UK Nuclear Activity

July 2019 Issue 73

In this issue,

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

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1. Nuclear Physics Publications for July*

If you are publishing a paper that you think would be of media value please contact Wendy Ellison, STFC Press Officer. 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. Lett. B **797** (2019) 134803
https://www.sciencedirect.com/science/article/pii/S0370269319305076?via%3Dihub

Single-particle shell strengths near the doubly magic nucleus 56Ni and the 56Ni(p,gamma)57Cu reaction rate in explosive astrophysical burning

D.Kahl[a], P.J.Woods[a], T.Poxon-Pearson[bcd], F.M.Nunes[bcd], B.A.Brown[bcd], H.Schatz[bcd], T.Baumann[b], D.Bazin[b], J.A.Belarge[b], P.C.Bender[b1], B.Elman[bc], A.Estrade[e], A.Gade[bcd], A.Kankainen[f], C.Lederer-Woods[a], S.Lipschutz[bcd], B.Longfellow[bc]S.-J.Lonsdale[a], E.Lunderberg[bc], F.Montes[bd], W.J.Ong[bcd], G.Perdikakis[e], J.Pereira[bd], C.Sullivan[bcd], R.Taverner[bcd], D.Weisshaar[b], R.Zegers[bcd]

Available online 25 July 2019

Phys. Lett. B **795** (2019) 241-247
https://www.sciencedirect.com/science/article/pii/S0370269319304228?via%3Dihub

Diversity of shapes and rotations in the γ-soft ^{130}Ba nucleus: First observation of a t-band in the A = 130 mass region

C.M.Petrache[a], P.M.Walker[b], S.Guo[cd], Q.B.Chen[e], S.Frauendorf[f], Y.X.Liu[g], R.A.Wyss[h], D.Mengoni[i], Y.H.Qiang[c], A.Astier[a], E.Dupont[a], R.Li[a], B.F.Lv[a], K.K.Zheng[a], D.Bazzacco[i], A.Boso[i], A.Goasduff[i], F.Recchia[i], D.Testov[i], F.Galtarossa[j], G.Jaworski[j], D.R.Napoli[j], S.Riccetto[j], M.Siciliano[jk], J.J.Valiente-Dobon[j], M.L.Liu[cd], X.H.Zhou[cd], J.G.Wang[c], C.Andreoiu[l], F.H.Garcia[l], K.Ortner[l], K.Whitmore[l], T.Bäck[h], B.Cederwall[h], E.A.Lawrie[m], I.Kuti[n], D.Sohler[n], J.Timár[n], T.Marchlewski[o], J.Srebrny[o], A.Tucholski[o]

Available online 20 June 2019

***Also includes missed publications from previous months**

Phys. Rev. C **100**, 011302(R)
https://journals.aps.org/prc/abstract/10.1103/PhysRevC.100.011302
Observation of a μs isomer in $^{134}_{49}In_{85}$: Proton-neutron coupling "southeast" of $^{132}_{50}Sn_{82}$
V. H. Phong[1,2], G. Lorusso[1,3,4,*], T. Davinson[5], A. Estrade[6], O. Hall[5], J. Liu[1,7], K. Matsui[1,8], F. Montes[9], S. Nishimura[1], A. Boso[3], P. H. Regan[3,10], R. Shearman[3], Z. Y. Xu[11], J. Agramunt[12], J. M. Allmond[13], D. S. Ahn[1], A. Algora[12,14], H. Baba[1], N. T. Brewer[11,15], C. G. Bruno[5], R. Caballero-Folch[16], F. Calvino[17], M. Wolińska-Cichocka[18], G. Cortes[17], I. Dillmann[16,19], C. Domingo-Pardo[12], A. Gargano[20], S. Go[1], C. J. Griffin[5], R. K. Grzywacz[11,15], L. Harkness-Brennan[21], T. Isobe[1], A. Jungclaus[22], D. Kahl[5], L. H. Khiem[23,24], G. Kiss[1,14], A. Korgul[25], S. Kubono[1], K. Miernik[25], A. I. Morales[12], N. Nepal[6], M. Piersa[25], Zs. Podolyák[10], B. C. Rasco[11,15], K. P. Rykaczewski[13], H. Sakurai[1,8], Y. Shimizu[1], D. W. Stacener[13], T. Sumikama[1], H. Suzuki[1], H. Takeda[1], J. L. Tain[12], A. Tarifeño-Saldivia[12,17], A. Tolosa-Delgado[12], V. Vaquero[22], P. J. Woods[5], R. Yokoyama[11], and C. Yuan[26]
Published 29 July 2019

Phys. Rev. C **100**, 012201(R)
https://journals.aps.org/prc/abstract/10.1103/PhysRevC.100.012201
Electromagnetic properties of the d*(2380) hexaquark
M. Bashkanov*, D. P. Watts, and A. Pastore
Published 23 July 2019

Phys. Rev. C **100**, 014302
https://journals.aps.org/prc/abstract/10.1103/PhysRevC.100.014302
Backbending, seniority, and Pauli blocking of pairing correlations at high rotational frequencies in rapidly rotating nuclei
S. L. Miller[1,*], K. A. Villafana[1], M. A. Riley[1,†], J. Simpson[2], D. J. Hartley[3], E. S. Paul[4], A. D. Ayangeakaa[5], J. S. Baron[1], P. F. Bertone[6], A. J. Boston[4], M. P. Carpenter[6], J. J. Carroll[7], J. Cavey[3], C. J. Chiara[6,8,9,‡], P. Chowdhury[10], U. Garg[5], S. S. Hota[10], E. G. Jackson[10], R. V. F. Janssens[11], F. G. Kondev[6], T. Lauritsen[6], M. Litz[7], W. C. Ma[12], J. Matta[5], E. A. McCutchan[6], S. Mukhopadhyay[5], P. J. Nolan[4], E. E. Pedicini[3], L. L. Riedinger[13], J. F. Sharpey-Schafer[14], J. R. Vanhoy[3], A. Volya[1], X. Wang[1,§], and S. Zhu[6]
Published 2 July 2019

Phys. Rev. C **100**, 014304
https://journals.aps.org/prc/abstract/10.1103/PhysRevC.100.014304
Mass measurements of neutron-rich isotopes near N=20 by in-trap decay with the ISOLTRAP spectrometer
P. Ascher[1,*], N. Althubiti[2,3], D. Atanasov[4,†], K. Blaum[4], R. B. Cakirli[5], S. Grévy[1], F. Herfurth[6], S. Kreim[4], D. Lunney[7], V. Manea[8,†], D. Neidherr[6], M. Rosenbusch[9], L. Schweikhard[10], A. Welker[11], F. Wienholtz[10], R. N. Wolf[4,‡], and K. Zuber[11]
Published 8 July 2019

Phys. Rev. C **100**, 014305
https://journals.aps.org/prc/abstract/10.1103/PhysRevC.100.014305
α-spectroscopy studies of the new nuclides ^{165}Pt and ^{170}Hg
J. Hilton[1,2,*], J. Uusitalo[1], J. Sarén[1], R. D. Page[2], D. T. Joss[2], M. A. M. AlAqeel[2,3], H. Badran[1], A. D. Briscoe[2], T. Calverley[1,2], D. M. Cox[1,†], T. Grahn[1], A. Gredley[2], P. T. Greenlees[1], R. Harding[4], A. Herzan[5,2,‡], E. Higgins[2], R. Julin[1], S. Juutinen[1], J. Konki[1,§], M. Labiche[6], M. Leino[1], M. C. Lewis[2], J. Ojala[1], J. Pakarinen[1], P. Papadakis[1,‖], J. Partanen[1,¶], P. Rahkila[1], P. Ruotsalainen[1], M. Sandzelius[1], C. Scholey[1], J. Sorri[1,7], L. Sottili[1], S. Stolze[1,**], and F. Wearing[2]
Published 8 July 2019

Phys. Rev. C **100**, 014311
https://journals.aps.org/prc/abstract/10.1103/PhysRevC.100.014311
Lifetimes and shape-coexisting states of ^{99}Zr
P. Spagnoletti[1], G. Simpson[2], S. Kisyov[3], D. Bucurescu[3], J.-M. Régis[4], N. Saed-Samii[4], A. Blanc[5], M. Jentschel[5], U. Köster[5], P. Mutti[5], T. Soldner[5], G. de France[6], C. A. Ur[7], W. Urban[8], A. M. Bruce[9], C. Bernards[10], F. Drouet[2], L. M. Fraile[11], L. P. Gaffney[12], D. G. Ghiță[3], S. Ilieva[13], J. Jolie[4], W. Korten[14], T. Kröll[13], S. Lalkovski[15], C. Larijarni[16,17], R. Lică[3], H. Mach[11,18], N. Mărginean[3], V. Paziy[11], Zs. Podolyák[16], P. H. Regan[16,17], M. Scheck[1], J. F. Smith[1], G. Thiamova[2], C. Townsley[16], A. Vancraeyenest[2], V. Vedia[11], N. Warr[4], V. Werner[10,13], and M. Zielińska[14]
Published 16 July 2019

Phys. Rev. C **100**, 014319
https://journals.aps.org/prc/abstract/10.1103/PhysRevC.100.014319
First observation of γ-soft and triaxial bands in Zr isotopes
W. Urban[1], T. Rząca-Urban[1], J. Wiśniewski[1], A. G. Smith[2], G. S. Simpson[2], and I. Ahmad[3]
Published 26 July 2019

Phys. Rev. C **100**, 014322
https://journals.aps.org/prc/abstract/10.1103/PhysRevC.100.014322
Structure of ^{28}Mg and influence of the neutron pf shell
J. Williams[1,*], G. C. Ball[2], A. Chester[1], T. Domingo[1], A. B. Garnsworthy[2], G. Hackman[2], J. Henderson[2], R. Henderson[2], R. Krücken[2,3], Anil Kumar[4], K. D. Launey[5], J. Measures[2,6], O. Paetkau[2], J. Park[2,3], G. H. Sargsyan[5], J. Smallcombe[2], P. C. Srivastava[4], K. Starosta[1,†], C. E. Svensson[7], K. Whitmore[1], and M. Williams[2]
Published 29 July 2019

Phys. Rev. C **100**, 014330
https://journals.aps.org/prc/abstract/10.1103/PhysRevC.100.014330
Lifetime of the recently identified 10^+ isomeric state at 3279 keV in the ^{136}Nd nucleus
A. Tucholski[1], Ch. Droste[2], J. Srebrny[1], C. M. Petrache[3], J. Skalski[4], P. Jachimowicz[5], M. Fila[2], T. Abraham[1], M. Kisieliński[1], A. Kordyasz[1], M. Kowalczyk[1], J. Kownacki[1], T. Marchlewski[1], P. J. Napiorkowski[1], L. Próchniak[1], J. Samorajczyk-Pyśk[1], A. Stolarz[1], A. Astier[3], B. F. Lv[3], E. Dupont[3], S. Lalkovski[6], P. Walker[7], E. Grodner[4], and Z. Patyk[4]
Published 31 July 2019

Phys. Rev. C **100**, 014611
https://journals.aps.org/prc/abstract/10.1103/PhysRevC.100.014611
Validation of the multinucleon transfer method for the determination of the fission barrier height
K. R. Kean[1,2], K. Nishio[2], K. Hirose[2], M. J. Vermeulen[2], H. Makii[2], R. Orlandi[2], K. Tsukada[2], A. N. Andreyev[2,3], I. Tsekhanovich[4], and S. Chiba[1]
Published 23 July 2019

Phys. Rev. C **100**, 024902
https://journals.aps.org/prc/abstract/10.1103/PhysRevC.100.024902
Centrality and pseudorapidity dependence of the transverse energy density in pPb collisions at $\sqrt{s_{NN}}$ =5.02 TeV
A. M. Sirunyan *et al.* (CMS Collaboration, CMS Collaboration)
Published 1 August 2019

Phys. Rev. C **100**, 024301
https://journals.aps.org/prc/abstract/10.1103/PhysRevC.100.024301
Shape coexistence in the neutron-deficient lead region: A systematic study of lifetimes in the even-even $^{188-200}$Hg with the GRIFFIN spectrometer at TRIUMF
B. Olaizola[1,*], A. B. Garnsworthy[1], F. A. Ali[2,3], C. Andreoiu[4], G. C. Ball[1], N. Bernier[1,5], H. Bidaman[2], V. Bildstein[2], M. Bowry[1], R. Caballero-Folch[1], I. Dillmann[1,6], G. Hackman[1], P. E. Garrett[2], B. Jigmeddorj[2], A. I. Kilic[2,†], A. D. MacLean[2], H. P. Patel[1], Y. Saito[1,5], J. Smallcombe[1,‡], C. E. Svensson[2], J. Turko[2], K. Whitmore[4], and T. Zidar[2]
Published 2 August 2019

Phys. Rev. C **100**, 024602
https://journals.aps.org/prc/abstract/10.1103/PhysRevC.100.024602
Elastic scattering for the ^{8}B and ^{7}Be+^{208}Pb systems at near-Coulomb barrier energies
M. Mazzocco[1,2,*], N. Keeley[3], A. Boiano[4], C. Boiano[5], M. La Commara[6,4], C. Manea[2,†], C. Parascandolo[4], D. Pierroutsakou[4], C. Signorini[1,2], E. Strano[1,2], D. Torresi[1,2,‡], H. Yamaguchi[7], D. Kahl[7,§], L. Acosta[8,9,‖], P. Di Meo[4], J. P. Fernandez-Garcia[9,¶], T. Glodariu[10,#], J. Grebosz[11], A. Guglielmetti[12,5], Y. Hirayama[13], N. Imai[7,13], H. Ishiyama[13], N. Iwasa[14], S. C. Jeong[13,15], H. M. Jia[16], Y. H. Kim[13], S. Kimura[13,**], S. Kubono[7,17], G. La Rana[18,4], C. J. Lin[16], P. Lotti[2], G. Marquínez-Durán[8], I. Martel[8,19], H. Miyatake[13], M. Mukai[13], T. Nakao[7], M. Nicoletto[2], A. Pakou[20], K. Rusek[21], Y. Sakaguchi[7], A. M. Sánchez-Benítez[22,23], T. Sava[10], O. Sgouros[20,‡], V. Soukeras[20,‡], F. Soramel[1,2], E. Stiliaris[24], L. Stroe[10], T. Teranishi[25], N. Toniolo[26], Y. Wakabayashi[17], Y. X. Watanabe[13], L. Yang[16,7], Y. Y. Yang[27], and H. Q. Zhang[16]
Published 1 August 2019

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2. News to Report

a. IOP Ernest Rutherford Medal and Prize

Professor Philip Walker, Emeritus Professor of Physics at the University of Surrey, has been awarded the 2019 IOP Ernest Rutherford Medal and Prize for advances in understanding metastable nuclear states: their origins, properties and applications.

Philip Walker has made breakthroughs in both the study and exploitation of nuclear isomers, the sensitivity of spectroscopic techniques, the prospect of high-spin radioactive beams, and recently, the exciting possibility for future energy storage and coherent gamma-ray emission.

https://www.iop.org/about/awards/subject/rutherford/rutherford-medallists/page_72837.html

https://www.surrey.ac.uk/news/professor-philip-walker-honoured-institute-physics

Contribution by Philip Walker (University of Surrey)

b. 24th European Conference on Few-Body Problems in Physics

Later this year, the University of Surrey will host the next European Conference on Few-Body Problems in Physics which will take place from **2-6 September 2019** in Guildford. This event is promoted by the European Few-Body Physics Research Committee, which started in 1972 in Budapest. The previous conference took place in Aarhus (2016).

The European Few-Body Conferences represent a wonderful opportunity for European scientists and colleagues from countries across the world, to come together to discusss and update their knowledge of the current state-of-the-art in the research field of few-body systems — that is, systems which can be understood in terms of a few effective degrees of freedom, both from theoretical and experimental prospective. Although the origin of the Few-Body Conferences is closely related to the study of few-nucleon systems', their scope is nowadays much wider, ranging from particle physics (mesons and baryons

described in terms of their constituents), to atomic, molecular, and even solid state physics. This *interdisciplinary character* is an essential part of the culture of the few-body community.

The UK involvement in few-body research, within the STFC remit, is represented by studies of hadron structure and spectroscopy, short-range nuclear structure, nuclear halos and clustering phenomena and the dynamics of few-body reactions. The upcoming 24th conference in Guildford will provide an opportunity for the UK community to make themselves visible at this multidisciplinary event.

Although the abstract submission is closed the local organizing committee would still consider submissions for posters. The best three posters will attract a cash prize sponsored by the NuPECC:

1st prize: 400 euros
2nd prize: 250 euros
3rd prize: 100 euros

Those interested in presenting a poster promoting their work are welcome to send an abstract to efb24@surrey.ac.uk.

Registration is open until 14th of August.

Please visit the web site at https://indico.cern.ch/event/789163/

Contribution by Natasha Timofeyuk (University of Surrey and Chair of the Local Organizing Committee)

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3. Outreach Activity

The Royal International Air Tattoo Show 2019

The South Central and South West branches of the Institute of Physics teamed up to exhibit in the Techno Zone® at the Royal International Air Tattoo Show 2019. The activities were organised and led by Dr Chantal Nobs, and with the support of some fantastic volunteers (and a visit from Darth Vader) we were able to interact with well over 1500 visitors across the weekend. The IoP exhibit was one of the Featured Organisations within the Techno Zone® showcasing a selection of Marvin and Milo experiments that fit with the 2019 theme of Air and Space, as well as running a "design a planet" challenge which yielded some brilliant and creative results, visit the IoP South Central Facebook and Twitter pages to see just a few of them.

https://www.airtattoo.com/airshow/visiting/attractions/techno-zone/featured-organisations

Contribution by Chantal Nobs (CCFE)
chantal.nobs@ukaea.uk

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4. Media Interactions

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