UK Nuclear Activity

August 2015 Issue 26

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 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.

J. Environ. Radioact., 146 (2015) 1 http://www.sciencedirect.com/science/article/pii/S0265931X15001046
A high-efficiency HPGe coincidence system for environmental analysis
R. Britton[a,b,], A.V. Davies[a], J.L. Burnett[b], M.J. Jackson[a]
Published August 2015

Eur. Phys. J A 51, 94 (2015) http://link.springer.com/article/10.1140%2Fepja%2Fi2015-15094-y
Resonance strengths in the ^{17,18}O(p, α)^{14,15}N reactions and background suppression underground
C. G. Bruno, D. A. Scott, A. Formicola, M. Aliotta, T. Davinson, M. Anders, A. Best, D. Bemmerer, C. Broggini, A. Caciolli, F. Cavanna, P. Corvisiero, R. Depalo, A. Di Leva, Z. Elekes, Zs. Fülöp, G. Gervino, C. J. Griffin, A. Guglielmetti, C. Gustavino, Gy. Gyürky, G. Imbriani, M. Junker, R. Menegazzo, E. Napolitani, P. Prati, E. Somorjai, O. Straniero, F. Strieder, T. Szücs, D. Trezzi, LUNA Collaboration
Published 4 August 2015

Phys. Rev. Lett. 115, 062701 (2015) http://journals.aps.org/prl/abstract/10.1103/PhysRevLett.115.062701
Inverse Kinematic Study of the ^{26}Al(d,p)^{27}Al Reaction and Implications for Destruction of ^{26}Al in Wolf-Rayet and Asymptotic Giant Branch Stars
V. Margerin[1], G. Lotay[1,2,3,*], P. J. Woods[1], M. Aliotta[1], G. Christian[4], B. Davids[4], T. Davinson[1], D. T. Doherty[1,†], J. Fallis[4], D. Howell[4], O. S. Kirsebom[4,‡], D. J. Mountford[1], A. Rojas[4], C. Ruiz[4], and J. A. Tostevin[2]
Published 5 August 2015

Phys. Rev. Lett. 115, 062502 (2015) http://journals.aps.org/prl/abstract/10.1103/PhysRevLett.115.062502
Enhanced γ-Ray Emission from Neutron Unbound States Populated in β Decay
J. L. Tain[1,*], E. Valencia[1], A. Algora[1], J. Agramunt[1], B. Rubio[1], S. Rice[2], W. Gelletly[2], P. Regan[2],A.-A. Zakari-Issoufou[3], M. Fallot[3], A. Porta[3], J. Rissanen[4], T. Eronen[4], J. Äystö[5], L. Batist[6], M. Bowry[2], V. M. Bui[3], R. Caballero-

Folch[7], D. Cano-Ott[8], V.-V. Elomaa[4], E. Estevez[1], G. F. Farrelly[2],A. R. Garcia[8], B. Gomez-Hornillos[7], V. Gorlychev[7], J. Hakala[4], M. D. Jordan[1], A. Jokinen[4], V. S. Kolhinen[4], F. G. Kondev[9], T. Martínez[8], E. Mendoza[8], I. Moore[4], H. Penttilä[4], Zs. Podolyák[2], M. Reponen[4], V. Sonnenschein[4], and A. A. Sonzogni[10]
Published 6 August 2015

Phys. Rev. C 92, 024310 (2015) http://journals.aps.org/prc/abstract/10.1103/PhysRevC.92.024310
Isospin-breaking interactions studied through mirror energy differences
M. A. Bentley[1,*], S. M. Lenzi[2], S. A. Simpson[1], and C. Aa. Diget[1]
Published 10 August 2015

Phys. Rev. C 92, 024315 (2015) http://journals.aps.org/prc/abstract/10.1103/PhysRevC.92.024315
Triplet energy differences and the low lying structure of ^{62}Ga
T. W. Henry[1], M. A. Bentley[1], R. M. Clark[2], P. J. Davies[1], V. M. Bader[3,4,*], T. Baugher[3,4], D. Bazin[3],C. W. Beausang[5], J. S. Berryman[3], A. M. Bruce[6], C. M. Campbell[2], H. L. Crawford[2], M. Cromaz[2],P. Fallon[2], A. Gade[3,4], J. Henderson[1,†], H. Iwasaki[3,4], D. G. Jenkins[1], I. Y. Lee[2], A. Lemasson[3,7],S. M. Lenzi[8], A. O. Macchiavelli[2], D. R. Napoli[9], A. J. Nichols[1], S. Paschalis[10], M. Petri[10], F. Recchia[3], J. Rissanen[2], E. C. Simpson[1], S. R. Stroberg[3,4], R. Wadsworth[1], D. Weisshaar[3], A. Wiens[2], and C. Walz[3,10]
Published 20 August 2015

J. Phys.: Conf. Ser., 620, 012005 (2015) http://iopscience.iop.org/1742-6596/620/1/012005
Development of NANA: A Fast-Scintillator, Coincidence Gamma-ray Array for Radioactive Source Characterisation and Absolute Activity Measurements at the UK National Physical Laboratory
P H Regan[1,2], R Shearman[1,2], S M Judge[1,2], G Lorusso[1,2], P Main[1,2], S Bell[1], S M Collins[1], P Ivanov[1], S M Jerome[1], J D Keightley[1], C Larijani[1], G Lotay[1,2] and A K Pearce[1]
Published 26 August 2015

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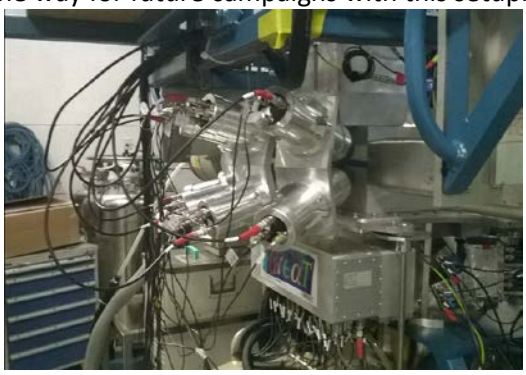
2. News to Report

a. York physicist wins prestigious Polish award. Professor Jacek Dobaczewski from the University has York has been awarded the Wojciech Rubinowicz prize by the Polish Physical Society (Polskie Towarzystwo Fizyczne - PTF).
The society awarded Professor Dobaczewski the annual scientific prize for fundamental studies in density functional theory (DFT) and its applications in nuclear physics.
The DFT is a universal tool used mainly to describe systems of many electrons in condensed matter physics, atomic physics, or quantum chemistry. Due to the complexity of nucleon to nucleon interaction, research in nuclear DFT requires novel theoretical approaches and estimating related theoretical uncertainties – a pioneering aspect of Professor Dobaczewski's work.
Significantly contributing to DFT applications in nuclear physics, Professor Dobaczewski has published more than 40 scientific papers in *World of Sciences* indexed journals, and has presented dozens of invited papers at nuclear-physics conferences, including the International Nuclear Physics Conference, where he summarised the state of research in the field in 2010.
Professor Dobaczewski said: "I am extremely proud to be awarded the PTF prize - recognition by peers is something that I value above all.
"The Wojciech Rubinowicz prize is named after the founder of theoretical physics research in Warsaw. It is the only scientific distinction awarded by the PTF each year, representing the entire community of Polish physicists, which covers all domains of physics. It is with great joy and satisfaction I will participate in the 43rd Congress of PTF, during which I will be presented with the prize on 10 September 2015."
Professor Dobaczewski is one of the world's foremost nuclear physics theorists and was previously Head of the Nuclear Structure Theory Division at the University of Warsaw. He joined the University of York this year, as part of a joint initiative between York and the Science and Technology Facilities Council (STFC) to significantly strengthen the UK's nuclear physics research community.
Contribution by Christian Aaen Diget christian.diget@york.ac.uk (York).

b. UK NUSTAR LaBr Detector setup at the RITU focal plane at the University of Jyväskylä, Finland. In August 2015, eight LaBr detectors, which belong to the UK NUSTAR collaboration, were installed at the focal plane

of the gas-filled separator RITU. This setup was constructed for a proof-of-principle experiment R51 to demonstrate that nuclear state lifetimes could be measured following the decay of isomeric states at the focal plane of RITU. A large part of the work was performed by Ph.D students from the Universities of Manchester, Brighton and the West of Scotland, UK and Bucharest, Romania. The main point that this experiment needed to prove was that lifetimes could actually be extracted from a distributed source of recoils which were spread across the entire RITU focal plane. The position of the recoil implant had to be known so that the different flight times to each of the detector pairs could be corrected for. The test experiment focused on measuring the lifetime of the 2^+ state in the ground-state rotational band of ^{138}Gd which is fed by the decay of the 6 μs, $K^{\pi}=8^-$ isomeric state. Although the final analysis is not complete, initial results from the centroid-shift method, reveal that the lifetime for the 2^+ state has order ~300 ps. Until the final prompt-response function has been carefully defined from the source calibration data, this value remains very tentative, however, it is encouraging to note that this value is at least consistent with the 300ps extracted from a previous differential plunger experiment using DPUNS at the target position. Finally, in the last 24 hours of the experiment, a yield test was made to study the lifetimes of states below the 8^+ isomer in ^{210}Ra.

This work has demonstrated that prompt gamma-gamma lifetimes can be extracted from a distributed recoil distribution at the focal plane of the RITU separator and paves the way for future campaigns with this setup.



The 8-Labr UK-NUSTAR detector setup for measuring nuclear state lifetimes in cascades following isomer decays at the focal plane of the RITU separator at the University of Jyväskylä, Finland.

Contribution by D.M. Cullen
dave.cullen@manchester.ac.uk (Manchester).

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3. Outreach Activity

Outreach talk

Paddy Regan gave the invited talk at the IoP Physics Teachers Conference at Charterhouse School, Godalming, Surrey on 7th July 2015. The title of the talk was: 'The Science of Polonium-210'.

Contribution by Paddy Regan
p.regan@surrey.ac.uk *(Surrey)*

I'm a Scientist - STFC funded zones Nov 2015

I'm a Scientist is an online outreach event that gets scientists talking to schools students all over the country at imascientist.org.uk, and applications are now open for the next event in November!

For two weeks, 9th – 20th November, STFC scientists will answer students' questions, and engage directly with them in live text-based chats. The students will then vote for their favourite scientist to win £500 to use for more public outreach. The STFC is funding two zones for scientists to be part of: Extreme Pressure Zone, and a general science zone, which is suitable for any STFC scientist.

By taking part you get to develop communication skills, gain a fresh perspective on your work, and find out what young people really think about science, while showing students that scientists are real people.

As everything happens online, you can do all this from your laptop at work, your phone on the train, or possibly even your internet-connected fridge.

Apply to take part by Sunday 27th September here:
imascientist.org.uk/scientists

For more insight into what's involved read what STFC winners Chris and James, and others from June, thought about the event here: "The most fun I've had in my lab coat"

If you'd like to find out more or have any questions, please contact antony@gallomanor.com or call on 01225 326892.

STFC PUBLIC ENGAGEMENT 2015B SMALL AWARDS SCHEME

STFC has announced that the 2015B Small Awards scheme round is open. The closing date for applications is Thursday 8th October at 4.00pm.

The Public Engagement Small Awards Scheme provides funds for small, local or 'pilot' projects promoting STFC science and technology. Almost anyone can apply, including grant-funded research groups, STFC research facility users, schools, museums, etc. Awards range from £500 to £10,000 and the expenditure can go towards materials, salaries and travel & subsistence.
Please see the notes for guidance for further information.

STFC PUBLIC ENGAGEMENT LARGE AWARDS SCHEME – 2015 ROUND: STAGE 1

The 2015 Stage 1 round of the *STFC Public Engagement Large Awards scheme* is now open for applications.
The closing date is 11th November 2015 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 for either the small or large awards must be relevant to publicising engagement or teaching about the STFC science and technology areas, namely:

- particle physics
- nuclear physics
- space, 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

Applicants are advised to consult the STFC Public Engagement Strategy in advance of submitting your proposal and are also encouraged (if applicable) to consider working with under-represented audiences such as girls and young women in engineering and physics, groups in areas geographically remote from STEM activity and underperforming schools.
All applications must be submitted through the RCUK Je-S system. E-mailed or hard copy applications will not be accepted.
The scheme is administered by the STFC Public Engagement Team.

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4. Media Interactions

Paddy Regan on 6th August 2015 participated in a live interview on the Mark Forrest Show. It was broadcast live to 39 different BBC Local Radio and covered the science behind nuclear weapons on the 70th Anniversary of Hiroshima.
Contribution by Paddy Regan
p.regan@surrey.ac.uk *(Surrey)*

Paul Stevenson was solicited to write a piece for *The Conversation* on the subject of nuclear physics, highlighting some of the ways it has brought societal benefits. The solicitation came to coincide with the news stories commemorating the 70th anniversary of the bombing of Hiroshima and Nagasaki. The article is available at
https://theconversation.com/what-has-nuclear-physics-ever-given-us-45790
Contribution by Paul Stevenson
p.stevenson@surrey.ac.uk *(Surrey)*