UK Nuclear Activity

April 2021 Issue 94

In this issue,

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

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1. Nuclear Physics Publications for April (also includes missed publications from previous months)

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.

The European Physical Journal A **57**: 108 (2021) **(Editor's Pick)**
https://link.springer.com/article/10.1140/epja/s10050-021-00357-3
The identification of αα-clustered doorway states in ^{44,48,52}Ti using machine learning
Sam Bailey, Tzany Kokalova, Martin Freer, Carl Wheldon, Robin Smith, Joseph Walshe, Neven Soić, Lovro Prepolec, Vedrana Tokić, Francisco Miguel Marqués, Lynda Achouri, Franck Delaunay, Marian Parlog, Quentin Deshayes, Beatriz Fernández-Dominguez & Bertrand Jacquot
Published 29 March 2021

The European Physical Journal A **56**: 300 (2020)
https://link.springer.com/article/10.1140/epja/s10050-020-00310-w
Study of cluster structures in nuclei through the ratio method: A tribute to Mahir Hussein
Pierre Capel, Ronald C. Johnson & Filomena M. Nunes
Published 15 December 2020

Phys. Rev. C 103, L031304
https://journals.aps.org/prc/abstract/10.1103/PhysRevC.103.L031304
Fission dynamics of compound nuclei: Pairing versus fluctuations
Yu Qiang[1], J. C. Pei[1,*], and P. D. Stevenson[2]
Published 24 March 2021

The European Physical Journal A **57**: 132 (2021)
https://link.springer.com/article/10.1140%2Fepja%2Fs10050-021-00425-8
Lifetime measurements of yrast states in ^{178}Pt using the charge plunger method with a recoil separator
J. Heery, L. Barber, J. Vilhena, B. S. Nara Singh, R.-D. Herzberg, D. M. Cullen, C. Müller-Gatermann, G. Beeton, M. Bowry, A. Dewald, T. Grahn, P. T. Greenlees, A. Illana, R. Julin, S. Juutinen, J. M. Keatings, M. Leino, M. Luoma, D. O'Donnell, J. Ojala, J. Pakarinen, P. Rahkila, P. Ruotsalainen, M. Sandzelius, J. Sarén, J. Sinclair, J. F. Smith, J. Sorri, P. Spagnoletti, H. Tann, J. Uusitalo & G. Zimba
Published 16 April 2021

Phys. Rev. Lett. **126**, 152501
https://journals.aps.org/prl/abstract/10.1103/PhysRevLett.126.152501
Observation of Beam Spin Asymmetries in the Process ep→e′π+π−X with CLAS12
T. B. Hayward et al. (CLAS Collaboration)
Published 12 April 2021

Phys. Rev. Lett. **126**, 152502
https://journals.aps.org/prl/abstract/10.1103/PhysRevLett.126.152502
New α-Emitting Isotope ^{214}U and Abnormal Enhancement of α-Particle Clustering in Lightest Uranium Isotopes
Z. Y. Zhang (张志远)[1,2], H. B. Yang (杨华彬)[1], M. H. Huang (黄明辉)[1,2], Z. G. Gan (甘再国)[1,2,*], C. X. Yuan (袁岑溪)[3], C. Qi (亓冲)[4], A. N. Andreyev[5,6], M. L. Liu (柳敏良)[1,2], L. Ma (马龙)[1], M. M. Zhang (张明明)[1], Y. L. Tian (田玉林)[1], Y. S. Wang (王永生)[1,2,7], J. G. Wang (王建国)[1], C. L. Yang (杨春莉)[1], G. S. Li (李广顺)[1], Y. H. Qiang (强赟华)[1], W. Q. Yang (杨维青)[1], R. F. Chen (陈若富)[1], H. B. Zhang (张宏斌)[1], Z. W. Lu (卢子伟)[1], X. X. Xu (徐新星)[1,2], L. M. Duan (段利敏)[1,2], H. R. Yang (杨贺润)[1,2], W. X. Huang (黄文学)[1,2], Z. Liu (刘忠)[1,2], X. H. Zhou (周小红)[1,2], Y. H. Zhang (张玉虎)[1,2], H. S. Xu (徐瑚珊)[1,2], N. Wang (王宁)[8], H. B. Zhou (周厚兵)[8], X. J. Wen (温小江)[8], S. Huang (黄山)[8], W. Hua (滑伟)[3], L. Zhu (祝龙)[3], X. Wang (王翔)[9], Y. C. Mao (毛英臣)[10], X. T. He (贺晓涛)[11], S. Y. Wang (王守宇)[12], W. Z. Xu (许文政)[12], H. W. Li (李弘伟)[12], Z. Z. Ren (任中洲)[13], and S. G. Zhou (周善贵)[14,15]
Published 14 April 2021

Phys. Rev. Lett. **126**, 162501
https://journals.aps.org/prl/abstract/10.1103/PhysRevLett.126.162501
Measurement of the Charge-Averaged Elastic Lepton-Proton Scattering Cross Section by the OLYMPUS Experiment
J. C. Bernauer et al. (OLYMPUS Collaboration)
Published 21 April 2021

Phys. Rev. C **103**, 044307
https://journals.aps.org/prc/abstract/10.1103/PhysRevC.103.044307
Identification of sub-μs isomeric states in the odd-odd nucleus ^{178}Au
S. A. Gillespie[1,2,*], A. Stott[1], A. N. Andreyev[1,3], J. G. Cubiss[1], M. Al Monthery[1], C. J. Barton[1], S. Antalic[4], K. Auranen[5,†], H. Badran[5], D. Cox[5,‡], T. Grahn[5], P. T. Greenlees[5], A. Herzan[5,§], E. Higgins[6], R. Julin[5], S. Juutinen[5], J. Klimo[7], J. Konki[5,‖], M. Leino[5], M. Mallaburn[5], J. Pakarinen[5], P. Papadakis[5,6], J. Partanen[5], P. M. Prajapati[7], P. Rahkila[5], M. Sandzelius[5], C. Scholey[5], J. Sorri[5], S. Stolze[5], R. Urban[7], J. Uusitalo[5], M. Venhart[7], and F. Wearing[6]
Published 2 April 2021

Phys. Rev. C **103**, 044308
https://journals.aps.org/prc/abstract/10.1103/PhysRevC.103.044308
Tilted precession bands in ^{135}Nd
B. F. Lv[1], C. M. Petrache[2,*], E. A. Lawrie[3,4], A. Astier[2], E. Dupont[2], K. K. Zheng[1,2], P. Greenlees[5], H. Badran[5], T. Calverley[5,6], D. M. Cox[5,†], T. Grahn[5], J. Hilton[5,6], R. Julin[5], S. Juutinen[5], J. Konki[5,‡], J. Pakarinen[5], P. Papadakis[5,§], J. Partanen[5], P. Rahkila[5], P. Ruotsalainen[5], M. Sandzelius[5], J. Saren[5], C. Scholey[5], J. Sorri[5,7], S. Stolze[5,‖], J. Uusitalo[5], B. Cederwall[8], A. Ertoprak[8], H. Liu[8], S. Guo[1], J. G. Wang[1], H. J. Ong[1], X. H. Zhou[1], Z. Y. Sun[1], I. Kuti[9], J. Timár[9], A. Tucholski[10], J. Srebrny[10], and C. Andreoiu[11]
Published 5 April 2021

Phys. Rev. C **103**, 044315
https://journals.aps.org/prc/abstract/10.1103/PhysRevC.103.044315
Isoscalar monopole and dipole transitions in ^{24}Mg, ^{26}Mg, and ^{28}Si
P. Adsley[1,2,3,4,*], V. O. Nesterenko[5,6,7], M. Kimura[8,9], L. M. Donaldson[3,1], R. Neveling[3], J. W. Brümmer[2], D. G. Jenkins[10], N. Y. Kheswa[3], J. Kvasil[11], K. C. W. Li[2], D. J. Marín-Lámbarri[3,12,13], Z. Mabika[12], P. Papka[2], L. Pellegri[3,1], V. Pesudo[3,12,14], B. Rebeiro[12], P.-G. Reinhard[15], F. D. Smit[3], and W. Yahia-Cherif[16]
Published 19 April 2021

Phys. Rev. C **103**, 044317
https://journals.aps.org/prc/abstract/10.1103/PhysRevC.103.044317
Dipole response in ^{128,130}Te below the neutron threshold
J. Isaak[1,*], D. Savran[2], B. Löher[2], T. Beck[1], U. Friman-Gayer[1,3,4], Krishichayan[5,3], N. Pietralla[1], V. Yu. Ponomarev[1], M. Scheck[6,7], W. Tornow[5,3], V. Werner[1], A. Zilges[8], and M. Zweidinger[1]
Published 22 April 2021

Phys. Rev. C **103**, 044320
https://journals.aps.org/prc/abstract/10.1103/PhysRevC.103.044320
Examining the nuclear mass surface of Rb and Sr isotopes in the A≈104 region via precision mass measurements
I. Mukul[1,*], C. Andreoiu[2], J. Bergmann[3], M. Brodeur[4], T. Brunner[1,5], K. A. Dietrich[1,6], T. Dickel[3,7], I. Dillmann[1,8], E. Dunling[1,9], D. Fusco[1,10], G. Gwinner[11], C. Izzo[1], A. Jacobs[1,12], B. Kootte[1,11], Y. Lan[1,12], E. Leistenschneider[1,12], E. M. Lykiardopoulou[1,12], S. F. Paul[1,6], M. P. Reiter[1,3,13], J. L. Tracy, Jr.[1], J. Dilling[1,12], and A. A. Kwiatkowski[1,8]
Published 28 April 2021

Phys. Rev. C **103**, 044321
https://journals.aps.org/prc/abstract/10.1103/PhysRevC.103.044321
Octupole correlations near ^{110}Te
D. A. Testov[1,2,3], S. Bakes[1,2,4], J. J. Valiente-Dobón[5], A. Goasduff[1,2], S. Frauendorf[6], F. Nowacki[7], T. R. Rodríguez[8], G. de Angelis[5], D. Bazzacco[2], C. Boiano[9], A. Boso[1,2], B. Cederwall[10], M. Cicerchia[1,5], P. Čolović[11], G. Colucci[1,2,12], F. Didierjean[7], M. Doncel[13], J. A. Dueñas[14], F. Galtarossa[5], A. Gozzelino[5], K. Hadyńska-Klęk[5,12], G. Jaworski[5,12], P. R. John[15], S. Lenzi[1,2], H. Liu[10], S. Lunardi[1,2], R. Menegazzo[2], D. Mengoni[1,2], A. Mentana[9], D. R. Napoli[5], G. Pasqualato[1,2], F. Recchia[1,2], S. Riccetto[16], L. M. Robledo[8], M. Rocchini[17,18,*], B. Saygi[19,†], M. Siciliano[5,‡], Yu. Sobolev[3], and S. Szilner[11]
Published 29 April 2021

Phys. Rev. C **103**, 045809
https://journals.aps.org/prc/abstract/10.1103/PhysRevC.103.045809
Measurement of the ^{72}Ge(n,γ) cross section over a wide neutron energy range at the CERN n_TOF facility
M. Dietz et al. (n_TOF Collaboration)
Published 27 April 2021

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2. News to Report

a. Nuclear Physics Virtual Seminar - Medical Applications of Nuclear Physics Research: Register Now

Professor Laura Harkness-Brennan:
14:00-15:00 [BST], 12 May 2021

Organised by the IOP Nuclear Physics Group

This is the first in a planned series of seminars, aimed at the undergraduate level audience, that aims at highlighting areas of both applied and fundamental nuclear physics research that are being undertaken in the UK. In particular these talks will include those areas of research where there is a significant overlap between applied and fundamental science and highlight where this research has a positive impact on society. The seminars will give the audience a chance to engage with world-leading researchers form the UK.

This event is open to all with an interest.

For further information and to register, visit the website **Nuclear Physics Virtual Seminar - Medical Applications of Nuclear Physics Research (iopconferences.org)**

Contribution by David Sharp
(Chair of the IOP Nuclear Physics Group)

b. STFC CERN Business Incubation Centre

Do you have a business idea that could benefit from CERN technologies or expertise?

The unique challenges entrepreneurs face in developing a business idea or new technology are complex, and can quickly become barriers to growth. Incubators have gained much traction amongst start-ups and investors over recent years, and are recognised for the dedicated support they offer to early stage companies with an ambition to grow.

STFC CERN Business Incubation Centre offers funding, business development and technical support for entrepreneurs and small high tech companies wishing to exploit the business opportunities linked to CERN technologies in high energy physics. One of the world's leading high-energy physics laboratories and home to the Large Hadron Collider (LHC), businesses can access Intellectual Property (IP) or expertise from CERN, for a wide range of applications.

We are looking for SME's, university spin-outs, or entrepreneurs with an innovative idea that can benefit from access to CERN technologies or expertise to accelerate their innovation to the next level.

Access to high-spec equipment at STFC and CERN alongside leading technical expertise is helping start-ups to accelerate to market quicker and gain a competitive advantage by exploring and integrating new technologies.

Benefits of the programme

The STFC CERN BIC provides an ideal package of support including:

- £40,000 of funding for use on intellectual property (IP) protection, design, prototyping, or market studies
- Access to up to 80 hours of CERN and STFC science and technical support (40 hours each)
- One-to-one business support and mentoring in key aspects of running a technology business
- Investment readiness training to prepare entrepreneurs for scaling and developing their business
- Use of CERN IP at favourable conditions
- Collaboration and networking opportunities with R&D companies, universities, entrepreneurs, and scientists

Don't miss out on the opportunity to put your business ideas forward.

The STFC contact for the scheme is Delyth Edwards, Business Incubation Programmes Manager, delyth.edwards@stfc.ukri.org

Contribution by Lisa Fletcher
(University of Surrey)

c. IOP Joint APP, HEPP and NPG conference

The annual IOP Nuclear Physics Group conference was held virtually 12-15 April in conjunction with the Astroparticle and High Energy Particle Physics Groups.

The event was very successful with a high level of engagement.

The conference website containing the programme, etc can be found at: http://appheppnp2021.iopconfs.org/home

Contribution by James Benstead
(Secretary of the IOP Nuclear Physics Group)

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3. Outreach Activity

a. A century of nuclear isomers

Professors Philip Walker and Zsolt Podolyák of the University of Surrey had an article titled "A century of nuclear isomers" published in the April edition of Physicsworld magazine.

One hundred years after nuclear isomers were first discovered the authors pick five examples of these long-lived, excited nuclear states to show why they are so important in medical physics and beyond.

https://physicsworld.com/

Contribution by Phil Walker
(University of Surrey)

b. IOP South Central Branch talk

The Institute of Physics South Central Branch invites you to attend an online afternoon lecture from 4pm to 5pm on Wed 12th May 2021.

The May IoP South Central Branch & University of Surrey talk brings Dr. Arnau Rios Huguet, Senior Lecturer in Theoretical Nuclear Physics at the University of Surrey to talk about the diversity of atomic nuclei...

The atomic nucleus is a fascinating physical system. Found at the core of every atom - nuclei are also the reason we have chemistry. By means of an interactive quiz (with prizes), we will take a guided tour around the isotopic chart. We will count nuclei; discuss their sizes, and their masses. This tour will give us the opportunity to explore several of the open questions in physics - and how nuclei impact our understanding of the universe, from the smallest systems to the largest astrophysical scales.

The talk is free to attend, and open to all (public and University members, whether Institute of Physics members or not) if you would like to attend please register at: https://surrey-ac.zoom.us/webinar/register/WN_1XDxamhDRXKbR7XgfG1JBg.

A Facebook event page is at https://www.facebook.com/events/789410871693864 if you would like to discuss the event and show interest in attending.

Contribution by Elizabeth Cunningham
(STFC / University of Surrey)

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4. Media Interactions

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