UK Nuclear Activity

April 2016 Issue 34

In this issue,

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1. Nuclear Physics Publications for March*

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. Phys.: Conf. Ser. 665 012045 (2016)
http://iopscience.iop.org/article/10.1088/1742-6596/665/1/012045
Approaching the precursor nuclei of the third r-process peak with RIBs
C.Domingo-Pardo, R.Caballero-Folch, J.Agramunt, A.Algora, A.Arcones, F.Ameil, Y.Ayyad, J.Benlliure, M.Bowry, F.Calvino, D.Cano-Ott, G.Cortes, T.Davinson, I.Dillmann, A.Estrade, A.Evdokimov, T.Faestermann, F.Farinon, D.Galaviz, A.Garcia-Rios, H.Geissel, W.Gelletly, R.Gernhauser, M.B.Gomez Hornillos, C.Guerrero, M.Heil, C.Hinke, R.Knobel, I.Kojouharov, J.Kurcewicz, N.Kurz, Y.Litvinov, L.Maier, J.Marganiec, M.Marta, T.Martinez, G.Martinez-Pinedo, B.S.Meyer, F.Montes, I.Mukha, D.R.Napoli, Ch.Nociforo, C.Paradela, S.Pietri, Z.Podolyak, A.Prochazka, S.Rice, A.Riego, B.Rubio, H.Schaffner, Ch.Scheidenberger, K.Smith, E.Sokol, K.Steiger, B.Sun, J.L.Tain, M.Takechi, D.Testov, H.Weick, E.Wilson, J.S.Winfield, R.Wood, P.Woods, and A.Yeremin
*Published January 2016

Phys. Rev. C 93, 024917 (2016) http://journals.aps.org/prc/abstract/10.1103/PhysRevC.93.024917
Production of light nuclei and anti-nuclei in pp and Pb-Pb collisions at energies available at the CERN Large Hadron Collider
ALICE Collaboration: D. Alexandre, L.S. Barnby, M. Borri, M. Chartier, 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 29 Feb 2016

*Also including missed publications from previous months.

Acta Phys.Pol. B47, 867 (2016) http://www.actaphys.uj.edu.pl/findarticle?series=Reg&vol=47&page=867
The $T_Z = \pm1 \rightarrow 0$ and $\pm2 \rightarrow \pm1$ Mirror Gamow-Teller Transitions in pf-shell Nuclei
Y. Fujita, B. Rubio, F. Molina, T. Adachi, H. Fujita, B. Blank, E. Ganioglu, W. Gelletly, and S.E.A. Orrigo
*Published March 2016

Acta Phys.Pol. B47, 923 (2016) http://www.actaphys.uj.edu.pl/findarticle?series=Reg&vol=47&page=923
Study of Octupole Collectivity in ^{146}Nd and ^{148}Sm Using the New Coulomb Excitation Set-up at ALTO
M. Komorowska, M. Zielińska, P. Napiorkowski, D.T. Doherty, K. Wrzosek-Lipska, P.A. Butler, L. Próchniak, W. Korten, R. Briselet, H. De Witte, L.P. Gaffney, G. Georgiev, A. Goasduff, A. Görgen, A. Gottardo, E.T. Gregor, K. Hadyńska-Klęk, H. Hess, M. Klintefjord, T. Konstantinopoulos, J. Ljungvall, R. Lutter, I. Matea, P. Matuszczak, G.G. O'Neill, W. Piątek, P. Reiter, D. Rosiak, M. Scheck, M. Seidlitz, B. Siebeck, M. Thürauf, and N. Warr
*Published March 2016

Phys. Lett. B 754, 81 (2016) http://www.sciencedirect.com/science/article/pii/S0370269315010151
Measurement of electrons from heavy-flavour hadron decays 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 10 March

Phys. Lett. B 754, 235 (2016) http://www.sciencedirect.com/science/article/pii/S0370269316000320
Direct photon production in Pb–Pb collisions at $\sqrt{s_{NN}} = 2.76$ 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 10 March 2016

Phys. Lett. B 754, 360 (2016) http://www.sciencedirect.com/science/article/pii/S0370269316000575
$^{3}_{\Lambda}$H and $^{3}_{\bar{\Lambda}}\bar{\text{H}}$ production in Pb–Pb collisions at $\sqrt{s_{NN}} = 2.76$ 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 10 March 2016

Phys. Lett. B 754, 373 (2016) http://www.sciencedirect.com/science/article/pii/S0370269316000678
Centrality evolution of the charged-particle pseudorapidity density over a broad pseudorapidity range in Pb–Pb collisions at $\sqrt{s_{NN}} = 2.76$ 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 10 March 2016

JHEP 03 (2016) 081 http://link.springer.com/article/10.1007/JHEP03(2016)081
Transverse momentum dependence of D-meson production in Pb-Pb collisions at $\sqrt{s_{NN}} = 2.76$ 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 14 March 2014

JHEP 03 (2016) 082 http://link.springer.com/article/10.1007/JHEP03(2016)082
Measurement of D_s^+ production and nuclear modification factor in Pb-Pb collisions at $\sqrt{s_{NN}} = 2.76$ 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 14 March 2014

Phys. Rev. C 93, 034913 (2016) https://journals.aps.org/prc/abstract/10.1103/PhysRevC.93.034913
Centrality dependence of the nuclear modification factor of charged pions, kaons, and protons in Pb-Pb collisions at $\sqrt{s_{NN}} = 2.76$ 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 25 March 2016

Phys. Rev. Lett. 116, 132501 (2016) http://journals.aps.org/prl/abstract/10.1103/PhysRevLett.116.132501
Investigating the Pygmy Dipole Resonance Using β Decay
M. Scheck[1,2,*], S. Mishev[3,4], V. Yu. Ponomarev[5], R. Chapman[1,2], L. P. Gaffney[1,2], E. T. Gregor[1,2], N. Pietralla[5], P. Spagnoletti[1,2], D. Savran[6], and G. S. Simpson[1,2]
*Published 30 March 2016

Phys. Rev. C 93, 034916 (2016) https://journals.aps.org/prc/abstract/10.1103/PhysRevC.93.034916
Event-shape engineering for inclusive spectra and elliptic flow in Pb-Pb collisions at $\sqrt{s_{NN}}$ = 2.76 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 31 March 2016

Phys. Rev. Lett. 116, 132302 (2016) http://journals.aps.org/prl/abstract/10.1103/PhysRevLett.116.132302
Anisotropic Flow of Charged Particles in Pb-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 1 April 2016

Phys. Rev. Lett. 116, 132701 (2016) http://journals.aps.org/prl/abstract/10.1103/PhysRevLett.116.132701
Direct Measurement of the Astrophysical ^{38}K(p,γ)^{39}Ca Reaction and Its Influence on the Production of Nuclides toward the End Point of Nova Nucleosynthesis
G. Lotay[1,2,*], G. Christian[3,†], C. Ruiz[3], C. Akers[3,4,‡], D. S. Burke[5], W. N. Catford[1], A. A. Chen[5], D. Connolly[6], B. Davids[3], J. Fallis[3], U. Hager[6,§], D. A. Hutcheon[3], A. Mahl[6], A. Rojas[3], and X. Sun[3,7]
Published 1 April 2016

Phys. Rev. C 93, 044303 (2016) http://journals.aps.org/prc/abstract/10.1103/PhysRevC.93.044303
Fast-timing study of the l-forbidden 1/2+→3/2+ M1 transition in ^{129}Sn
R. Lică[1,2], H. Mach[3,*], L. M. Fraile[4], A. Gargano[5], M. J. G. Borge[1,6], N. Mărginean[2], C. O. Sotty[2,7], V. Vedia[4], A. N. Andreyev[8], G. Benzoni[9], P. Bomans[7], R. Borcea[2], L. Coraggio[5], C. Costache[2], H. De Witte[7], F. Flavigny[7], H. Fynbo[10], L. P. Gaffney[7,11], P. T. Greenlees[12,13], L. J. Harkness-Brennan[14], M. Huyse[7], P. Ibáñez[4], D. S. Judson[14], J. Konki[12,13], A. Korgul[15], T. Kröll[16], J. Kurcewicz[1], S. Lalkovski[17],I. Lazarus[18], M. V. Lund[10], M. Madurga[1], R. Mărginean[2], I. Marroquín[6], C. Mihai[2], R. E. Mihai[2], A. I. Morales[19,20,9], E. Nácher[6], A. Negret[2], R. D. Page[14], J. Pakarinen[12,13], S. Pascu[2], V. Paziy[4], A. Perea[6], M. Pérez-Liva[4], E. Picado[4,21], V. Pucknell[18], E. Rapisarda[1], P. Rahkila[12,13], F. Rotaru[2], J. A. Swartz[7], O. Tengblad[6], P. Van Duppen[7], M. Vidal[4], R. Wadsworth[8], W. B. Walters[22], and N. Warr[23](IDS Collaboration)
Published 4 April 2016

Eur. Phys. J. A, 52, 76 (2016) http://link.springer.com/article/10.1140%2Fepja%2Fi2016-16076-3
Helium burning and neutron sources in the stars
M. Aliotta, M. Junker, P. Prati, O. Straniero, F. Strieder
Published 5 April 2016

Eur. Phys. J. C (2016) 76:184 http://link.springer.com/article/10.1140/epjc/s10052-016-3987-y
Inclusive quarkonium production at forward rapidity in pp collisions at √s = 8 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 5 April 2016

NIM A, 815, 96 (2016) http://www.sciencedirect.com/science/article/pii/S0168900215015697
The ^{3}He long-counter TETRA at the ALTO ISOL facility

D. Testov[a, b,], D. Verney[a], B. Roussière[a], J. Bettane[a], F. Didierjean[c], K. Flanagan[d], S. Franchoo[a]F. Ibrahim[a], E. Kuznetsova[a], R. Li[a], B. Marsh[f], I. Matea[a], Yu. Penionzhkevich[b, e], H. Pai[g], V. Smirnov[b], E. Sokol[b], I. Stefan[a], D. Suzuki[a], J.N. Wilson[a]
Published 11 April 2016

Phys. Rev. C 93, 044318 (2016) http://journals.aps.org/prc/abstract/10.1103/PhysRevC.93.044318
Particle-core coupling in ^{37}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], G. Simpson[1], 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 18 April 2016

Eur. Phys. J. A, 52, 96 (2016) http://link.springer.com/article/10.1140%2Fepja%2Fi2016-16096-y
E0 transitions in ^{106}Pd: Implications for shape coexistence
E. E. Peters, F. M. Prados-Estévez, A. Chakraborty, M. G. Mynk, D. Bandyopadhyay, S. N. Choudry, B. P. Crider, P. E. Garrett, S. F. Hicks, A. Kumar, S. R. Lesher, C. J. McKay, J. N. Orce, M. Scheck, J. R. Vanhoy, J. L. Wood, S. W. Yates
Published 20 April 2016

Eur. Phys. J. A, 52, 99 (2016) http://link.springer.com/article/10.1140/epja/i2016-16099-8
Analysis methods of safe Coulomb-excitation experiments with radioactive ion beams using the GOSIA code
M. Zielińska, L. P. Gaffney, K. Wrzosek-Lipska, E. Clément, T. Grahn, N. Kesteloot, P. Napiorkowski, J. Pakarinen, P. Van Duppen, N. Warr
Published 20 April 2016

Eur. Phys. J. A, 52, 101 (2016) http://link.springer.com/article/10.1140%2Fepja%2Fi2016-16101-7
Integral measurement of the ^{12}C(n, p)^{12}B reaction up to 10 GeV
P. Žugec, N. Colonna, D. Bosnar, A. Ventura, A. Mengoni, S. Altstadt, J. Andrzejewski, L. Audouin, M. Barbagallo, V. Bécares, F. Bečvář, F. Belloni, E. Berthoumieux, J. Billowes,V. Boccone, M. Brugger, M. Calviani, F. Calviño, D. Cano-Ott, C. Carrapiço, F. Cerutti, E. Chiaveri,M. Chin, G. Cortés, M. A. Cortés-Giraldo, L. Cosentino, M. Diakaki, C. Domingo-Pardo, R. Dressler,I. Duran, C. Eleftheriadis, A. Ferrari , P. Finocchiaro, K. Fraval, S. Ganesan, A. R. García, G. Giubrone, M. B. Gómez-Hornillos, I. F. Gonçalves, E. González-Romero, E. Griesmayer, C. Guerrero, F. Gunsing, P. Gurusamy, S. Heinitz, D. G. Jenkins, E. Jericha, F. Käppeler, D. Karadimos, N. Kivel, M. Kokkoris, M. Krtička, J. Kroll, C. Langer, C. Lederer, H. Leeb, L. S. Leong, S. Lo Meo, R. Losito, A. Manousos, J. Marganiec, T. Martínez, C. Massimi, P. Mastinu, M. Mastromarco, E. Mendoza, P. M. Milazzo, F. Mingrone, M. Mirea, W. Mondalaers, A. Musumarra, C. Paradela, A. Pavlik, J. Perkowski, A. Plompen, J. Praena, J. Quesada,T. Rauscher, R. Reifarth, A. Riego, F. Roman, C. Rubbia, R. Sarmento, A. Saxena, P. Schillebeeckx, S. Schmidt, D. Schumann, G. Tagliente, J. L. Tain, D. Tarrío, L. Tassan-Got, A. Tsinganis, S. Valenta, G. Vannini, V. Variale, P. Vaz, R. Versaci, M. J. Vermeulen, V. Vlachoudis, R. Vlastou, A. Wallner, T. Ware, M. Weigand, C. Weiß, T. Wright
Published 22 April 2016

Phys. Rev. C 93, 044333 (2016) http://journals.aps.org/prc/abstract/10.1103/PhysRevC.93.044333
Coulomb excitation of ^{44}Ca and ^{45}Ar
S. Calinescu[1,2], L. Cáceres[3], S. Grévy[4], O. Sorlin[3], Z. Dombrádi[5], M. Stanoiu[1], R. Astabatyan[6], C. Borcea[1], R. Borcea[1], M. Bowry[7], W. Catford[7], E. Clément[3], S. Franchoo[8], R. Garcia[9], R. Gillibert[10], I. H. Guerin[4], I. Kuti[5], S. Lukyanov[6], A. Lepailleur[3],V. Maslov[6], P. Morfouace[8], J. Mrazek[11], F. Negoita[1], M. Niikura[8], L. Perrot[8], Z. Podolyák[7], C. Petrone[1,2], Y. Penionzhkevich[6], T. Roger[3], F. Rotaru[1], D. Sohler[5], I. Stefan[8], J. C. Thomas[3], Z. Vajta[5], and E. Wilson[7]
Published 25 April 2016

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2. News to Report

a. Report on the 71st Board Meeting of the EPS Nuclear Physics Division.

Venue: The 71st Board Meeting of the EPS Nuclear Physics Division was held at IPN Orsay, Paris, France on the 18th and 19th April 2016. During the meeting the board was treated to a guided tour of the IPN laboratories and the ALTO nuclear physics research facility.

Membership: Faical Azaiez took over the Chair of the Nuclear Physics Division on 1st January 2016 and will serve in this role till the

end of 2017. While he has accepted a new appointment as director of the iThemba laboratory in South Africa from 1st May 2016, he intends to discharge his duties as Chair from there, making full use of communication technology and returning as necessary for key meetings. The board agreed to co-opt two new members from 1st July 2016 to fill two outstanding vacancies on the board. The new members will be Rabia Burcu Cakirli, from Istanbul University, Turkey, and Guy Ron, from the Hebrew University of Jerusalem, Israel.

Nuclear Physics in France: The meeting opened with a mini workshop of 10 short presentations on the many different aspects of Nuclear Physics in France. The topics covered accelerator physics, medical applications, nuclear energy, nuclear structure (Ganil, ALTO), quark-gluon plasma, hadron structure and the work of the French Physical Society.

New initiatives: The new division Chair plans to improve links between the EPS and National Societies to enhance and focus efforts to develop nuclear physics as a discipline across Europe. At present the work of different National Societies remains very disjointed. Sharing information more widely will encourage collaboration and combining efforts will provide the critical mass which will allow the community to undertake larger initiatives needed to drive the subject forward more effectively. Joint meetings of committed physicists from many European countries are envisaged and there will be also be focused discussions at future conferences organised by the Nuclear Physics Division.

EPS matters: One of our previous chairs, Victor Zamfir, was elected to the Executive Committee of the EPS. The EPS is setting up a new advisory board to enhance the advice it provides to European policymakers and politicians in Brussels about Physics related issues. Victor Zamfir will be a key member of this new advisory panel.

Topical Paper on "Nuclear Physics for Cultural Heritage":

Over the past two years the Nuclear Physics Division has been producing a web-based paper for a general scientific audience which covers applications of Nuclear Physics commonly used in the study and preservation of Cultural Heritage. It includes contributions from experts in the field and focusses on examples from European laboratories. It covers applications from ion beam techniques, accelerator mass spectrometry to nuclear reactions induced by intense laser sources. The board approved the final draft of this topical paper, which now goes to the EPS Executive Committee for endorsement. Following this it is expected to be published as an open-source public-understanding resource by the EPS.

Public Awareness of Nuclear Science: The division has a joint programme of activity with NuPECC under the heading of Public Awareness of Nuclear Science. Paul Stevenson joins Nicola Colonna and Johan Nyberg as the division's representatives on this joint body.

Conferences: The meeting reviewed plans for its next two Divisional conferences and chose the location of the 2018 European Nuclear Physics Conference. In our series of facility-based conferences, a divisional conference titled "Towards a EURISOL Distributed Facility" will take place in Leuven, Belgium, 18th - 21st October this year. Plans for this conference are well advanced, the local and advisory committees have been appointed and a conference website has now been set up: https://iks32.fys.kuleuven.be/indico/event/37/. In 2017 the 8th Nuclear Physics in Astrophysics Divisional conference will take place in Catania, Italy, 18th – 23rd June 2017, see https://agenda.infn.it/conferenceDisplay.py?confId=10834 for further details. Looking to the future, the Division received six bids to host the 2018 European Nuclear Physics Conference. After long and very detailed consideration this conference will be held in Bologna, Italy. York will be disappointed its bid was not accepted, but the competition was intense.

Prizes, fellows, awards and prize committees: The division approved the recommendation of the Lise Meitner Prize Committee and the winner of the 2016 Lise Meitner Prize for Nuclear Science will be announced shortly, once the decision is ratified by the EPS executive Committee. Sydney Gales, director of research at IPN Orsay and a recent winner of the French "Chevalier de la legion d'honneur", was elected a Fellow of the EPS at the recent EPS Council meeting. At this meeting it was also announced that Douglas MacGregor, former chair of the Division, was one of two physicists to be awarded the new EPS Achievement Award for service to the

Society. The award citation reads "for his outstanding leadership skills and his active promotion of the activities of the Nuclear Physics Division, increasing the visibility, significance and impact of the EPS." Paul Stevenson has joined the Prize committee for the EPS 2015-2017 Nuclear Physics PhD Prize.
Next meeting: The autumn meeting will be held in Dubna, Russia, 28th - 30th September 2016. No venue was chosen for the Spring 2017 meeting.
Contribution by Douglas MacGregor Douglas.MacGregor@glasgow.ac.uk (Glasgow) – Past Chair EPS Nuclear Physics Division

b. Soapbox Science London – Nuclear Physics on the Southbank!
Chantal Nobs, a PhD student from the University of Brighton, is one of 12 women selected to participate in the Soapbox Science London event on 28th May, on London's Southbank. The aim of the event is to help eliminate gender inequality in science, by challenging the public's views. Four speakers at a time will stand upon their soapboxes for an hour to discuss their research areas with the general public, covering topics from ecology to numerical general relativity. The title of Chantal's talk is "Nuclear Physics: Exploring the centre of the atom and harnessing its potential". The event is open to anyone wanting to attend, more details about the event and other speakers can be found here.
Contribution by Chantal Nobs c.nobs@brighton.ac.uk (Brighton)

c. IOP Nuclear Physics Conference.
The IoP Annual Nuclear Physics Conference was held at the Central Teaching Laboratory of the University of Liverpool during the Easter vacation (30th March – 1st April). An exciting programme of invited speakers provided topical talks covering the broad range of UK nuclear research interests and attracted approximately 120 delegates to the meeting. The invited talks included a presentation by Dr Daniel Doherty (York) who was awarded the IoP Nuclear Physics Early Career 'for contributions towards the study of exotic nuclei and shape phenomena by means of Coulomb excitation'. The parallel sessions mixed student and PDRA talks from different parts of the community. All students who requested talks were scheduled in the programme and the standard of research presentations was very high.

Outreach was an important component of the meeting. The conference reception at the Victoria Gallery and Museum – where the first wireless telegraph was transmitted by Lodge - allowed delegates to visit the exhibition 'A World, A Particle', which showcased Liverpool's contributions to subatomic physics.

Further outreach opportunities were presented by Dr Elizabeth Cunningham (STFC) and Dr Christian Diget and colleagues from the University of York assembled an impressive LEGO Chart of Nuclides.
A constructive Town Meeting with eight senior STFC staff in attendance preceded the conference dinner held in the Anglican Cathedral sponsored by Canberra and attended by their Chief Technology Officer, Professor James Cocks.

The local organizing committee is grateful to all the speakers, session chairs, poster presenters, Priscilla Lim and Joanne Hemstock (IoP) for their excellent organization, all the exhibitors and our generous sponsors at Canberra.
Contribution by David Joss David.Joss@liverpool.ac.uk (Liverpool)

d. Is it Nuclear Astrophysics or not?
After I sent Elizabeth Cunningham the details of three publications [1, 2, 3] for this month's

newsletter I realised that they all had some connection with Nuclear Astrophysics. “So what”, I hear you say. After all every report advocating the building of a new facility for Nuclear Physics has Nuclear Astrophysics as one of the main justifications for building it and we all know that many nuclear reactions and decays occur in astrophysical environments and events. A cursory glance at Physical Review Letters or Physical Review C reveals many papers that claim a connection with Nuclear Astrophysics, usually in the introduction, although in many of them the idea fades from view before the end of the paper.

The three papers I sent to Elizabeth do not fall neatly into a particular category and are the result of a number of different strands of research that my collaborators and I are pursuing. The first [1] of them was driven by an attempt to answer a question in Nuclear Physics. Beta Decay and Charge Exchange are complementary processes with the same $\sigma\tau$ operator but the former is governed by the Weak Interaction and the latter by the Strong Interaction. Our principal aim was to look at how isospin symmetry breaking affects that. Earlier we had looked [4] at the Tz = +/- 1 → 0 cases in the fp-shell , where we found that the strengths of the strong transitions agree very well but the weaker ones do not always match and there are a number of possible reasons for that. In the paper reported here the comparison is not so easy since the final states are in different nuclei with Tz = +/- 1 but in general terms we have found that isospin symmetry still works well. In making the comparison we encountered the interesting case of the mirror pair ^{56}Fe and ^{56}Co, where the isobaric Analogue State (IAS) is mixed with another nearby 0+ state [5]. We are in very neutron-deficient nuclei and the IAS in ^{56}Fe lies above the proton separation energy. Accordingly it decays by proton emission but, to our surprise, it also decays by gamma emission followed by proton emission. This is one of only a few cases of beta –delayed gamma proton decay that are known. Even though the proton decay of the IAS is isospin forbidden it is still intrinsically much faster than gamma decay and the latter only competes because of nuclear structure factors [6]. Is there a connection with Nuclear Astrophysics? Well the nuclei concerned all lie on the rp-process path and we need precise information on the decays and reactions involved in the rp-process if we are to have reliable model calculations and hence test our understanding of X-ray bursters.

The second [2] of the three papers can be legitimately labelled Nuclear Astrophysics. In the same way as the Standard model has encompassed most of the Particle Physics of the last 40-50 years or so B^{2}FH[7], as it is known, has provided the backdrop or canvas for a large part of Nuclear Astrophysics, where one is trying to fill in the detail. One topic of abiding interest is our attempts to understand the observed abundance curves for the chemical elements. For example a lot of attention has been paid to the double peaks we see at the Magic neutron numbers due to the s- and r-processes of neutron capture. Paper [2] is aimed fairly and squarely at the properties of nuclei involved in the creation of the third r-process abundance peak. The reported experiments were carried out at GSI. The complex calculations of the abundances rely *inter alia* on a large amount of information on individual reactions and decays along the r-process pathway. The nuclei at the so-called waiting points are of particular importance. There has been much discussion as to whether the tensor force alters the strength of the magic numbers far from stability and thus alters the properties of these particular nuclei. The point of importance here is that we need the best possible information we can get about the nuclei concerned if we are to progress.

Paper [3] (already included in January’s newsletter) has a link with the third and last paper. Beta-delayed neutron decay is not nearly as well studied as its neutron-deficient counterpart beta –delayed proton decay. It plays an important role in fission reactors and some of the more neutron-rich nuclei on the r-process pathway also decay this way so it also plays a part in determining the r-process abundance peaks. Measurements of neutrons are much harder than on charged particles and our methods of studying them have not advanced much over many years. As part of the preparations for NuSTAR at FAIR the Spanish groups at IFIC (Valencia), Barcelona and CIEMAT (Madrid), with some input from the UK, have been building a neutron detector array called BELEN. It will be important in making measurements of importance in nuclear structure, nuclear astrophysics as indicated above and also various aspects of fission reactor operation. This particular paper

describes the characterisation of the array, which has already been used in experiments at GSI and Jyvaskyla and will, together with detectors from other parts of the World, be at the heart of a campaign of experiments at RIKEN including some experiments relevant to the r-process.

What is the moral of this tale? Classifying bits of science does not really mean too much, unless you are an administrator who likes to put things in boxes in order to divide up some financial cake. Then it has some limited significance. The phenomena we study do not know whether they belong to EPSRC or STFC and, unknown to them, they may have been loved and cherished at other times by other organisations. These organisations will no doubt disappear in time and we will learn different acronyms, hopefully as enjoyable as "Swindon Town Football Club". The thing for us to remember is that the measurements we make and nuclear theories we create are often the basis for applications and the more precise the measurements the better. Our measurements are useful in Nuclear Astrophysics but it is just one of many applications even if it is one that stirs the heart with romantic associations and wonder. So the title of this brief article is not very meaningful or important but if we make our measurements as well as we possibly can they may be important and meaningful in this and other contexts.

References:-

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4. F. Molina et al., Phys.Rev.C91 (2015) 014301
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7. E. M. Burbidge, G. R. Burbidge, W. A. Fowler and F. Hoyle, Rev. Mod. Phys. 29 (1957)

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e. UK Theory Workshop – York, May 24-25.

The second UK Nuclear Theory Workshop will be held at the University of York on May 24-25, 2016. This is 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.

The meeting will run from noon the 24th to early afternoon the 25th (to allow for travel to/from York with a one night stay) and will follow a format of three or four talks per day plus discussions. Focus will be on novel advances in nuclear theory. Participation from UK experimentalists is strongly encouraged and we envisage talks from local participants on current experimental challenges.

Confirmed speakers so far include N. Timofeyuk (Surrey), G. Bailey (Surrey), A. Rios (Surrey), J. McGovern (Manchester), J. Dobaczewski (York).

Further information will be posted through the Workshop and NTV websites:
http://personal.ph.surrey.ac.uk/~cb0023/ukthteory
http://www.ntv-uk.manchester.ac.uk

Contribution by Jacek Dobaczewski (York), Carlo Barbieri c.barbieri@surrey.ac.uk (Surrey) and Niels Walet (Manchester)

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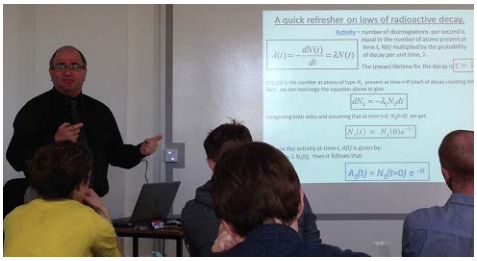
3. Outreach Activity

Radium Week

Paddy Regan gave two one hour lectures at Galway Radium Week, a workshop on the application and use of radiopharmaceuticals, in particular 223Ra, which is used as a treatment for metastasised prostate cancer. One talk was on the basics of radioactive decay and the other on nuclear spectrometry with nuclear data from gamma and alpha measurements which underpin these treatments.



The workshop was attended by ~50 (international, but mainly Irish) delegates

including leading radio-oncology consultants (i.e. senior medics); nuclear medicine experts; representatives from the radiopharmaceutical industry; MSc medical physics students; and heads of nuclear medicine at major Irish and UK hospitals.
Contribution by Paddy Regan p.regan@surrey.ac.uk (Surrey).

Outreach Lectures
Chantal Nobs gave a talk to AS and A2 physics students at Worthing College on Thursday 28th April. Starting from the periodic table and explaining the many fundamental concepts of nuclear physics she explained her work as a PhD student as well as the applications of nuclear physics research.
Contribution by Chantal Nobs c.nobs@brighton.ac.uk (Brighton)

John Roberts (Manchester) gave presentations on nuclear energy to St Mary's Sixth Form in Blackburn and Wilmslow High School. He also participated in a Princes Teaching Institute training day for trainee and newly qualified teachers held at Altrincham Grammar School for Girls. The day consisted of presentations and demonstrations of school experiments involving radiation.
Contribution by John Roberts j.w.roberts@manchester.ac.uk (Manchester)

Calling all physicists who want to help inspire the next generation
The Institute for Research in Schools is a new charity that aims to engage school students and their teachers with fundamental research.
www.researchinschools.org
Its flagship project in nuclear physics is CERN@school. This programme places detector chips from the Medipix collaboration in schools for use in collaborative research projects such as monitoring the background radiation during the eclipse, analysing soil samples and measuring radioactivity in the oceans. Schools students also get access to data from these chips in space!
We are now looking for researchers to support the Institute's work by helping schools with their knowledge and expertise. We can make use of as little or as much time as you are able to give.
For more information please contact the CERN@school project manager Elizabeth Cunningham Elizabeth.Cunningham@stfc.ac.uk.

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4. Media Interactions

The beginning and end of the Universe
David Evans (Birmingham) was featured in the ALICE control room speaking with Jim Al-Khalili for his The Beginning and End of the Universe: The Beginning episode, broadcast on 22 March. The clip can be watched at http://www.bbc.co.uk/programmes/p03ms8x9