UK Nuclear Activity

November 2021 Issue 101

In this issue,

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1. Nuclear Physics Publications for November

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. Rev. Lett. **127** 192501 (https://doi.org/10.1103/PhysRevLett.127.192501)
Large Shape Staggering in Neutron-Deficient Bi Isotopes
A. Barzakh, A. N. Andreyev, C. Raison, J. G. Cubiss, P. Van Duppen, S. Peru, S. Hilaire, S. Goriely, B. Andel, S. Antalic, M. Al Monthery, J. C. Berengut, J. Bieroń, M. L. Bissell, A. Borschevsky, K. Chrysalidis, T. E. Cocolios, T. Day Goodacre, J.-P. Dognon, M. Elantkowska, E. Eliav, G. J. Farooq-Smith, D. V. Fedorov, V. N. Fedosseev, L. P. Gaffney, R. F. Garcia Ruiz, M. Godefroid, C. Granados, R. D. Harding, R. Heinke, M. Huyse, J. Karls, P. Larmonier, J. G. Li (李冀光), K. M. Lynch, D. E. Maison, B. A. Marsh, P. Molkanov, P. Mosat, A. V. Oleynichenko, V. Panteleev, P. Pyykkö, M. L. Reitsma, K. Rezynkina, R. E. Rossel, S. Rothe, J. Ruczkowski, S. Schiffmann, C. Seiffert, M. D. Seliverstov, S. Sels, L. V. Skripnikov, M. Stryjczyk, D. Studer, M. Verlinde, S. Wilman, and A. V. Zaitsevskii
Published 2 November 2021

Phys. Rev. C **104** 054301 (https://doi.org/10.1103/PhysRevC.104.054301)
New β-decaying state in ^{214}Bi
B. Andel, P. Van Duppen, A. N. Andreyev, A. Blazhev, H. Grawe, R. Lica, H. Naïdja, M. Stryjczyk, A. Algora, S. Antalic, A. Barzakh, J. Benito, G. Benzoni, T. Berry, M. J. G. Borge, K. Chrysalidis, C. Clisu, C. Costache, J. G. Cubiss, H. De Witte, D. V. Fedorov, V. N. Fedosseev, L. M. Fraile, H. O. U. Fynbo, P. T. Greenlees, L. J. Harkness-Brennan, M. Huyse, A. Illana, J. Jolie, D. S. Judson, J. Konki, I. Lazarus, M. Madurga, N. Marginean, R. Marginean, C. Mihai, B. A. Marsh, P. Molkanov, P. Mosat, J. R. Murias, E. Nacher, A. Negret, R. D. Page, S. Pascu, A. Perea, V. Pucknell, P. Rahkila, E. Rapisarda, K. Rezynkina, V. Sánchez-Tembleque, K. Schomacker, M. D. Seliverstov, C. Sotty, L. Stan, C. Sürder, O. Tengblad, V. Vedia, S. Viñals, R. Wadsworth, and N. Warr
Published 2 November 2021

Edited by Jack Henderson, IOP Nuclear Physics Group Committee
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Phys. Rev. C **104**, L051301 (https://doi.org/10.1103/PhysRevC.104.L051301)
Evolution of single-particle structure near the N=20 island of inversion
P. T. MacGregor, D. K. Sharp, S. J. Freeman, C. R. Hoffman, B. P. Kay, T. L. Tang, L. P. Gaffney, E. F. Baader, M. J. G. Borge, P. A. Butler, W. N. Catford, B. D. Cropper, G. de Angelis, J. Konki, Th. Kröll, M. Labiche, I. H. Lazarus, R. S. Lubna, I. Martel, D. G. McNeel, R. D. Page, O. Poleshchuk, R. Raabe, F. Recchia, and J. Yang
Published 8 November 2021

Phys. Rev. Lett. **127** 202301 (https://doi.org/10.1103/PhysRevLett.127.202301)
Λ^+_c Production and Baryon-to-Meson Ratios in pp and p-Pb Collisions at √sNN=5.02 TeV at the LHC
ALICE Collaboration
Published 9 November 2021

Phys. Rev. C **104** 054905 (https://doi.org/10.1103/PhysRevC.104.054905)
Λ^+_c production in pp and in p-Pb collisions at √sNN=5.02 TeV
ALICE Collaboration
Published 9 November 2021

Phys. Rev. Lett. **127** 202501 (https://doi.org/10.1103/PhysRevLett.127.202501)
Solving the Puzzles of the Decay of the Heaviest Known Proton-Emitting Nucleus ^{185}Bi
D. T. Doherty, A. N. Andreyev, D. Seweryniak, P. J. Woods, M. P. Carpenter, K. Auranen, A. D. Ayangeakaa, B. B. Back, S. Bottoni, L. Canete, J. G. Cubiss, J. Harker, T. Haylett, T. Huang, R. V. F. Janssens, D. G. Jenkins, F. G. Kondev, T. Lauritsen, C. Lederer-Woods, J. Li, C. Müller-Gatermann
Published 12 November 2021

Phys. Rev. C **104** 054308 (https://doi.org/10.1103/PhysRevC.104.054308)
Neutron occupancies and single-particle energies across the stable tin isotopes
S. V. Szwec, D. K. Sharp, B. P. Kay, S. J. Freeman, J. P. Schiffer, P. Adsley, C. Binnersley, N. de Séréville, T. Faestermann, R. F. Garcia Ruiz, F. Hammache, R. Hertenberger, A. Meyer, C. Portail, I. Stefan, A. Vernon, S. Wilkins, and H.-F. Wirth
Published 15 November 2021

Phys. Rev. C **104** 055806 (https://doi.org/10.1103/PhysRevC.104.055806)
(^{6}Li,d) and (^{6}Li,t) reactions on ^{22}Ne and implications for s-process nucleosynthesis
S. Ota, G. Christian, W. N. Catford, G. Lotay, M. Pignatari, U. Battino, E. A. Bennett, S. Dede, D. T. Doherty, S. Hallam, F. Herwig, J. Hooker, C. Hunt, H. Jayatissa, A. Matta, M. Moukaddam, E. Rao, G. V. Rogachev, A. Saastamoinen, D. Scriven, J. A. Tostevin, S. Upadhyayula, and R. Wilkinson
Published 24 November 2021

Phys. Rev. C **104** 054316 (https://doi.org/10.1103/PhysRevC.104.054316)
Reinterpretation of excited states in ^{212}Po: Shell-model multiplets rather than α-cluster states
A. Fernández, A. Jungclaus, P. Golubev, D. Rudolph, L. G. Sarmiento, A. Gargano, H. Naïdja, A. Astier, E. Dupont, A. Gadea, E. Nácher, A. Perea, K. Wimmer, E. Clément, G. Fremont, J. Goupil, C. Houarner, B. Jacquot, A. Korichi, A. Lemasson, H. J. Li, J. Ljungvall, L. Ménager, R. M. Pérez-Vidal, C. M. Petrache, D. Ralet, J. A. Ropert, F. Saillant, A. Såmark-Roth, G. S. Simpson, C. Spitaels, M. Zielinska, S. Ansari, J. Dudouet, A. Illana, M. Jurado, D. Kocheva, N. Lalovic, Ch. Lorenz, B. Quintana, G. Rainovski, N. Redon, G. Tocabens, D. Barrientos, G. Benzoni, B. Birkenbach, A. J. Boston, H. C. Boston, A. Bracco, M. Ciemala, J. Collado, D. M. Cullen, C. Domingo-Pardo, J. Eberth, V. González, L. J. Harkness-Brennan, H. Hess, D. S. Judson, W. Korten, S. Leoni, A. Maj, R. Menegazzo, D. Mengoni, C. Michelagnoli, B. Million, D. R. Napoli, J. Nyberg, Zs. Podolyak, A. Pullia, P. Reiter, E. Sanchis, O. Stezowski, Ch. Theisen, and J. J. Valiente-Dobón
Published 29 November 2021

Phys. Rev. C **104** 054611 (https://doi.org/10.1103/PhysRevC.104.054611)
Inertial-confinement fusion-plasma-based cross-calibration of the deuterium-tritium γ-to-neutron branching ratio
J. Jeet, A. B. Zylstra, M. Rubery, Y. Kim, K. D. Meaney, C. Forrest, V. Glebov, C. J. Horsfield, A. M. McEvoy, and H. W. Herrmann
Published 29 November 2021

Phys. Rev. C **104** 054322 (https://doi.org/10.1103/PhysRevC.104.054322)
Charge radii, moments, and masses of mercury isotopes across the N = 126 shell closure
T. Day Goodacre, A. V. Afanasjev, A. E. Barzakh, L. Nies, B. A. Marsh, S. Sels, U. C. Perera, P. Ring, F. Wienholtz, A. N. Andreyev, P. Van Duppen, N. A. Althubiti, B. Andel, D. Atanasov, R. S. Augusto, J. Billowes, K. Blaum, T. E. Cocolios, J. G. Cubiss, G. J. Farooq-Smith, D. V. Fedorov, V. N. Fedosseev, K. T. Flanagan, L. P. Gaffney, L. Ghys, A. Gottberg, M. Huyse, S. Kreim, P. Kunz, D. Lunney, K. M. Lynch, V. Manea , Y. Martinez Palenzuela, T. M. Medonca, P. L. Molkanov, M. Mougeot , J. P. Ramos, M. Rosenbusch, R. E. Rossel, S. Rothe, L. Schweikhard, M. D. Seliverstov, P. Spagnoletti, C. Van Beveren, M. Veinhard, E. Verstraelen, A. Welker, K. Wendt, R. N. Wolf, A. Zadvornaya, and K. Zuber
Published 30 November 2021

Phys. Rev. C **104** 054323 (https://doi.org/10.1103/PhysRevC.104.054323)
Search for in-band transitions in the candidate superdeformed band in ^{28}Si
L. Morris, D. G. Jenkins, M. N. Harakeh, J. Isaak, N. Kobayashi, A. Tamii, S. Adachi, P. Adsley, N. Aoi, A. Bracco, A. Brown, M. P. Carpenter, J. J. Carroll, S. Courtin, F. C. L. Crespi, P. J. Davies, G. Fruet, Y. D. Fang, H. Fujita, G. Gey, T. H. Hoang, N. Ichige, E. Ideguchi, A. Inoue, C. Iwamoto, T. Koike, M. Kumar Raju, M. L. Liu, D. Montanari, P. von Neumann-Cosel, S. Noji, H. J. Ong, D. Savran, J. M. Schmitt, C. Sullivan, B. Wasilewska, M. Weinert, V. Werner, Y. Yamamoto, R. G. T. Zegers, X. H. Zhou, and S. Zhu
Published 30 November 2021

Nature Physics (https://doi.org/10.1038/s41567-021-01395-w)
Precision mass measurement of lightweight self-conjugate nucleus ^{80}Zr
A. Hamaker, E. Leistenschneider, R. Jain, G. Bollen, S. A. Giuliani, K. Lund, W. Nazarewicz, L. Neufcourt, C. R. Nicoloff, D. Puentes, R. Ringle, C. S. Sumithrarachchi and I. T. Yandow
Published 25 November 2021

Nature Physics (https://doi.org/10.1038/s41567-021-01443-5)
No need to decide
A. Pastore
Published 25 November 2021

Phys. Lett. B **823** 136784 (https://doi.org/10.1016/j.physletb.2021.136784)
Mirror energy differences above the $0f_{7/2}$ shell: First γ-ray spectroscopy of the T_z=−2 nucleus ^{56}Zn
A.Fernández, A.Jungclaus, P.Doornenbal, M.A.Bentley, S.M.Lenzi, D.Rudolph, F.Browne, M.L.Cortés, T.Koiwai, R.Taniuchi, V.Vaquero, K.Wimmer, T.Arici, N.Imai, N.Kitamura, B.Longfellow, R.Lozeva, B.Mauss, D.R.Napoli, M.Niikura, X.Pereira-Lopez, S.Pigliapoco, A.Poves, F.Recchia, P.Ruotsalainen, H.Sakurai, S.Uthayakumaar, R.Wadsworth, R.Yajzey
Published 10 December 2021

Phys. Lett. B **823** 126766 (https://doi.org/10.1016/j.physletb.2021.136766)
Impact of shell evolution on Gamow-Teller β decay from a high-spin long-lived isomer in ^{127}Ag
H. Watanabe, C.X. Yuan, G. Lorusso, S. Nishimura, Z.Y. Xu, T. Sumikama, P.-A. Söderström, P. Doornenbal, F. Browne, G. Gey, H.S. Jung, J. Taprogge, Zs. Vajta, H.K. Wang, J. Wu, A. Yagi, H. Baba, G. Benzoni, K.Y. Chae, F.C.L. Crespi, N. Fukuda, R. Gernhäuser, N. Inabe, T. Isobe, A. Jungclaus, D. Kameda, G.D. Kim, Y.K. Kim, I. Kojouharov, F.G. Kondev, T. Kubo, N. Kurz, Y.K. Kwon, G.J. Lane, Z. Li, C.-B. Moon, A. Montaner-Pizá, K. Moschner, F. Naqvi, M. Niikura, H. Nishibata, D. Nishimura, A. Odahara, R. Orlandi, Z. Patel, Zs. Podolyák, H. Sakurai, H. Schaffner, G.S. Simpson, K. Steiger, H. Suzuki, H. Takeda, A. Wendt, K. Yoshinaga
Published 10 December 2021

Phys. Lett. B **823** 136757 (https://doi.org/10.1016/j.physletb.2021.136757)
Spectroscopy of the T = 2 mirror nuclei ^{48}Fe/^{48}Ti using mirrored knockout reactions
R. Yajzey, M.A. Bentley, E.C. Simpson, T. Haylett, S. Uthayakumaar, D. Bazin, J. Belarge, P.C. Bender, P.J. Davies, B. Elman, A. Gade, H. Iwasaki, D. Kahl, N. Kobayashi, S.M. Lenzi, B. Longfellow, S.J. Lonsdale, E. Lunderberg, L. Morris, D.R. Napoli, X. Pereira-Lopez, F. Recchia, J.A. Tostevin, R. Wadsworth, D. Weisshaar
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2. News to Report

a. New ALICE Physics Convener

Congratulations to Jaime Norman for becoming a new Physics convener of the ALICE Collaboration at the LHC (CERN). Starting from November 2021 Jaime co-chairs the Physics Analysis Group focusing on jets and hard photons measurements (e.g. jet spectra, isolated photons, gamma-jet, hadron-jet…).

Since his PhD in the Liverpool ALICE group, Jaime has played a leading role in new measurements of heavy-flavour production in proton-proton, proton-lead and lead-lead collisions at the LHC. Notably he has performed first measurements with ALICE of the production of the Λc (udc) charmed baryon, which is sensitive to perturbative and non-perturbative aspects of Quantum Chromodynamics, including the hadronisation of charm quarks (J. High Energy Phys. 04 (2018) 108, Phys.Lett. B793 (2019) 212-223, Phys. Rev. Lett. 127 (2021) 202301).

More recently, returning to Liverpool from LPSC Grenoble (France) where he worked as a postdoc for two years, he has initiated a new research programme of jet measurements which aim to probe fundamental transport properties of hot QCD matter and reveal the short distance structure of the quark gluon plasma through, for instance, measurements of the yield and acoplanarity of jets recoiling from a high pT hadron.

Data taking at the LHC is due to restart in 2022. Alongside his new role as physics convener Jaime intends to keep developing his research programme, taking advantage of the new opportunities offered by the upgraded ALICE experiment (e.g. the new Inner Tracking System which Liverpool contributed to build in the last few years). He is planning first high-precision measurements, which correlate the production of heavy-flavour hadrons (with charm or beauty) and jets in lead-lead collisions. As heavy-ion collisions at ultra-relativistic energies give rise to a challenging high-density environment, Jaime also develops and uses novel machine learning techniques to perform these complex data analyses.

Contribution by Marielle Chartier (m.chartier@liverpool.ac.uk)

b. First Nuclear Physics ECR Forum

The first forum for UK Nuclear Physics Early Career Researchers was held over the 1st and 2nd of November at the Institute of Physics building in London. Attendees from ten institutions participated in the event, which also allowed for remote participation.

In addition to science talks from ECRs, a career-development panel was convened, made up of academics with experience serving on research council panels. An invited speaker from industry also presented their perspective on career development and non-academic routes open to ECRs.

Contribution by Jack Henderson (jack.henderson@surrey.ac.uk)

c. STFC Nuclear Physics Summer School

We are delighted to announce the first details of the 21st Science and Technology Facilities Council (STFC) Nuclear Physics Summer School, which will be held at the University of Sheffield from the 27th of March - 3rd of April 2022. We are planning for an in-person event and have put together an exciting programme of lectures which will be delivered by leading international experts, which will be supported by tutorial sessions, a dedicated careers session, and student talks.

For more information and initial registration (the registration deadline is 14/02/2022), please visit the school webpage - https://indico.stfc.ac.uk/e/STFCNuclearPhysicsSummerSchool2022 and fill in your details. For STFC-funded students there is no fee but we would also ask that students not funded by STFC register their interest at this point as well, the fee will be contingent on other

funding that we manage to secure for the school.

Please do let us know if you have any questions and we look forward to seeing everyone in Sheffield.
With best wishes,

The School Organisers
Marina Petri (marina.petri@york.ac.uk)
Daniel Doherty (d.t.doherty@surrey.ac.uk)

Contribution by Daniel Doherty

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3. Outreach Activity

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4. Media Interactions

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