UK Nuclear Activity

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1. Nuclear Physics Publications for October (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.

Phys. Rev. C **100**, 041301(R)
https://journals.aps.org/prc/abstract/10.1103/PhysRevC.100.041301

Intruder dominance in the 0^+_2 state of ^{32}Mg studied with a novel technique for in-flight decays

R. Elder[1,2], H. Iwasaki[1,2], J. Ash[1,2], D. Bazin[1,2], P. C. Bender[1,3], T. Braunroth[4], B. A. Brown[1,2], C. M. Campbell[5], H. L. Crawford[5], B. Elman[1,2], A. Gade[1,2], M. Grinder[1,2], N. Kobayashi[6], B. Longfellow[1,2], A. O. Macchiavelli[5], T. Mijatović[1,7], J. Pereira[1], A. Revel[1], D. Rhodes[1,2], J. A. Tostevin[8], and D. Weisshaar
Published 4 October 2019

Phys. Rev. C **100**, 044302
https://journals.aps.org/prc/abstract/10.1103/PhysRevC.100.044302

Physics of even-even superheavy nuclei with 96<Z<110 in the quark-meson-coupling model

J. R. Stone, K. Morita, P. A. M. Guichon, and A. W. Thomas
Published 3 October 2019

Phys. Rev. C **100**, 044305
https://journals.aps.org/prc/abstract/10.1103/PhysRevC.100.044305

Total absorption γ-ray spectroscopy of the β-delayed neutron emitters ^{137}I and ^{95}Rb

V. Guadilla[*], J. L. Tain, A. Algora[†], J. Agramunt, D. Jordan, M. Monserrate, A. Montaner-Pizá, E. Nácher[‡], S. E. A. Orrigo, B. Rubio, E. Valencia, M. Estienne, M. Fallot, L. Le Meur, J. A. Briz, A. Cucoanes, A. Porta, T. Shiba, A.-A. Zakari-Issoufou, A. A. Sonzogni, J. Äystö, T. Eronen, D. Gorelov, J. Hakala, A. Jokinen, A. Kankainen[§], V. S. Kolhinen, J. Koponen, I. D. Moore, H. Penttilä, I. Pohjalainen, J. Reinikainen, M. Reponen, S. Rinta-Antila, K. Rytkönen, V. Sonnenschein, A. Voss, L. M. Fraile, V. Vedia, E. Ganioğlu, W. Gelletly, M. Lebois, J. N. Wilson, and T. Martinez

Published 9 October 2019

Phys. Rev. C **100**, 044309
https://journals.aps.org/prc/abstract/10.1103/PhysRevC.100.044309

Fast-timing measurements in the ground-state band of ^{114}Pd

E. R. Gamba[1], A. M. Bruce[1,*], S. Lalkovski[2,†], M. Rudigier[2], S. Bottoni[3,‡], M. P. Carpenter[3], S. Zhu[3], J. T. Anderson[3], A. D. Ayangeakaa[3,§], T. A. Berry[2], I. Burrows[4], M. Carmona Gallardo[5], R. J. Carroll[2], P. Copp[6], D. M. Cullen[7], T. Daniel[2,¶], G. Fernández Martínez[8], J. P. Greene[3], L. A. Gurgi[2], D. J. Hartley[9], R. Ilieva[2], S. Ilieva[8], F. G. Kondev[10], T. Kröll[8], G. J. Lane[11], T. Lauritsen[3], I. Lazarus[4], G. Lotay[2], C. R. Niță[12], Zs. Podolyák[2], V. Pucknell[4], M. Reed[11], P. H. Regan[2,13], J. Rohrer[3], J. Sethi[3], D. Seweryniak[3], C. M. Shand[2], J. Simpson[4], M. Smoleń[14], E. A. Stefanova[15], V. Vedia[5], and O. Yordanov[15]

Published 11 October 2019

Phys. Rev. C **100**, 044311
https://journals.aps.org/prc/abstract/10.1103/PhysRevC.100.044311

Half-lives of ^{73}Sr and ^{76}Y and the consequences for the proton dripline

L. Sinclair[1,2], R. Wadsworth[1,*], J. Dobaczewski[1,3,4], A. Pastore[1], G. Lorusso[2,5,6], H. Suzuki[2], D. S. Ahn[2], H. Baba[2], F. Browne[2,7], P. J. Davies[1,†], P. Doornenbal[2], A. Estrade[8,‡], Y. Fang[9,§], N. Fukuda[2], J. Henderson[1,‖], T. Isobe[2], D. G. Jenkins[1], S. Kubono[2], Z. Li[10], D. Lubos[2,11], S. Nishimura[2], I. Nishizuka[12,¶], Z. Patel[2,6], S. Rice[2,6], H. Sakurai[2], Y. Shimizu[2], P. Schury[2,#], H. Takeda[2], P.-A. Söderström[2,**], T. Sumikama[13], H. Watanabe[14], V. Werner[15], J. Wu[2,10], and Z. Y. Xu

Published 16 October 2019

Phys. Rev. C **100**, 044323
https://journals.aps.org/prc/abstract/10.1103/PhysRevC.100.044323

α-decay spectroscopy of the N=130 isotones ^{218}Ra and ^{220}Th: Mitigation of α-particle energy summing with implanted nuclei

E. Parr[1,2,*,†], J. F. Smith[1,2], P. T. Greenlees[3], K. Auranen[3], P. A. Butler[4], R. Chapman[1,2], D. M. Cox[3], D. M. Cullen[5], L. P. Gaffney[1,2,*], T. Grahn[3], E. T. Gregor[1,2], L. Grocutt[1,2], A. Herzáň[3,‡], R.-D. Herzberg[4], D. Hodge[5], U. Jakobsson[3], R. Julin[3], S. Juutinen[3], J. Keatings[1,2], J. Konki[3,§], M. Leino[3], P. P. McKee[1,2], C. McPeake[4], D. Mengoni[6], A. K. Mistry[4], K. F. Mulholland[1,2], B. S. Nara Singh[5,‖], G. G. O'Neill[4], J. Pakarinen[3], P. Papadakis[3,¶], J. Partanen[3], P. Peura[3], P. Rahkila[3], P. Ruotsalainen[3], M. Sandzelius[3], J. Sarén[3], M. Scheck[1,2], C. Scholey[3], M. Siciliano[3,#], M. Smolen[1,2], J. Sorri[3,**], P. Spagnoletti[1,2], K. M. Spohr[1,2], S. Stolze[3,††], M. J. Taylor[5,‡‡], and J. Uusitalo[3]

Published 30 October 2019

Phys. Rev. C **100**, 044324

https://journals.aps.org/prc/abstract/10.1103/PhysRevC.100.044324

β and γ bands in N=88, 90, and 92 isotones investigated with a five-dimensional collective Hamiltonian based on covariant density functional theory: Vibrations, shape coexistence, and superdeformation

S. N. T. Majola[1,2,3,4], Z. Shi[5], B. Y. Song[6], Z. P. Li[6], S. Q. Zhang[7], R. A. Bark[2], J. F. Sharpey-Schafer[8], D. G. Aschman[4], S. P. Bvumbi[3], T. D. Bucher[2,9], D. M. Cullen[10,11], T. S. Dinoko[2,12], J. E. Easton[2,8], N. Erasmus[2,8], P. T. Greenlees[10], D. J. Hartley[13], J. Hirvonen[10], A. Korichi[14], U. Jakobsson[10], P. Jones[2], S. Jongile[1,2,9], R. Julin[10], S. Juutinen[10], S. Ketelhut[10], B. V. Kheswa[2,3], N. A. Khumalo[2,8], E. A. Lawrie[2,8], J. J. Lawrie[2], R. Lindsay[8], T. E. Madiba[2,8], L. Makhathini[2,9], S. M. Maliage[2,8], B. Maqabuka[2,8], K. L. Malatji[2,9], P. L. Masiteng[2,3,8], P. I. Mashita[2,8], L. Mdletshe[1,2], A. Minkova[15], L. Msebi[2,8], S. M. Mullins[2], J. Ndayishimye[2], D. Negi[2,16], A. Netshiya[2,8], R. Newman[9], S. S. Ntshangase[1], R. Ntshodu[2], B. M. Nyakó[17], P. Papka[2,9], P. Peura[10], P. Rahkila[10], L. L. Riedinger[18], M. A. Riley[19], D. G. Roux[20], P. Ruotsalainen[10], J. J. Saren[10], C. Scholey[10], O. Shirinda[2,9], M. A. Sithole[2,8], J. Sorri[10,21], M. Stankiewicz[2,4], S. Stolze[10,22], J. Timár[17], J. Uusitalo[10], P. A. Vymers[2,9], M. Wiedeking[2], and G. L. Zimba[2,3,10]

Published 30 October 2019

Phys. Rev. C **100**, 044604

https://journals.aps.org/prc/abstract/10.1103/PhysRevC.100.044604

Modelling incomplete fusion dynamics of complex nuclei at Coulomb energies

Rafael Van den Bossche and Alexis Diaz-Torres

Published 4 October 2019

Phys. Rev. C **100**, 044902

https://journals.aps.org/prc/abstract/10.1103/PhysRevC.100.044902

Charged-particle angular correlations in XeXe collisions at $\sqrt{s_{NN}}$ =5.44 TeV

A. M. Sirunyan *et al.* (CMS Collaboration)

Published 3 October 2019

Phys. Rev. C **100**, 044903

https://journals.aps.org/prc/abstract/10.1103/PhysRevC.100.044903

Two-particle differential transverse momentum and number density correlations in p–Pb collisions at 5.02 TeV and Pb-Pb collisions at 2.76 TeV at the CERN Large Hadron Collider

S. Acharya *et al.* (ALICE Collaboration)

Published 10 October 2019

Phys. Rev. C **100**, 045804

https://journals.aps.org/prc/abstract/10.1103/PhysRevC.100.045804

Measurement of the ^{70}Ge(n,γ) cross section up to 300 keV at the CERN n_TOF facility

A. Gawlik *et al.* (The n_TOF Collaboration)

Published 17 October 2019

Phys. Rev. Lett. **123**, 142301

https://journals.aps.org/prl/abstract/10.1103/PhysRevLett.123.142301

Investigations of Anisotropic Flow Using Multiparticle Azimuthal Correlations in pp, p–Pb, Xe-Xe, and Pb-Pb Collisions at the LHC

S. Acharya *et al.* (A Large Ion Collider Experiment Collaboration)

Published 2 October 2019

Phys. Rev. Lett. **123**, 142501

https://journals.aps.org/prl/abstract/10.1103/PhysRevLett.123.142501

Quasifree Neutron Knockout from ^{54}Ca Corroborates Arising N=34 Neutron Magic Number

S. Chen[1,2,3,*], J. Lee[1,†], P. Doornenbal[2], A. Obertelli[4,2,5], C. Barbieri[6], Y. Chazono[7], P. Navrátil[8], K. Ogata[7], T. Otsuka[2,9,10], F. Raimondi[11], V. Somà[4], Y. Utsuno[12,9], K. Yoshida[12,7], H. Baba[2], F. Browne[2], D. Calvet[4], F. Château[4], N. Chiga[2], A. Corsi[4], M. L. Cortés[2], A. Delbart[4], J.-M. Gheller[4], A. Giganon[4], A. Gillibert[4], C. Hilaire[4], T. Isobe[2], J. Kahlbow[5,2], T. Kobayashi[13], Y. Kubota[2,14], V. Lapoux[4], H. N. Liu[4,15,5], T. Motobayashi[2], I. Murray[16,2], H. Otsu[2], V. Panin[2], N. Paul[4], W. Rodriguez[17,2], H. Sakurai[2,18], M. Sasano[2], D. Steppenbeck[2], L. Stuhl[14], Y. L. Sun[4,5], Y. Togano[19], T. Uesaka[2], K. Wimmer[18], K. Yoneda[2], N. Achouri[4], O. Aktas[15], T. Aumann[5,20], L. X. Chung[21], F. Flavigny[16], S. Franchoo[16], I. Gašparić[22,2], R.-B. Gerst[23], J. Gibelin[24], K. I. Hahn[25], D. Kim[25,2], T. Koiwai[18], Y. Kondo[26], P. Koseoglou[5,20], C. Lehr[5,2], B. D. Linh[21], T. Lokotko[1], M. MacCormick[16], K. Moschner[23], T. Nakamura[26], S. Y. Park[25,2], D. Rossi[5], E. Sahin[27], D. Sohler[28], P.-A. Söderström[5], S. Takeuchi[26], H. Törnqvist[5,20], V. Vaquero[29], V. Wagner[5,2], S. Wang[30], V. Werner[5], X. Xu[1], H. Yamada[26], D. Yan[30], Z. Yang[2], M. Yasuda[26], and L. Zanetti[5,2]

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2. News to Report

a. Tastes of Nuclear Physics Conference

During the week of 30th September 2019, three nuclear physicists from the University of York attended the Tastes of Nuclear Physics conference at the University of Zululand in South Africa. This was part of their STFC GCRF project, MANDELA (Modern African Nuclear Detector Laboratory). The project is to work with two historically disadvantaged universities in South Africa to upskill young people to work in nuclear applications and new concepts in medical imaging. Prof. David Jenkins and Dr Mikhail Bashkanov presented lectures on nuclear applications and medical imaging. Together with Dr Julien Bordes, they led five hours of hands-on workshops on GEANT4 Monte Carlo simulation. Forty students participated in the training programme, simulating for themselves how charged particles and gamma rays interact with matter. The GEANT4 simulations were run “on the cloud” using an Amazon cloud server with students running them from laptops. This avoided the complexity of installing the software and using powerful computers which were unavailable on site. This activity would be readily translatable to projects in high schools or elsewhere.

Contributed by David Jenkins (University of York)

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3. Outreach Activity

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4. Media Interactions

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