UK Nuclear Activity

June 2016 Issue 36

In this issue,

1. Nuclear Physics Publications for June

2. News to Report
   a. 2nd International Workshop on the Applications of Novel Scintillators in Research & Industry
   b. UK Nuclear Theory Meeting
   c. Building Blocks at the University of York

3. Outreach Activity

4. Media Interactions

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 June*

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 93, 061301(R) (2016) http://journals.aps.org/prc/abstract/10.1103/PhysRevC.93.061301
New neutron-deficient isotopes from ^{78}Kr fragmentation
B. Blank[1], T. Goigoux[1], P. Ascher[1], M. Gerbaux[1], J. Giovinazzo[1], S. Grévy[1], T. Kurtukian Nieto[1],C. Magron[1], J. Agramunt[2], A. Algora[2,3], V. Guadilla[2], A. Montaner-Piza[2], A. I. Morales[2], S. E. A. Orrigo[2], B. Rubio[2], D. S. Ahn[4], P. Doornenbal[4], N. Fukuda[4], N. Inabe[4], G. Kiss[4], T. Kubo[4], S. Kubono[4], S. Nishimura[4], V. H. Phong[4], H. Sakurai[4,5], Y. Shimizu[4], P.-A. Söderström[4], T. Sumikama[4], H. Suzuki[4], H. Takeda[4], J. Wu[4], Y. Fujita[6,7], M. Tanaka[6], W. Gelletly[2,8], P. Aguilera[9],F. Molina[9], F. Diel[10], D. Lubos[11], G. de Angelis[12], D. Napoli[12], C. Borcea[13], A. Boso[14], R. B. Cakirli[15], E. Ganioglu[15], J. Chiba[16], D. Nishimura[16], H. Oikawa[16], Y. Takei[16], S. Yagi[16], K. Wimmer[5], G. de France[17], and S. Go[18]
Published 2 June 2016

Phys. Rev. Lett. 116, 222301 (2016) http://journals.aps.org/prl/abstract/10.1103/PhysRevLett.116.222301
Measurement of an Excess in the Yield of J/ψ at Very Low pT in Pb–Pb Collisions at $\sqrt{s_{NN}}$=2.76 TeV
J. Adam *et al.* (ALICE Collaboration)
Published 2 June 2016

Phys. Rev. Lett. 116, 222302 (2016) http://journals.aps.org/prl/abstract/10.1103/PhysRevLett.116.222302
Centrality Dependence of the Charged-Particle Multiplicity Density at Midrapidity in Pb-Pb Collisions at $\sqrt{s_{NN}}$ =5.02 TeV
J. Adam *et al.* (ALICE Collaboration)
Published 3 June 2016

Phys. Rev. C 93, 064316 (2016) http://journals.aps.org/prc/abstract/10.1103/PhysRevC.93.064316
Short-lived isomers in ^{192}Po and ^{194}Po
B. Andel[1,*], A. N. Andreyev[2,3], S. Antalic[1], F. P. Heßberger[4,5], D. Ackermann[4,†], S. Hofmann[4,6], M. Huyse[7], Z. Kalaninová[1,‡], B. Kindler[4], I. Kojouharov[4], P. Kuusiniemi[4,§], B. Lommel[4], K. Nishio[3], R. D. Page[8], B. Sulignano[4,‖], and P. Van Duppen[7]
Published 17 June 2016

Phys. Rev. C 93, 064318 (2016) http://journals.aps.org/prc/abstract/10.1103/PhysRevC.93.064318
Cu charge radii reveal a weak sub-shell effect at N=40
M. L. Bissell[1,2], T. Carette[3], K. T. Flanagan[1,4,2], P. Vingerhoets[1], J. Billowes[2], K. Blaum[5], B. Cheal[2,6], S. Fritzsche[7,8], M. Godefroid[3], M. Kowalska[9], J. Krämer[10,11], R. Neugart[5,10], G. Neyens[1], W. Nörtershäuser[10,11], and D. T. Yordanov[5,9,12]
Published 17 June 2016

EPJ Web of Conferences 122, 12002 (2016) http://dx.doi.org/10.1051/epjconf/201612212002
Calculations of Compound Nucleus Spin-Parity Distributions Populated via the (p,t) Reaction in Support of Surrogate Neutron Capture Measurements
J. Benstead[1,2a], J.A. Tostevin[2], J.E. Escher[3], J.T. Burke[3], R.O. Hughes[3], S. Ota[3], R.J. Casperson[3] and I.J. Thompson[2,3]
Published 21 June 2016

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2. News to Report

a. 2nd International Workshop on the Applications of Novel Scintillators in Research and Industry

A three day workshop on the development of novel inorganic and organic scintillators for various applications in research and industry, was hosted for the second year running at University College Dublin, from the 11th-13th of May, 2016. The event was sponsored by the Institute of Physics Nuclear Physics, Nuclear Industry, Instrument Science and Technology and Materials and Characterisation groups, as well as Science Foundation Ireland, ORTEC/Ametek, Scionix, Failte Ireland and UCD. The agenda, workshop photo, and most of the presentations can be found on the ANSRI workshop website here. The speakers included representatives from many industries, research laboratories and academic institutions worldwide. The content of the packed, three day program included; the development and characterisation of novel scintillators (such as ceramics, plastic and inorganic halide scintillators), and the applications of such scintillators in a wide range of fields. Such application areas include; nuclear physics, medicine, gamma-ray astronomy, geophysics, and security. Early career prizes sponsored by ORTEC/Ametek, were judged by professionals in the field of scintillator research during the workshop. The first place prize was awarded to Ms. Shuping Liu, a PhD student from the Shanghai Institute of Ceramics at the Chinese Academy of Sciences, for her talk entitled "*Composition dependence of luminescence and scintillation properties of LuAg:Ce,Mg optical ceramics*." Two runner-up prizes were also awarded to outstanding oral and poster contributions from Ms. Alice Mentana (INFN-Milan) and Oleksii Poleshchuk (KU Leuven). The event was attended by around 60 people from many different industries and scientific communities located in 14 countries, and was successful in its primary goal of uniting and re-uniting many different scientists and industries together in relevant areas to collaborate on similar future projects in the field of scintillator research.

The feedback received for this small international workshop for the second year running was positive, and it is likely that the exchanges between workshop attendees, will lead to many fruitful scientific endeavours in the years to come.

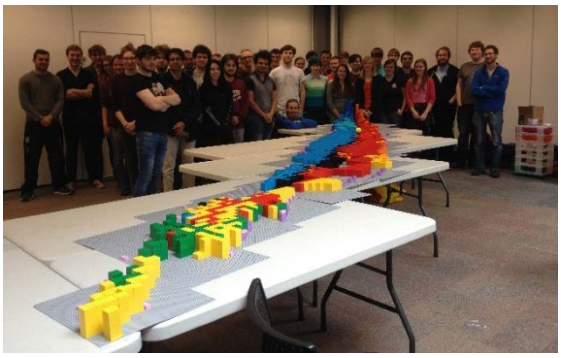
Contribution by Oliver Roberts oliver.roberts@ucd.ie (University College Dublin)

b. UK Nuclear Theory Meeting

The next UK nuclear theory meeting is going to be held at the University of Surrey in Guildford on November 1-2, 2016.

This will be the third in a series of meetings organised under the STFC "*Nuclear.Theory.Vision@UK*" initiative which is meant to foster interactions and collaboration both within the UK nuclear theory community and between theory and the other Nuclear physics groups in the country.
Focus will be on novel advances in nuclear theory. Participation from UK experimentalists is strongly welcomed and we envisage talks from local participants.
More info (also on previous meetings) will be found at
http://personal.ph.surrey.ac.uk/~cb0023/ukththeory
Contribution by Carlo Barbieri
C.Barbieri@surrey.ac.uk *(Surrey)*

c. Building Blocks at the University of York
On Tuesday 31st May, the Department of Physics at the University of York ran a training event for future presenters of Binding Blocks. This project, funded by STFC, aims to explain simple concepts related to nuclear physics to school kids by using a 3D LEGO Nuclear Chart installation
http://www.york.ac.uk/physics/public-and-schools/schools/secondary/binding-blocks/.
The chart is interactive and built in collaborations with school students during a two hours event. During the construction phase, the members of the Binding Block team interact with the pupils by explaining simple concepts related to nuclear physics as nuclear fusion/fission or medical applications of radioactive isotopes.
To increase the number of our team members, we had a first training event open to all students of the York Physics Department. We had a very positive feedback since more than 40 students attended the event!
For the very first time we decided to extend the original version of the chart (usually up to ^{56}Fe) to the heaviest element discovered till present. The complete installation was 7m long and required more than 24000 LEGO bricks!



This new team will help us bring the LEGO Chart to schools in Yorkshire and other upcoming public events, and will help us communicate how nuclear physics plays a crucial role in understanding several phenomena.
There is more information about building blocks events and activities later in this newsletter or you can find them on YouTube and Twitter.
Contribution by Alessandro Pastore
alessandro.pastore@york.ac.uk *(York)*

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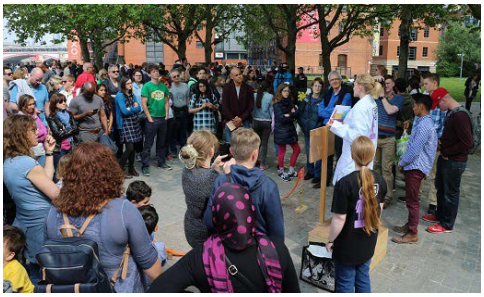
3. Outreach Activity

Soapbox Science London Event
On 28th May Chantal Nobs was one of 12 women to take to her Soapbox on London's Southbank to explain and discuss her research with passers-by.

The aim of the event was to help eliminate gender inequality in science, by challenging the public's views. Chantal's talk was titled "Nuclear Physics: Exploring the centre of the atom and harnessing its potential" and aimed to answer three key questions: how do we create nuclei? What can we learn from them? How are they useful outside physics? Her talk involved the use of Hot Wheels cars and tracks to demonstrate the processes and difficulties of nuclear fusion and fission, which were particularly popular with younger members of the audience.

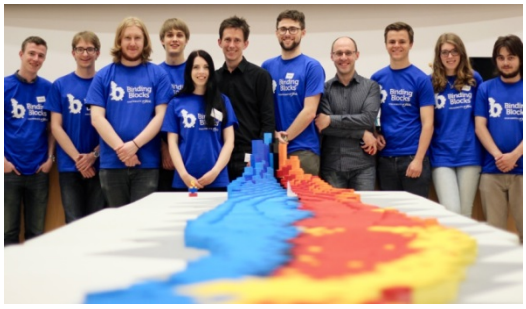


Follow this link to watch video highlights of Chantal's talk. A standout quote from one of

the many passers-by: “I had no idea what nuclear physics was before today, and now not only do I know what it means but I know that women can do it!”.
Contribution by Chantal Nobs
c.nobs@brighton.ac.uk (Brighton)

CERN Teacher’s Day: Binding Blocks at University of York

On Friday 17th June, the Binding Blocks team at the University of York ran a training event for 50 teachers that recently visited CERN, through the National STEM Learning Centre. An introduction to the concept of nuclear energies and decay modes was given, before the teachers were let loose building the nuclear chart.
After the chart was completed in a record 45 minutes due to the competitiveness of the teachers and Binding Blocks team, the talks continued on aspects of fusion, astrophysics, the future of particle accelerators, research into exotic nuclei and medical applications.



Furthermore, visual demonstrations of energies were given, with an alpha nucleus (4 tennis balls held together with ‘Velcro’ patches) was thrown at a wall and broke apart, and tennis balls rolled down the chart from Hydrogen to show why element formation in stars halts at Iron. A prototype 3D printed partial model of the chart was displayed. Feedback was then gathered from the teachers about the event and how they could implement this into their classes, both at GCSE and A-Level.
The purpose of this three-dimensional chart is to explain nuclear phenomena to the general public and schools. This ranges from young children, whom are very enthusiastic about the LEGO, to visitors who are young at heart. The chart has a variety of colours to explain different properties. The black blocks represent stable nuclei, yellow alpha decay, red beta+ decay, orange proton decay, light blues beta- decay and dark blue (at the beginning) neutron decay, with the height of the blocks representing the available energy per kg material (in units of 25000GJ/kg).
The chart also impacted more widely within the NSLC, with staff and visitors wanting to know more about Binding Blocks due to the strong visual appearance of the shear amount of bricks. In addition to the CERN Teachers’ Day, the chart was integrated into two other training events on the following Saturday and Monday, before being taken down in preparation for *subsequent events*:
24th -25th June: University of York Open Day, with partial Binding Blocks chart as part of Department of Physics stand.
27th June: Schools Physicists of the Year Awards, full Binding Blocks chart built before ceremony by attendees.
28th June: Big Bang Fair at Doncaster Racecourse, partial Binding Blocks chart with schools and public attending.
Upcoming events:
9th July: Daresbury Laboratory, full Binding Blocks chart.
Contribution by Thomas Sanders
tjs529@york.ac.uk (York)

Daresbury Open Week Needs You!!

Daresbury Laboratory is opening its doors from the 5th July – 9th July 2016 and one of the many amazing and inspirational activities available is the LHC roadshow…
http://www.stfc.ac.uk/news-events-and-publications/events/stfc-events/large-hadron-collider-roadshow/
We are currently looking for enthusiastic scientists to come and staff the exhibition for the schools day on Wednesday 6th July and the public day on Saturday 9th July.
If your research is connected to CERN and/or the LHC and you have enthusiasm for outreach then please get in touch with me for further details, or sign up here: http://doodle.com/poll/r7uuri9vfe8uh37p. STFC will cover all reasonable speaker expenses.
The Daresbury open week is an exceptional opportunity to engage and involve people with our amazing science!
Contribution by Elizabeth Cunningham
elizabeth.cunningham@stfc.ac.uk (STFC)

4. Media Interactions

Science and Technology Committee
Paddy Regan gives evidence in the committees first session on science in emergencies: chemical, biological, radiological or nuclear incidents.
http://parliamentlive.tv/event/index/b95451a1-c600-40e9-9eff-f638f2ef36ca