3. Outreach Activity

CERN@school Symposium
CERN@school uses pixel detector chips from the Medipix Collaboration at CERN in schools and on the LUCID spacecraft in orbit around the Earth, to aid with the teaching of nuclear and particle physics. CERN@school brings technology from CERN into the classroom, to inspire the next generation of scientists and engineers by giving school students the opportunity to be part of a national collaboration of students, teachers and academics, analysing data obtained from detectors based on the ground and in space.
All students and teachers who have used the CERN@school detectors were invited to attend an end of year symposium on 8th September 2014. The symposium ran alongside the Position Sensitive Detectors conference at the University of Surrey, allowing students to present their work to researchers using detectors in all fields. At the end of the day Professor John Womersley presented participation certificates to all the students who attended.
During the symposium students also promoted their 'Radiation Around You' project. This is a research programme that aims to encourage CERN@school collaboration members to gather measurements of background radiation levels across the UK, to try and identify spatial and temporal trends.
Contribution by Elizabeth Cunningham elizabeth.cunningham@stfc.ac.uk (STFC/Surrey)

I'm a scientist, get me out of here! The "I'm a scientist, get me out of here!" project is continuing, and the next two zones are a Big Data Zone and an Extreme Temperature Zone, which will run from 10–21 November. They're looking for volunteers for the project – there have been a few participants from the nuclear physics community in the past, and it'd be nice to continue this involvement.
I'm a Scientist is a great, easy way for scientists to dip their toes in public engagement. They develop their communication skills, gain a fresh perspective

on their research, feel reinvigorated about their jobs and science in general, build new networks, and find out what young people think about science and the role of scientists. And what's more, they do all this without leaving their desk!
It all happens online at imascientist.org.uk. Scientists answer students' questions, and engage directly with them in live text-based chats. Students vote for their favourite researcher to win £500 to spend on further public engagement.
Most participants say they spend around 2 hours a day answering students' questions, though half of that can be during the evening, outside of the work day.
Scientists can find out more information and apply at imascientist.org.uk/scientists before September 29th. If you have any questions, or would like more information, email angela@gallomanor.com and she'll be happy to help.

Outreach Funding. The 2014 round of the STFC Public Engagement Large Awards scheme is now open for applications. The closing date is 6th November 2014 at 4.00pm.

The Large Awards Scheme provides funds for projects which are expected to have a significant regional or national impact. It offers awards from £10,000 up to £100,000. Almost anyone can apply but project teams must have strong links with STFC's scientific research community. We also encourage partnerships that may positively impact on the success of the project e.g. universities with science centres.
Projects must be relevant to publicising engagement or teaching about the STFC science and technology areas, namely:
•particle physics
•nuclear physics
•space, ionospheric, solar and planetary science
•astronomy
•astrophysics
•cosmology
•studying materials with muon and neutron sources
•studying materials with synchrotron light sources
•research using laser facilities
•other science areas'
The STFC contact is: Andy Thompson Tel: 01793 442098.

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4. Media Interactions

What is nuclear fusion?

http://www.thenakedscientists.com/HTML/content/interviews/interview/1000879/
Brian Fulton, explains nuclear fusion to Dave Ansell on the Naked Scientist radio show broadcast on BBC Radio Cambridge on Sunday 31st August.
Contribution by Brian Fulton brian.fulton@york.ac.uk (York)