UK Nuclear Activity

August 2013 Issue 2

In this issue,

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1. Nuclear Physics Publications for August

Phys. Rev. C 88, 024301 (2013) http://prc.aps.org/abstract/PRC/v88/i2/e024301
Shape evolution in ^{116,118}Ru: Triaxiality and transition between the O(6) and U(5) dynamical symmetries
P.-A. Söderström[1,*], G. Lorusso[1], H. Watanabe[1,2], S. Nishimura[1], P. Doornenbal[1], G. Thiamova[3], F. Browne[1,4], G. Gey[1,3], H. S. Jung[5], T. Sumikama[6], J. Taprogge[1,7,8], Zs. Vajta[1,9], J. Wu[1,10], Z. Y. Xu[11], H. Baba[1], G. Benzoni[12], K. Y. Chae[13], F. C. L. Crespi[12,14], N. Fukuda[1], R. Gernhäuser[15], N. Inabe[1], T. Isobe[1], A. Jungclaus[8], D. Kameda[1], G. D. Kim[16], Y.-K. Kim[16,17], I. Kojouharov[18], F. G. Kondev[19], T. Kubo[1], N. Kurz[18], Y. K. Kwon[16], G. J. Lane[20], Z. Li[21], A. Montaner-Pizá[22], K. Moschner[23], F. Naqvi[24], M. Niikura[11], H. Nishibata[25], A. Odahara[25], R. Orlandi[26], Z. Patel[27], Zs. Podolyák[27], H. Sakurai[1,11], H. Schaffner[18], G. S. Simpson[3], K. Steiger[15], H. Suzuki[1], H. Takeda[1], A. Wendt[23], A. Yagi[25], and K. Yoshinaga[28]
Published 1st August

Phys. Rev. C 88, 024302 (2013) http://prc.aps.org/abstract/PRC/v88/i2/e024302
Submicrosecond isomer in $_{45}{}^{117}Rh_{72}$ and the role of triaxiality in its electromagnetic decay rate
S. Lalkovski[1,2,*], A. M. Bruce[2], A. M. Denis Bacelar[2], M. Górska[3], S. Pietri[3,4], Zs. Podolyák[4], P. Bednarczyk[3], L. Caceres[3], E. Casarejos[5], I. J. Cullen[4], P. Doornenbal[3,6], G. F. Farrelly[4], A. B. Garnsworthy[4], H. Geissel[3], W. Gelletly[4], J. Gerl[3], J. Grębosz[3,7], C. Hinke[8], G. Ilie[9,10], D. Ivanova[1], G. Jaworski[11,12], S. Kisyov[1], I. Kojouharov[3], N. Kurz[3], N. Minkov[13], S. Myalski[7], M. Palacz[12], P. Petkov[13], W. Prokopowicz[3], P. H. Regan[4], H. Schaffner[3], S. Steer[4], S. Tashenov[3], P. M. Walker[4], and H. J. Wollersheim[3]
Published 2nd August 2013

Phys. Rev. Lett. 111, 062501 (2013) http://prl.aps.org/abstract/PRL/v111/i6/e062501
Isotopic Chains Around Oxygen from Evolved Chiral Two- and Three-Nucleon Interactions
A. Cipollone[1], C. Barbieri[1,*], and P. Navrátil[2]
Published 7th August 2013

Phys. Rev. Lett. 111, 062502 (2013) http://prl.aps.org/abstract/PRL/v111/i6/e062502
Electromagnetic Transition from the 4^+ to 2^+ Resonance in ^{8}Be Measured via the Radiative Capture in ^{4}He+^{4}He
V. M. Datar[1,2], D. R. Chakrabarty[1], Suresh Kumar[1,2], V. Nanal[3], S. Pastore[4], R. B. Wiringa[5], S. P. Behera[1], A. Chatterjee[1], D. Jenkins[6], C. J. Lister[5], E. T. Mirgule[1], A. Mitra[1], R. G. Pillay[3], K. Ramachandran[1], O. J. Roberts[6], P. C. Rout[1,2], A. Shrivastava[1], and P. Sugathan[7]
Published 9th August 2013

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Phys. Lett. B, 725, 79 (2013) http://www.sciencedirect.com/science/article/pii/S0370269313005200
Proton emission from an oblate nucleus ^{151}Lu
M.G. Procter[a], D.M. Cullen[a], M.J. Taylor[a], G.A. Alharshan[a], L.S. Ferreira[b], E. Maglione[c], K. Auranen[d], T. Grahn[d], P.T. Greenlees[d], U. Jakobsson[d], R. Julin[d], A. Herzáň[d], J. Konki[d], M. Leino[d], J. Pakarinen[f], J. Partanen[e], P. Peura[d], P. Rahkila[d], P. Ruotsalainen[d], M. Sandzelius[d], J. Sarén[d], S. Stolze[d], C. Scholey[d], J. Sorri[d], J. Uusitalo[d], T. Braunroth[e], E. Ellinger[e], A. Dewald[e], D.T. Joss[f], C. McPeake[f], B. Saygi[f]
Published 9th August 2013

Phys. Lett. B, 725, 85 (2013) http://www.sciencedirect.com/science/article/pii/S0370269313005297#
Structure of nearly degenerate dipole bands in ^{108}Ag
J. Sethi[a], R. Palit[a], S. Saha[a], T. Trivedi[a], G.H. Bhat[b], J.A. Sheikh[b], P. Datta[c], J.J. Carroll[d], S. Chattopadhyay[e], R. Donthi[a], U. Garg[f], S. Jadhav[a], H.C. Jain[a], S. Karamian[g], S. Kumar[h], M.S. Litz[d], D. Mehta[i], B.S. Naidu[a], Z. Naik[j], S. Sihotra[i], P.M. Walker[k]
Published 9th August 2013

Phys. Rev. C 88, 024310 (2013) http://prc.aps.org/abstract/PRC/v88/i2/e024310
Schottky mass measurements of heavy neutron-rich nuclides in the element range 70≤Z≤79 at the GSI Experimental Storage Ring
D. Shubina[1,2,3], R. B. Cakirli[1,4], Yu. A. Litvinov[1,3], K. Blaum[1], C. Brandau[3,5], F. Bosch[3], J. J. Carroll[6], R. F. Casten[7], D. M. Cullen[8], I. J. Cullen[9], A. Y. Deo[9], B. Detwiler[10], C. Dimopoulou[3], F. Farinon[3], H. Geissel[3,11], E. Haettner[11], M. Heil[3], R. S. Kempley[9], C. Kozhuharov[3], R. Knöbel[3], J. Kurcewicz[3,20], N. Kuzminchuk[11], S. A. Litvinov[3], Z. Liu[12,13], R. Mao[13], C. Nociforo[3], F. Nolden[3], Z. Patyk[14], W. R. Plass[11], A. Prochazka[3], M. W. Reed[9,15], M. S. Sanjari[3,16], C. Scheidenberger[3,11], M. Steck[3], Th. Stöhlker[3,17,18], B. Sun[11,19], T. P. D. Swan[9], G. Trees[10], P. M. Walker[9,20], H. Weick[3], N. Winckler[1,3], M. Winkler[3], P. J. Woods[12], T. Yamaguchi[21], and C. Zhou[7]
Published 13th August 2013

Phys. Rev. Lett. 111, 072501 (2013) http://prl.aps.org/abstract/PRL/v111/i7/e072501
Mirror Energy Differences at Large Isospin Studied through Direct Two-Nucleon Knockout
P. J. Davies[1,*], M. A. Bentley[1], T. W. Henry[1], E. C. Simpson[2], A. Gade[3], S. M. Lenzi[4], T. Baugher[3], D. Bazin[3], J. S. Berryman[3], A. M. Bruce[5], C. Aa. Diget[1], H. Iwasaki[3], A. Lemasson[3], S. McDaniel[3], D. R. Napoli[6], A. Ratkiewicz[3], L. Scruton[1], A. Shore[3], R. Stroberg[3], J. A. Tostevin[2], D. Weisshaar[3], K. Wimmer[3], and R. Winkler[3]
Published 16th August 2013

Phys. Rev. C 88, 024611 (2013) http://prc.aps.org/abstract/PRC/v88/i2/e024611
Population of high-spin isomeric states following fragmentation of ^{238}U
M. Bowry[1], Zs. Podolyák[1], S. Pietri[2], J. Kurcewicz[2], M. Bunce[1], P. H. Regan[1], F. Farinon[2], H. Geissel[2,3], C. Nociforo[2], A. Prochazka[2], H. Weick[2], N. Al-Dahan[1], N. Alkhomashi[1], P. R. P. Allegro[4], J. Benlliure[5], G. Benzoni[6], P. Boutachkov[2], A. M. Bruce[7], A. M. Denis Bacelar[7], G. F. Farrelly[1], J. Gerl[2], M. Górska[2], A. Gottardo[8], J. Grębosz[9], N. Gregor[2], R. Janik[10], R. Knöbel[2], I. Kojouharov[2], T. Kubo[11], N. Kurz[2], Yu. A. Litvinov[2], E. Merchan[2], I. Mukha[2], F. Naqvi[12], B. Pfeiffer[2,3], M. Pfützner[13], W. Plaß[3], M. Pomorski[13], B. Riese[2], M. V. Ricciardi[2], K.-H. Schmidt[2], H. Schaffner[2], C. Scheidenberger[2,3], E. C. Simpson[1], B. Sitar[10], P. Spiller[2], J. Stadlmann[2], P. Strmen[10], B. Sun[2,14], I. Tanihata[15], S. Terashima[14], J. J. Valiente Dobón[8], J. S. Winfield[2], H.-J. Wollersheim[2], and P. J. Woods[16]
Published 16th August 2013

2. News to report

a. TALENT School. The 6th TALENT (Training in Advanced Low Energy Nuclear Theory) Course was held in July at GANIL in Caen, France. About 20 Masters and PhD students with backgrounds in both experimental and theoretical nuclear physics came from around the world to take part in the 3 week course , including students from Edinburgh (Vincent Margerin), Surrey (Tomokazu Miyamoto) and York (Jess Tomlinson, Carine Nsangu). Lectures on topics such as scattering, transfer reactions and R-Matrix analysis were given each morning. The afternoons were filled with practical exercises, allowing students to gain experience using tools such as FRESCO and AZURE, and to apply them in the interpretation of experimental data. The lectures and exercises can be found online at http://www.nucleartheory.net/Talent_6_Course/.
Contribution by Jessica Tomlinson jrt501@york.ac.uk (York) and Ed Simpson e.simpson@surrey.ac.uk (York/Surrey)

b. New approach to 3-body effects in A(d,p)B reactions. Natasha Timofeyuk, Ron Johnson, Jeff Tostevin in collaboration with D. Y. Pang of Beihang University, Beijing, have shown that the calculation of the three-body dynamics of the A(d,p)B reaction in which A is a massive nucleus has a simple feature that has not been fully recognised previously. This new insight arises because they have paid particular attention to the special role played in the theory of this reaction by the projection of the exact three-body wavefunction onto the region of space in which the neutron and proton in the deuteron are within the range of the neutron-proton interaction, i.e., a volume about 8 times less than that of the deuteron itself. This has opened up paths to new theories that recognise the important role played by the loosely bound structure of the deuteron. The aim of this work is to increase the reliability of the interpretation of A(d,p)B data obtained by Surrey experimentalists and others in terms of the structure of nuclei away from the valley of stability by strengthening the theory of the reaction mechanism . D. Y. Pang, N. K. Timofeyuk, R. C. Johnson and J. A. Tostevin, Phys. Rev. C87, 064613 (2013).
Contribution by Ron Johnson r.johnson@surrey.ac.uk (Surrey)

c. IGLIS-NET website comes online. Following a successful workshop last December at RIKEN (Japan), the community on In-Gas Laser Ionisation & Spectroscopy (IGLIS) has established itself in a network aiming at exchanging information and interests more efficiently. The scope of IGLIS-NET covers technical developments of the gas-catcher techniques, production of new radioactive ion beams at existing and future facilities, a survey of resonant laser ionisation schemes and a study of issues associated with resonant laser ionisation spectroscopy. For more information on the possibilities offered by IGLIS-NET, please visit our new website http://kekrnb.kek.jp/iglis-net.
Contribution by Thomas E. Cocolios thomas.cocolios@manchester.ac.uk (Manchester)

d. Astrophysics experiment at the Surrey Ion Beam Centre. Earlier this month, a collaboration from the University of York's nuclear physics department, led by Dr C. Diget, travelled to the University of Surrey's Ion Beam Centre (SIBC) to perform nuclear astrophysics cross section measurements. The proof of principle experiment was carried out in collaboration with Dr C. Jeynes (SIBC) and was the first use of the facility for nuclear astrophysics. The reaction studied in this instance was the 27Al(p,α)24Mg. The inverse reaction, 24Mg(α,p)27Al has been highlighted as playing an important role in determining abundances of isotopes produced in type Ia supernovae (Bravo *et. al*, 2012). The tandem accelerator at SIBC is capable of reaching voltages of 2 MV, capable of accelerating protons to 4 MeV, for example. This makes the SIBC ideal for low-energy, low-cross section nuclear astrophysics measurements, and the experiment paves the way for a wider programme of nuclear astrophysics in the future.
Contribution by Edward Martin ejm519@york.ac.uk (York)

3. Outreach Activity

Bright Club at Green Man Festival
Ed Simpson (Surrey/York) performed nuclear physics based comedy at Bright Club to an audience of ~140. Topics included carbon dating, bananas and the nuclear physics of stars. The show was part of Einstein's Garden area at Green Man Festival (Glanusk, Wales).

Public Engagement Symposium
STFC invites all those interested in public engagement (PE) to this free PE Symposium, being held on the University of Birmingham campus on 25th November 2013. Online registration is now open
http://www.stfc.ac.uk/stfcforms/PESymposium.aspx
All researchers who engage with STFC and its supported Laboratories/Facilities are welcome. We particularly welcome participation by early career researchers, and attending can contribute to researchers' continuing professional development. STFC can pay up to £100 towards reasonable actual travel and subsistence costs for STFC-funded PhD students, PDRAs and postdoctoral fellows to attend. Please contact Jane Butt, Jane.Butt@stfc.ac.uk to check your eligibility.
The Programme will include
· Keynote talks from PE champions, including media people, and the strategic importance of public engagement for your Research Organisation and your personal research
· Hands on Workshops to include Citizen Science and using new and social media, Pathways to Impact, evaluating your PE work and hands on activities etc.
· A showcase session for anyone with something to offer.
· Exhibits, resources and hands on interactive displays over lunch.
· A chance to meet and discuss with public engagement experts to help you with your PE work, including the National Co-ordinating Centre for Public Engagement.
· An opportunity to share your ideas and best practice, learn about developments and network.

STFC Public Engagement Awards/Grants
http://www.stfc.ac.uk/pefunding
STFC are pleased to announce the following Public Engagement funding schemes for projects that aim to engage and inspire a wider audience with STFC Science and Technology, including work done at its world-leading facilities.
- *Small Awards Scheme* – offers up to £10,000 for small, local or 'pilot' PE projects.
Closing date for Autumn 2013 Round applications – 10 October 2013 at 16:00
For further details please go to
http://www.stfc.ac.uk/1838.aspx
- *Large Awards Scheme* – funding for PE projects that will have a significant regional or national impact. Up to £100,000 (£125,000 fEC) can be applied for. This is a 2-stage process with short-listing in December.
Closing date for 2013 Round Stage 1 applications – 07 November 2013 at 16:00
For further details please go to
http://www.stfc.ac.uk/1839.aspx
- *Public Engagement fellowships* – are aimed at those with significant research experience who have demonstrated a track record in outreach or communications work.
http://www.stfc.ac.uk/1840.aspx
- *Bursary Scheme* – for media workshops.
http://www.stfc.ac.uk/1601.aspx

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4. Media interactions

Measurement of the first ionization potential of astatine by laser ionization spectroscopy
http://www.nature.com/ncomms/journal/v4/n5/abs/ncomms2819.html
Nature Communication article: Published 14th May 2013
http://home.web.cern.ch/about/updates/2013/05/fundamental-property-rarest-element-earth [Press release]
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http://news.yahoo.com/property-rarest-element-earth-measured-1st-time-193221404.html
http://www.youtube.com/watch?v=x8Jdu9O2RhU
http://www.youtube.com/watch?v=eEUPvii2UcQ
Contribution by Thomas E. Cocolios thomas.cocolios@manchester.ac.uk (Manchester).