UK Nuclear Activity

October 2013 Issue 4

In this issue,

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

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*1. Nuclear Physics Publications for October**

Phys. Rev. Lett. 111 102301 (2013) http://prl.aps.org/abstract/PRL/v111/i10/e102301
D Meson Elliptic Flow in Noncentral Pb-Pb Collisions at $\sqrt{s_{NN}}$=2.76 TeV
B. Abelev et al., ALICE Collaboration, UK Authors: D. Alexandre, L. Barnby, D. Evans, L.D. Hanratty, P.G. Jones, A. Jusko, M. Krivda, G.R. Lee, R. Lietava, R.C. Lemmon, A. Palaha, P. Petrov, R. Romita, P.A. Scott, O. Villalobos-Baillie
*Published 5th September 2013

JHEP 09 (2013) 049 http://link.springer.com/article/10.1007%2FJHEP09%282013%29049
Multiplicity dependence of two-particle azimuthal correlations in pp collisions at the LHC
B. Abelev et al., ALICE Collaboration, UK Authors: D. Alexandre, L. Barnby, D. Evans, L.D. Hanratty, P.G. Jones, A. Jusko, M. Krivda, G.R. Lee, R. Lietava, R.C. Lemmon, A. Palaha, P. Petrov, R. Romita, P.A. Scott, O. Villalobos-Baillie
*Published 10th September 2013

Phys. Lett. B, 725, 292 (2013) http://www.sciencedirect.com/science/article/pii/S0370269313006175
New μs isomers in the neutron-rich ^{210}Hg nucleus
A. Gottardo[a,b], J.J. Valiente-Dobón[a], G. Benzoni[c], A. Gadea[d], S. Lunardi[b,e], P. Boutachkov[f], A.M. Bruce[g], M. Górska[f], J. Grebosz[h], S. Pietri[f], Zs. Podolyák[i], M. Pfützner[j], P.H. Regan[i], H. Weick[f], J. Alcántara Núñez[k], A. Algora[d], N. Al-Dahan[i], G. de Angelis[a], Y. Ayyad[k], N. Alkhomashi[i], P.R.P. Allegro[m], D. Bazzacco[e], J. Benlliure[k], M. Bowry[i], A. Bracco[c,n], M. Bunce[g], F. Camera[c,n], E. Casarejos[o], M.L. Cortes[f], F.C.L. Crespi[c], A. Corsi[c,n], A.M. Denis Bacelar[g], A.Y. Deo[i], C. Domingo-Pardo[f], M. Doncel[p], Zs. Dombradi[q], T. Engert[f], K. Eppinger[r], G.F. Farrelly[i], F. Farinon[f], E. Farnea[e], H. Geissel[f], J. Gerl[f], N. Goel[f], E. Gregor[f], T. Habermann[f], R. Hoischen[f,s], R. Janik[t], P.R. John[b,e], S. Klupp[r], I. Kojouharov[f], N. Kurz[f], S.M. Lenzi[b,e], S. Leoni[c,n], S. Mandal[u], R. Menegazzo[e], D. Mengoni[e], B. Million[c], V. Modamio[a], A.I. Morales[c], D.R. Napoli[a], F. Naqvi[f,v], R. Nicolini[c,n], C. Nociforo[f], A. Prochazka[f], W. Prokopowicz[f], F. Recchia[e], R.V. Ribas[m], M.W. Reed[i], D. Rudolph[s], E. Sahin[a], H. Schaffner[f], A. Sharma[f], B. Sitar[t], D. Siwal[u], K. Steiger[r], P. Strmen[t], T.P.D. Swan[i], I. Szarka[t], C.A. Ur[e], P.M. Walker[i], O. Wieland[c], H.-J. Wollersheim[f]
Published 1st October 2013

Phys. Rev. C 88, 044602 (2013) http://prc.aps.org/abstract/PRC/v88/i4/e044602
The ratio method: A new tool to study one-neutron halo nuclei
P. Capel[*], R. C. Johnson[†] and F. M. Nunes[‡]
Published 2 October 2013

*Also including missed publications from September.

Edited by Elizabeth Cunningham, STFC Particle and Nuclear Physics Outreach Officer.
Elizabeth.Cunningham@stfc.ac.uk or E.Cunningham@surrey.ac.uk

Phys. Rev. C 88, 044301 (2013) http://prc.aps.org/abstract/PRC/v88/i4/e044301
Half-life of the yrast 2^+ state in ^{188}W: Evolution of deformation and collectivity in neutron-rich tungsten isotopes
P. J. R. Mason[1,*], Zs. Podolyák[1], N. Mărginean[2], P. H. Regan[1,3], P. D. Stevenson[1], V. Werner[4], T. Alexander[1], A. Algora[5,6], T. Alharbi[1,7], M. Bowry[1], R. Britton[1], A. M. Bruce[8], D. Bucurescu[2], M. Bunce[1], G. Căta-Danil[2], I. Căta-Danil[2], N. Cooper[4], D. Deleanu[2], D. Delion[2], D. Filipescu[2], W. Gelletly[1], D. Ghiţă[2], I. Gheorghe[2], T. Glodariu[2], G. Ilie[4], D. Ivanova[9], S. Kisyov[9], S. Lalkovski[9], R. Lica[2], S. N. Liddick[10], R. Mărginean[2], C. Mihai[2], K. Mulholland[11,12], C. R. Nita[2], A. Negret[2], S. Pascu[2], S. Rice[1], O. J. Roberts[8], T. Sava[2], J. F. Smith[11,12], P.-A. Söderström[13], L. Stroe[2], G. Suliman[2], R. Suvaila[2], S. Toma[2], C. Townsley[1], E. Wilson[1], R. T. Wood[1], M. Zhekova[9], and C. Zhou[4]
Published 2 October 2013

Phys. Rev. C 88, 044302 (2013) http://prc.aps.org/abstract/PRC/v88/i4/e044302
Symmetric nuclear matter with chiral three-nucleon forces in the self-consistent Green's functions approach
Arianna Carbone, Artur Polls and Arnau Rios
Published 3 October 2013

Phys. Lett. B. 726, 164 (2013) http://www.sciencedirect.com/science/article/pii/S0370269313006503
Long-range angular correlations of π, K and p in p–Pb collisions at $\sqrt{s_{NN}}$ = 5.02 TeV
B. Abelev et al., ALICE Collaboration, UK Authors: L. Barnby, D. Evans, L.D. Hanratty, P.G. Jones, A. Jusko, M. Krivda, G.R. Lee, R. Lietava, R.C. Lemmon, A. Palaha, P. Petrov, R. Romita, P.A. Scott, O. Villalobos-Baillie
Published 7 October 2013

Phys. Rev. Lett. 111, 152501 (2013) http://prl.aps.org/abstract/PRL/v111/i15/e152501
Isomers in ^{128}Pd and ^{126}Pd: Evidence for a Robust Shell Closure at the Neutron Magic Number 82 in Exotic Palladium Isotopes
H. Watanabe[1,2,3,*], G. Lorusso[3], S. Nishimura[3], Z. Y. Xu[4], T. Sumikama[5], P.-A. Söderström[3], P. Doornenbal[3], F. Browne[3,6], G. Gey[3,7], H. S. Jung[8,†], J. Taprogge[3,9,10], Zs. Vajta[3,11], J. Wu[3,12], A. Yagi[13], H. Baba[3], G. Benzoni[14], K. Y. Chae[15], F. C. L. Crespi[14,16], N. Fukuda[3], R. Gernhäuser[17], N. Inabe[3], T. Isobe[3], A. Jungclaus[10], D. Kameda[3], G. D. Kim[18], Y. K. Kim[18,19], I. Kojouharov[20], F. G. Kondev[21], T. Kubo[3], N. Kurz[20], Y. K. Kwon[18], G. J. Lane[22], Z. Li[12], C.-B. Moon[23], A. Montaner-Pizá[24], K. Moschner[25], F. Naqvi[26], M. Niikura[4], H. Nishibata[13], D. Nishimura[27], A. Odahara[13], R. Orlandi[28], Z. Patel[29], Zs. Podolyák[29], H. Sakurai[3], H. Schaffner[20], G. S. Simpson[7], K. Steiger[17], H. Suzuki[3], H. Takeda[3], A. Wendt[25], and K. Yoshinaga[27]
Published 8 October 2013

Phys. Rev. C 88, 044315 (2013) http://prc.aps.org/abstract/PRC/v88/i4/e044315
Spectroscopic factors and asymptotic normalization coefficients for 0*p*-shell nuclei: Recent updates
N. K. Timofeyuk
Published 14 October 2013

Phys. Rev. C 88, 044909 (2013) http://prc.aps.org/abstract/PRC/v88/i4/e044909
Centrality determination of Pb-Pb collisions at $\sqrt{s_{NN}}$=2.76 TeV with ALICE
B. Abelev et al., ALICE Collaboration, UK Authors: L. Barnby, D. Evans, L.D. Hanratty, P.G. Jones, A. Jusko, M. Krivda, G.R. Lee, R. Lietava, A. Palaha, P. Petrov, R. Romita, P.A. Scott, O. Villalobos-Baillie
Published 15 October 2013

Phys. Rev. C 88, 044910 (2013) http://prc.aps.org/abstract/PRC/v88/i4/e044910
Centrality dependence of π, K, and p production in Pb-Pb collisions at $\sqrt{s_{NN}}$=2.76 TeV
B. Abelev et al., ALICE Collaboration, UK Authors: L. Barnby, D. Evans, L.D. Hanratty, P.G. Jones, A. Jusko, M. Krivda, G.R. Lee, R. Lietava, R.C. Lemmon, A. Palaha, P. Petrov, R. Romita, P.A. Scott, O. Villalobos-Baillie
Published 15 October 2013

Phys. Rev. Lett. 111, 162301 (2013) http://prl.aps.org/abstract/PRL/v111/i16/e162301
J/ψ Elliptic Flow in Pb-Pb Collisions at $\sqrt{s_{NN}}$=2.76 TeV
E. Abbas et al., ALICE Collaboration, UK Authors: L. Barnby, D. Evans, L.D. Hanratty, P.G. Jones, A. Jusko, M. Krivda, G.R. Lee, R. Lietava, R.C. Lemmon, A. Palaha, P. Petrov, R. Romita, P.A. Scott, O. Villalobos-Baillie
Published 17 October 2013

Phys. Rev. C 88, 044321 (2013) http://prc.aps.org/abstract/PRC/v88/i4/e044321
β-delayed fission of ^{180}Tl
J. Elseviers[1], A. N. Andreyev[2,3], M. Huyse[1], P. Van Duppen[1], S. Antalic[4], A. Barzakh[5], N. Bree[1], T. E. Cocolios[1,6], V. F. Comas[7], J. Diriken[1], D. Fedorov[5], V. N. Fedosseev[8], S. Franchoo[9], L. Ghys[1], J. A. Heredia[7], O. Ivanov[1], U. Köster[10], B. A. Marsh[8], K. Nishio[3], R. D. Page[11], N. Patronis[1,12], M. D. Seliverstov[1,6], I. Tsekhanovich[13,14], P. Van den Bergh[1], J. Van De Walle[6], M. Venhart[1,15], S. Vermote[16], M. Veselský[15], and C. Wagemans[16]
Published 21 October 2013

Phys. Rev. C 88, 044322 (2013) http://prc.aps.org/abstract/PRC/v88/i4/e044322
β-delayed fission and α decay of ^{178}Tl
V. Liberati[1], A. N. Andreyev[2,3], S. Antalic[4], A. Barzakh[5], T. E. Cocolios[6,7,13], J. Elseviers[6], D. Fedorov[5], V. N. Fedoseeev[7], M. Huyse[6], D. T. Joss[8], Z. Kalaninová[4], U. Köster[9], J. F. W. Lane[1], B. Marsh[7], D. Mengoni[1,10], P. Molkanov[5], K. Nishio[3], R. D. Page[8], N. Patronis[6,14], D. Pauwels[6,15], D. Radulov[6], M. Seliverstov[1,5,7], M. Sjödin[7], I. Tsekhanovich[11,13], P. Van den Bergh[6], P. Van Duppen[6], M. Venhart[6,12], and M. Veselský[12]
Published 21 October 2013

Phys. Rev. C 88, 044323 (2013) http://prc.aps.org/abstract/PRC/v88/i4/e044323
Possible deformation evolution in the $\pi i_{13/2}$ structure of ^{171}Re
D. J. Hartley[1], E. E. Pedicini[1,*], R. V. F. Janssens[2], L. L. Riedinger[3], M. A. Riley[4], X. Wang[4], S. Miller[4], A. D. Ayangeakaa[5,†], M. P. Carpenter[2], J. J. Carroll[6], J. Cavey[1], C. J. Chiara[2,7,8], P. Chowdhury[9], U. Garg[5], S. S. Hota[9,‡], E. G. Jackson[9], F. G. Kondev[10], T. Lauritsen[2], M. Litz[6], W. C. Ma[11], J. Matta[5], E. S. Paul[12], J. Simpson[13], J. R. Vanhoy[1], and S. Zhu[2]
Published 21 October 2013

NIM A 726, 191 (2013) http://www.sciencedirect.com/science/article/pii/S0168900213007377
The generalized centroid difference method for picosecond sensitive determination of lifetimes of nuclear excited states using large fast-timing arrays
J.-M. Régis[a], H. Mach[b], G.S. Simpson[c], J. Jolie[a], G. Pascovici[a], N. Saed-Samii[a], N. Warr[a], A. Bruce[d], J. Degenkolb[a], L.M. Fraile[b], C. Fransen[a], D.G. Ghita[e], S. Kisyov[f], U. Koester[g], A. Korgul[h], S. Lalkovski[f], N. Mărginean[e], P. Mutti[g], B. Olaizola[b], Z. Podolyak[i], P.H. Regan[i], O.J. Roberts[d], M. Rudigier[a], L. Stroe[e], W. Urban[g], D. Wilmsen[a]
Published 21 October 2013

NIM A 726, 52 (2013) http://www.sciencedirect.com/science/article/pii/S0168900213007547
Characterisation of a Si(Li) orthogonal-strip detector
L.J. Harkness[a,], D.S. Judson[a], A.J. Boston[a], H.C. Boston[a], J.R. Cresswell[a], P.J. Nolan[a], A. Sweeney[a], J. Beau[b], M. Lampert[b], B. Pirard[b], M. Zuvic[b]
Published 21 October 2013

Phys. Rev. C 88, 044326 (2013) http://prc.aps.org/abstract/PRC/v88/i4/e044326
Lifetime measurements in neutron-rich ^{63,65}Co isotopes using the AGATA demonstrator
V. Modamio[1], J. J. Valiente-Dobón[1], S. Lunardi[2], S. M. Lenzi[2], A. Gadea[3], D. Mengoni[2,4], D. Bazzacco[2], A. Algora[3], P. Bednarczyk[5], G. Benzoni[6], B. Birkenbach[7], A. Bracco[6,8], B. Bruyneel[9], A. Bürger[10], J. Chavas[2], L. Corradi[1], F. C. L. Crespi[6,8], G. de Angelis[1], P. Désesquelles[11,12], G. de France[13], R. Depalo[2], A. Dewald[7], M. Doncel[14], M. N. Erduran[15], E. Farnea[2], E. Fioretto[1], Ch. Fransen[7], K. Geibel[7], A. Gottardo[1], A. Görgen[9,10], T. Habermann[16], M. Hackstein[7], H. Hess[7], T. Hüyük[3], P. R. John[2], J. Jolie[7], D. Judson[17], A. Jungclaus[18], N. Karkour[9], R. Kempley[19], S. Leoni[6,8], B. Melon[20], R. Menegazzo[2], C. Michelagnoli[2], T. Mijatović[21], B. Million[6], O. Möller[22], G. Montagnoli[2], D. Montanari[1], A. Nannini[20], D. R. Napoli[1], Zs. Podolyak[19], G. Pollarolo[23], A. Pullia[6,8], B. Quintana[14], F. Recchia[2], P. Reiter[7], D. Rosso[1], W. Rother[7], E. Sahin[1], M. D. Salsac[9], F. Scarlassara[2], K. Sieja[24], P. A. Söderström[25], A. M. Stefanini[1], O. Stezowski[26], S. Szilner[21], Ch. Theisen[9], B. Travers[11,12], and C. A. Ur[2]
Published 22 October 2013

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2. News to report

a. Nuclear Physics Technology Showcase. The IOP Review into the Health of UK Nuclear Physics in 2012 pointed out that links between nuclear physicists and UK industry were not as well developed as they could be, due to lack of visibility of the nuclear physics groups. To address this, in part, a Nuclear Physics Technology Showcase event was held at the IOP on 26th September. The event was sponsored by STFC (who did most of the practical organisation) and the IOP nuclear physics and nuclear industry groups. The event was attended by over 100 people drawn from a wide range of different industries and from the nuclear physics community. The morning session focussed on a series of presentation of applications work led by nuclear physicists. In the afternoon, there were presentations by the funding councils on how they could do more to support the interaction between scientists and industry. This was followed by a panel discussion to go through some of the issues acting as a barrier to this interaction. The event was very successful and good feedback was received.
The materials from this event will be published on nuclearphysics.stfc.ac.uk . This new website setup by Daresbury Laboratory will be industry-focussed and a good opportunity to further showcase industrial or other applications work coming out of the universities.
Contribution by David Jenkins david.jenkins@york.ac.uk (York)

b. ProSPECTus: Next Generation Medical Imaging. A project to significantly reduce the

radiation dose delivered to patients during diagnostic imaging is underway at the University of Liverpool and STFC Daresbury. The ProSPECTus system aims to revolutionise SPECT (Single Photon Emission Computed Tomography) technology, leading to improved diagnosis and monitoring of tumours and neurological disease. Conventional SPECT systems use a gamma camera composed of scintillation detectors coupled to a mechanical collimator, to produce a 3D image of a radiopharmaceutical that has been injected into a patient. The collimator is necessary in the current design as it allows the distribution of the radiation to be inferred. However, it results in an undesirable compromise between efficiency and image resolution. The ProSPECTus system uses the Compton camera principle to generate images, thereby removing the need for mechanical collimation. In a Compton camera, a radiopharmaceutical is located through reconstructing the path of gamma rays that interact at least twice in the system. ProSPECTus consists of a lithium-drifted silicon detector and a high purity germanium detector housed within a single cryostat. The excellent detector performance will permit imaging of multiple radiopharmaceuticals simultaneously, something that is not possible in current systems without complex data processing. The system has also been designed to operate with a standard Magnetic Resonance Imaging (MRI) scanner, to facilitate dual-modality imaging. The system has excellent solid angle coverage and detection efficiency, resulting in a vast increase in the fraction of radiation that is used to generate an image. Simulated data has shown the potential increase in sensitivity is up to 100 times that of current systems. The main potential benefits include improved image quality, shorter data acquisition times and lower patient doses. The system is currently being tested at STFC Daresbury and will be used at Liverpool to generate the first experimental images in the coming months. *Contribution by Laura Harkness-Brennan ljh@ns.ph.liv.ac.uk (Liverpool)*

c. ISOLDE gets itself a new decay spectroscopy station. The ISOLDE Decay Spectroscopy (IDS) collaboration meeting was held on 21 October at CERN with a high level of participation from UK nuclear physicists. Many aspects of the IDS Phase 1 for operation in the 2014 ISOLDE campaign were discussed, with particular focus on the data acquisition system. The Nutaq system from Daresbury/Liverpool was chosen as the best option, following its successful use at the University of Jyväskylä (Finland) and the availability of its parts. The continued support and developments from the Daresbury team were also key points in that decision. Many proposals are already presented and awaiting approval from the CERN Research Board. For more information on the IDS or to propose experiments there, please contact one of the UK members of the IDS Steering Committee: Robert Page (Liverpool) rdp@ns.ph.liv.ac.uk, John Simpson (Daresbury) john.simpson@stfc.ac.uk, Thomas Cocolios (Manchester) thomas.cocolios@manchester.ac.uk, Zsolt Podolyak (Surrey) z.podolyak@surrey.ac.uk, Gary Simpson (Uni. of the West of Scotland) simpson@lpsc.in2p3.fr, Andrei Andreyev – (York) andrei.andreyev@york.ac.uk. *Contribution by Thomas E. Cocolios thomas.cocolios@manchester.ac.uk (Manchester)*

d. Advances in time-dependent methods for quantum many-body systems. 14-18 October 2013, ECT* Trento. Organised by: A. Rios Huguet (Surrey) and P. Danielewicz (MSU & NSCL, USA). This workshop was attended by 40 leading researchers from Europe, the US, Japan and Australia. The overarching topic of this multidisciplinary meeting was the theoretical description of the time evolution of quantum many-body systems. Fundamental concepts, new techniques and computational issues in the broad area of time-dependent quantum mechanics were discussed intensively. The purpose was twofold: to expose nuclear theorists to developments in other areas of quantum dynamics and to showcase to other areas the most recent advances in nuclear theory. Common interests were discussed and potential new synergies were identified. *Contribution by Arnau Rios Huguet a.rios@surrey.ac.uk (Surrey)*

e. Nuclear Physics Summer School 2013 – Bristol. This year's instalment of the biennial Nuclear physics summer school took place between the 26th August and the 7th

September in Bristol and was organized by Andrew Boston and Bradley Cheal. For those of you not familiar with the format of the summer schools students attend morning lectures given by eminent researchers/academics. This is then followed by tutorials in the afternoon and a question and answer session with the speakers, before the students themselves give talks in the evening on their area of research. Andy and Bradley had arranged a wide range of topics with which to enlighten and broaden the horizons of the students (and I dare say the tutors as well) over 9 days. The lectures covered Nuclear Theory, Gamma-Ray Spectroscopy, Relativistic Heavy-Ion Collisions, Hadronic Physics, Nuclear Energy, Applied Nuclear Physics, Environmental Monitoring and Nuclear Medicine.
The range of student talks represented the diversity in the field of nuclear physics research covering many of the topics mentioned above. As one of the tutors, whose job it was to judge which talk was best, I can say that the quality of the talks was fantastic and our job to pick a winner was a very tough one. In the end the winners of the talks were Adelle Hay (1st year - York) and Victoria Truesdale (2nd year -York), with the runners up Tom Day Goodacre (1st year - Manchester) and Jack Henderson (2nd year – York).

The students did have a break from lectures in the middle of the day in which time many took part in sporting activities or went in to Bristol to hunt for Gromits (think Wallace &). During the school a croquet tournament was run for all to take part in and was hotly contested due to both the hot weather and some competitive spirits. The tournament was won by Joseph Walshe (Birmingham).
Bristol was a fantastic host city and seemed to have something for everyone and we were lucky to have wonderful sunshine for almost all our stay there. Our hosts at Wills Hall also took great care of us. I can safely say that the summer school was its usual success and the students will have come away with a broader understanding of nuclear physics as a whole as well as forming links with fellow students and current academics and post docs that will serve them well as they progress through their careers.
Contribution by David Sharp david.sharp@manchester.ac.uk (Manchester and fulfilled summer school tutor)

f. BRIKEN collaboration: BRIKEN is a new international collaboration for the study of beta-delayed neutron emission properties of neutron-rich nuclei at the Radioactive Ion Beam Factory (RIBF) in RIKEN, Japan. The collaboration plans to build a high efficiency neutron counter using up to 180 ^{3}He tubes provided by institutions in Europe, Japan, and the United States. The BRIKEN neutron detector will be used in conjunction with the Advanced Implantation Detection Array (AIDA), which detects the beta-decay events of implanted ions and correlates them with subsequently emitted neutrons. AIDA is a project of the University of Edinburgh, the University of Liverpool, and STFC Daresbury and Rutherford Appleton Labs. An expected detection efficiency around 60 % for a large range of neutron energies, coupled to the large production rates of unstable ions at RIBF, will result in an unprecedented level of sensitivity for the measurement of beta-delayed neutron emission probabilities (Pn-values) for isotopes far from beta-stability. Pn-values provide a probe of the nuclear structure of neutron-rich isotopes (e.g., to investigate their beta-strength functions), a critical input in nuclear astrophysics models (r-process nucleosynthesis), as well as being relevant for nuclear energy applications. The collaboration has organized two workshops in the past year (Valencia, Dec. 2012, and Tokyo, Aug. 2013), and will submit a construction proposal to the upcoming Nuclear Physics PAC at RIKEN outlining its technical aspects and main scientific goals. BRIKEN is an open project, and the experimental setup will be available to the worldwide nuclear physics community. For more information contact briken.project@gmail.com, or visit the following web page: http://indico.ific.uv.es/indico/event/briken2.
Contribution by Alfredo Estrade aestrade@ph.ed.ac.uk (Edinburgh)

g. Birmingham increases ALICE Physics Board representation. ALICE is the LHC experiment dedicated to the study of heavy-ion collisions and through these the nature of nuclear matter at high temperature. At the beginning of October Orlando Villalobos-Baillie, Senior Research Fellow at the University of Birmingham, took up his appointment as a convenor of ALICE's Ultraperipheral and Diffractive (UD) Physics Working Group. The UD working group includes the analysis of photonuclear interactions which are sensitive to nuclear shadowing effects in the parton distribution function. With the role of convenor comes a seat on the Physics Board where he joins Lee Barnby, also a Research Fellow from Birmingham, who is Light Flavour (LF) Working Group convenor. The LF working group study the production of hadrons, whose momentum spectra are sensitive the hydrodynamic expansion of the quark gluon plasma and to the energy loss experienced by high momentum partons. The Physics Board co-ordinates the analysis and sets the physics priorities of the experiment. This gives Birmingham the highest representation of any of the University groups in ALICE and further increases UK participation in the leadership of the experiment.

Contribution by Lee Barnby
l.barnby@bham.ac.uk (Birmingham)

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3. Outreach Activity

Fukushima: The real story. Steven Judge and Paddy Regan from NPL's Radioactivity Group were invited to talk at The British Science Festival in Newcastle during a review session on the Fukushima disaster.

On 11 March 2011, the Fukushima Daiichi nuclear plant was hit first by an earthquake and then by a tsunami, knocking out vital equipment and leading to a loss of cooling and multiple reactor meltdowns. Leaks and explosions released radioactive material into the environment and the disaster has since been categorised as a Level 7 nuclear accident, giving it the same rating as Chernobyl.

Two years on, there are still questions that need answering but there is also an opportunity to look back with hindsight, assessing what happened and ensuring that whatever mistakes were made are not repeated in the future. The wider discussion on the implications of Fukushima in terms of the role of nuclear power in the future energy mix is on-going. The more we know about the disaster the better informed this debate will be.

Steven Judge and Paddy Regan work in NPL's Radioactivity Group aims to support and improve the accurate measurement of radiation, whether following a nuclear disaster, during routine nuclear site visits or in hospitals to support the delivery of nuclear medicine.

During the talk, Paddy Regan, explained the types of measurement that are needed following a disaster like Fukushima. The radioactive material initially released decays into different elements due to nuclear fission and neutron capture reactions. It is important that we understand the products of these reactions so that we can make the right measurements. Steven Judge spoke about his experiences working in Japan shortly after the disaster and explained some of the risks posed to the human population by the radioactive material released during the disaster. He also discussed the role of an independent, international, measurement system in giving the public confidence in information concerning the risks to health.

For more on NPL's work on Radioactivity, see http://www.npl.co.uk/ionising-radiation/radioactivity/

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

Science group talks. On 8th October Paul Stevenson gave a talk entitled "What has nuclear physics done for us?" at the Chichester Science Group, in Fishbourne, Chichester, West Sussex to a lay audience of around 50 people.

Contribution by Paul Stevenson
p.stevenson@surrey.ac.uk (Surrey)

School Skype session. On 9th October Christian Aaen Diget participated in a very effective 1/2 hour Skype session with an A' level physics class focussed on 'Stellar helium fusion'. This included a 15 minute introduction and a 15 min Q&A session. The class was prepared in advance with an introduction from their teacher. This format worked very well and is warmly recommended.
Contribution by Christian Aaen Diget
christian.diget@york.ac.uk (York)

School Talk. On 9th October John Roberts gave a presentation at Thomas Whitham Sixth Form College, Burnley on 'Nuclear Energy – The Facts Behind The Fuss' to 60 sixth form pupils and 4 teachers.
Contribution by John Roberts
j.w.roberts@manchester.ac.uk (Manchester)

Liverpool Physics Olympics. The 22nd Annual Liverpool Physics Olympics took place in the new Central Teaching Laboratories at the University of Liverpool on Saturday 19th October 2013. Thirty three teams of four or five mainly Y12 students were accompanied by their teachers. Over the day the teams took part in six events covering a range of physics related activities and the Fermi quiz which tests their ability to estimate physics quantities which range over many orders of magnitude. One of the events gave the students an opportunity to use Sodium Iodide gamma-ray detectors with digital electronics and a ^{137}Cs source to investigate how to use materials to shield the radiation. This covered radioactive decay and the absorption of gamma rays in materials. Several members of the Liverpool Nuclear Physics group play a leading role in organising the day and leading the fun during the events. At the end of the day the teams that have performed best in each of the six events received prizes and the three teams with the best overall scores receive medals and prizes. Over the years we have built up excellent links with many schools including supporting the use of modern spectroscopic radiation detectors in the school environment.
Contribution by Paul Nolan
pjn@ns.ph.liv.ac.uk (Liverpool)

CERN@school: using technology from CERN to inspire nuclear and particle physics teaching. CERN@school is a project to bring technology from CERN into the classroom to aid with the teaching of nuclear and particle physics. It aims to inspire the next generation of physicists 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. Thanks to the support of a Science in Society Large Award from STFC, CERN@school has grown from its beginnings at the Simon Langton Grammar School for Boys, Canterbury and a pilot scheme with the South East Physics Network (SEPnet), into a national programme rolled out in partnership with Institute of Physics.
Data from school-based research projects will be combined with data from the space-based LUCID (the Langton Ultimate Cosmic ray Intensity Detector), and made available to all schools. This will give students the chance to experience working with data no-one has seen before, and take part in cutting-edge science. The pilot scheme has seen participating schools register a huge uptake in physics; students love the challenge of working on authentic research. It has also been invigorating for physics teachers who have been inspired by being part of a research team. By extending this nationally and involving all the national players we can transform the experience students have of physics.
The school-based detectors, developed by CERN's Medipix Collaboration and generously supported by STFC, allow the visualisation of alpha, beta and gamma radiation and can be used to measure the dosage of various radioactive sources, bring the teaching of radioactivity and particle physics to life. Schools with the detectors have already been running projects looking at background radiation and the radioactivity of various common objects, such as bananas, brazil nuts, and rock samples.
For more information, please visit the website: http://cernatschool.web.cern.ch/.
Contribution by Clare Harvey
outreach@sepnet.ac.uk *(SEPnet)*

4. Media interactions

The least unexpected Nobel Prize I remember
http://www.bbc.co.uk/programmes/p01jf3ht

BBC Radio 4, World at One: Jim Al-Khalili on the award of the Nobel Prize for Physics to Professor Peter Higgs.
Contribution by Paul Stevenson p.stevenson@surrey.ac.uk and Jim Al-Khalili j.al-khalili@surrey.ac.uk (Surrey)