UK Nuclear Activity

May 2020 Issue 83

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

Nuclear Physics Public Engagement Website: NuclearPhysicsForYou

Nuclear Physics Outreach Poster – order hardcopies from STFC free of charge here

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1. Nuclear Physics Publications for May (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. Lett. **124**, 132502 **(Editor's pick)**
https://journals.aps.org/prl/abstract/10.1103/PhysRevLett.124.132502
Charge Radius of the Short-Lived ^{68}Ni and Correlation with the Dipole Polarizability
S. Kaufmann[1], J. Simonis[2], S. Bacca[2,3], J. Billowes[4], M. L. Bissell[4], K. Blaum[5], B. Cheal[6], R. F. Garcia Ruiz[4,7,†], W. Gins[8], C. Gorges[1], G. Hagen[9], H. Heylen[5,7], A. Kanellakopoulos[8], S. Malbrunot-Ettenauer[7], M. Miorelli[10], R. Neugart[5,11], G. Neyens[7,8], W. Nörtershäuser[1,*], R. Sánchez[12], S. Sailer[13], A. Schwenk[1,5,14], T. Ratajczyk[1], L. V. Rodríguez[15,‡], L. Wehner[16], C. Wraith[6], L. Xie[4], Z. Y. Xu[8], X. F. Yang[8,17], and D. T. Yordanov[15]
Published 1 April 2020

Eur. Phys. J. WoC **232**, 03005 (2020)
https://link.springer.com/article/10.1140/epjc/s10052-019-7389-9
Role of the Surface Energy in Heavy-Ion Collisions
P. D. Stevenson
Published 6 April 2020

Eur. Phys. J. A (2020) **56**: 75
https://epja.epj.org/articles/epja/abs/2020/03/10050_2020_Article_77/10050_2020_Article_77.html

A new approach to monitor $^{13}\mathrm{C}$-targets degradation in situ for $^{13}\mathrm{C}(\alpha, \mathrm{n})^{16}\mathrm{O}$ cross-section measurements at LUNA

G. F. Ciani[1,2,3*], L. Csedreki[1,2**], J. Balibrea-Correa[4,5], A. Best[4,5], M. Aliotta[6], F. Barile[7], D. Bemmerer[8], A. Boeltzig[1,2], C. Broggini[9], C. G. Bruno[6], A. Caciolli[9,10], F. Cavanna[11], T. Chillery[6], P. Colombetti[12,13], P. Corvisiero[11,14], T. Davinson[6], R. Depalo[9], A. Di Leva[4,5], L. Di Paolo[2], Z. Elekes[3], F. Ferraro[11,14], E. M. Fiore[7,15], A. Formicola[2], Zs. Fülöp[3], G. Gervino[12,13], A. Guglielmetti[16,17], C. Gustavino[18], Gy. Gyürky[3], G. Imbriani[4,5], M. Junker[2], I. Kochanek[2], M. Lugaro[19], P. Marigo[9,10], E. Masha[16,17], R. Menegazzo[9], V. Mossa[7], F. R. Pantaleo[7,20], V. Paticchio[7], R. Perrino[7,24], D. Piatti[9,10], P. Prati[11,14], L. Schiavulli[7,15], K. Stöckel[8,21], O. Straniero[2,22], T. Szücs[8], M. P. Takács[8,21,25], F. Terrasi[23], D. Trezzi[16,17] and S. Zavatarelli[11]
Published 3 March 2020

Phys. Rev. Lett. **124**, 192701
https://journals.aps.org/prl/abstract/10.1103/PhysRevLett.124.192701

Advances in the Direct Study of Carbon Burning in Massive Stars

G. Fruet[1,2], S. Courtin[1,2,3,*], M. Heine[1,2,†], D. G. Jenkins[4], P. Adsley[5], A. Brown[4], R. Canavan[6,7], W. N. Catford[6], E. Charon[8], D. Curien[1,2], S. Della Negra[5], J. Duprat[9], F. Hammache[5], J. Lesrel[5], G. Lotay[6], A. Meyer[5], D. Montanari[1,2,3], L. Morris[4], M. Moukaddam[6], J. Nippert[1,2], Zs. Podolyák[6], P. H. Regan[6,7], I. Ribaud[5], M. Richer[1,2], M. Rudigier[6], R. Shearman[6,7], N. de Séréville[5], and C. Stodel[10]
Published 12 May 2020

Phys. Rev. Lett. **124**, 212503
https://journals.aps.org/prl/abstract/10.1103/PhysRevLett.124.212503

Halo Structure of the Neutron-Dripline Nucleus ^{19}B

K. J. Cook[1,*], T. Nakamura[1], Y. Kondo[1], K. Hagino[2], K. Ogata[3,4], A. T. Saito[1], N. L. Achouri[5], T. Aumann[6,7], H. Baba[8], F. Delaunay[5], Q. Deshayes[5], P. Doornenbal[8], N. Fukuda[8], J. Gibelin[5], J. W. Hwang[9], N. Inabe[8], T. Isobe[8], D. Kameda[8], D. Kanno[1], S. Kim[9], N. Kobayashi[1], T. Kobayashi[10], T. Kubo[8], S. Leblond[5,†], J. Lee[8,‡], F. M. Marqués[5], R. Minakata[1], T. Motobayashi[8], K. Muto[10], T. Murakami[2], D. Murai[11], T. Nakashima[1], N. Nakatsuka[2], A. Navin[12], S. Nishi[1], S. Ogoshi[1], N. A. Orr[5], H. Otsu[8], H. Sato[8], Y. Satou[9], Y. Shimizu[8], H. Suzuki[8], K. Takahashi[10], H. Takeda[8], S. Takeuchi[8,1], R. Tanaka[1], Y. Togano[7,11], J. Tsubota[1], A. G. Tuff[13], M. Vandebrouck[14,§], and K. Yoneda[8]
Published 27 May 2020

Phys. Rev. C **101**, 054311
https://journals.aps.org/prc/abstract/10.1103/PhysRevC.101.054311

Octupole states in ^{207}Tl studied through β decay

T. A. Berry[1], Zs. Podolyák[1,*], R. J. Carroll[1], R. Lică[2,3], B. A. Brown[4], H. Grawe[5], Ch. Sotty[3,6], N. K. Timofeyuk[1], T. Alexander[1], A. N. Andreyev[7], S. Ansari[8], M. J. G. Borge[2], M. Brunet[1], J. R. Cresswell[9], C. Fahlander[10], L. M. Fraile[11], H. O. U. Fynbo[12], E. Gamba[13], W. Gelletly[1], R.-B. Gerst[8], M. Górska[5], A. Gredley[9], P. Greenlees[14,15], L. J. Harkness-Brennan[9], M. Huyse[6], S. M. Judge[16], D. S. Judson[9], J. Konki[14,15,†], M. Kowalska[2], J. Kurcewicz[2], I. Kuti[17], S. Lalkovski[1], I. Lazarus[18], M. Lund[12], M. Madurga[2], N. Mărginean[3], R. Mărginean[3], I. Marroquin[19], C. Mihai[3], R. E. Mihai[3], E. Nácher[19], A. Negret[3], S. Nae[3], C. Niţă[3,13], S. Pascu[3], R. D. Page[9], Z. Patel[1], A. Perea[19], J. Phrompao[20], M. Piersa[21], V. Pucknell[18], P. Rahkila[14,15], E. Rapisarda[2], P. H. Regan[1,16], F. Rotaru[3], M. Rudigier[1], C. M. Shand[1], R. Shearman[1,16], E. C. Simpson[22], S. Stegemann[8], T. Stora[2], O. Tengblad[19], A. Turturica[3], P. Van Duppen[6], V. Vedia[11], P. M. Walker[1], N. Warr[8], F. P. Wearing[9], and H. De Witte[6]
Published 18 May 2020

Phys. Rev. C **101**, 054314
https://journals.aps.org/prc/abstract/10.1103/PhysRevC.101.054314
γ-ray spectroscopy of a four-quasiparticle isomer band in ^{174}Re
R. J. Carroll[1], P. M. Walker[1], G. J. Lane[2], M. W. Reed[2], A. Akber[2], H. M. Albers[3], J. J. Carroll[4], D. M. Cullen[5], A. C. Dai[6], C. Fahlander[7], M. S. M. Gerathy[2], S. S. Hota[2], G. Lotay[1], T. Kibédi[2], V. Margerin[8], A. J. Mitchell[2], N. Palalani[2], T. Palazzo[2], Z. Patel[1], R. Shearman[1,9], A. E. Stuchbery[2], and F. R. Xu[6]
Published 26 May 2020

Phys. Rev. C **101**, 055801
https://journals.aps.org/prc/abstract/10.1103/PhysRevC.101.055801
Measurement of the ^{7}Li(γ,t)^{4}He ground-state cross section between $E_γ$=4.4 and 10 MeV
M. Munch[1,2], C. Matei[3,*], S. D. Pain[4], M. T. Febbraro[4], K. A. Chipps[4], H. J. Karwowski[5,6], C. Aa. Diget[2], A. Pappalardo[3], S. Chesnevskaya[3], G. L. Guardo[3,7], D. Walter[8], D. L. Balabanski[3], F. D. Becchetti[9], C. R. Brune[10], K. Y. Chae[11], J. Frost-Schenk[2], M. J. Kim[11], M. S. Kwag[11], M. La Cognata[7], D. Lattuada[3], R. G. Pizzone[7], G. G. Rapisarda[7], G. V. Turturica[3], C. A. Ur[3], and Y. Xu[3]
Published 14 May 2020

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2. News to Report

a. UK Lockdown Seminars

A number of members of the UK nuclear physics community have been giving online seminars as part of a series during the lockdown. Several more seminars are scheduled for each week of June.

These are mostly aimed at the nuclear physics community itself, rather than being outreach oriented, but all are welcome.

This is an ongoing effort hosted by the Liverpool and Manchester and more details are on our website: http://www.lockdownseminars.co.uk/

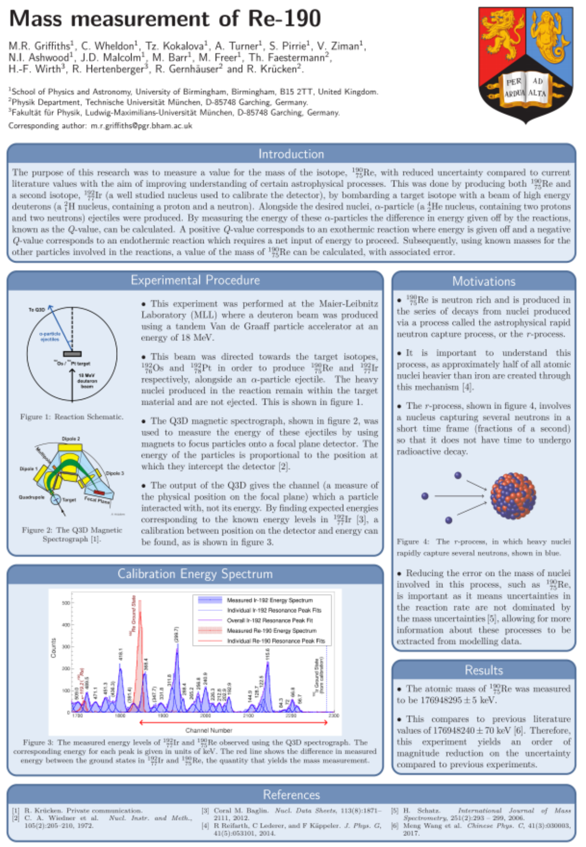
Contributed by James Smallcombe (Univ. Liverpool)

b. National Physics Poster Competition

Congratulations to Mark Griffiths.

On 12th May, Mark Griffiths, a PhD student at the University of Birmingham, was awarded 2nd place in the www.scientistt.net national Physics Poster competition, after being shortlisted by judges followed by a members vote. His poster, entitled "Mass measurement of Re-190", described how the mass was measured to an accuracy of 5 keV – an improvement of over an order of magnitude – using the Munich Q3D spectrograph in Germany.

Rhenium-190 is populated in the decay of r-process-path nuclei and contains a low-lying metastable state with a half-life of 3.2 hours. The more accurate ground-state mass also means the isomeric state mass is much better constrained.



Contributed by Tzany Kokalova Wheldon (Univ. Birmingham)

c. Radiation Detection Analyst Vacancies

Do you have practical experience in a nuclear or radiation laboratory? Do you also have experience analysing and interpreting gamma spectra with some experience of writing / reviewing technical reports? UKAEA are recruiting for a Radiation Detection Analyst to primarily perform measurements and analysis of routine waste drums and ad-hoc samples. The role has lots of scope for growth and opportunity to work independently as well as part of a large group at UKAEA.

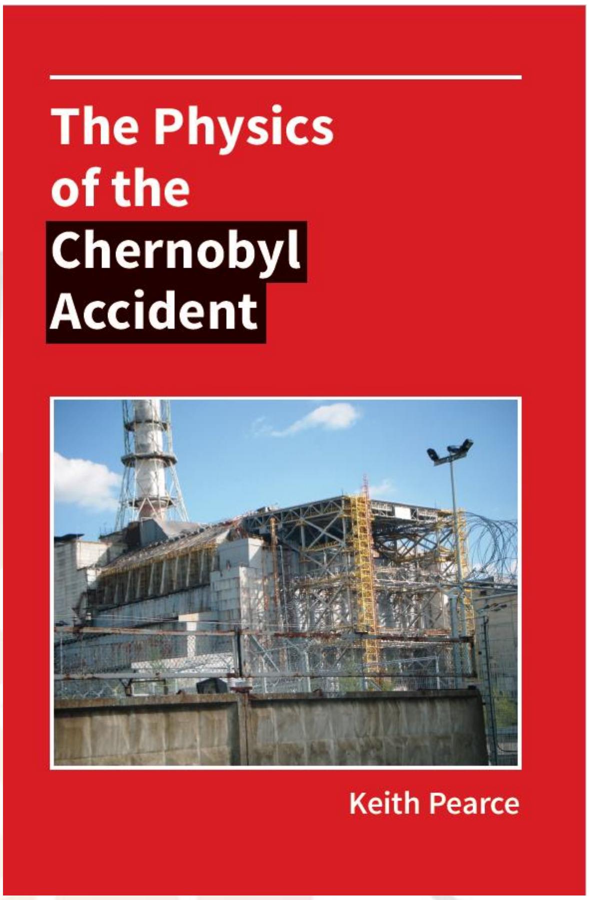
Please see a link to the role below, if there are any questions please contact Chantal, chantal.nobs@ukaea.uk

https://ccfe.amrislive.com/wizards_v2/ccfe/vacancyView.php?requirementId=4534&

Contributed by Chantal Nobs (UKAEA)

If you have any nuclear physics vacancies that you'd like highlighting in the newsletter, please get in touch.

d. Short Review: The Physics of the Chernobyl Accident



"An accident has occurred at the Chernobyl nuclear power plant and one of the reactors was damaged. Measures are being taken to eliminate the consequences of the accident. Aid is being given to those affected. A Government commission has been set up." Soviet Union announcement 29th April 1986.

A new book has been published examining The Physics of the Chernobyl Accident. Keith Pearce draws upon his own knowledge and experience of nuclear reactor design and operation to assess and describe the Chernobyl disaster from a largely physics-based perspective.

The book is written in layman's terms where possible, but given the technical nature of the subject the reader will still require a reasonably strong background in both maths and physics. For those with such a background, the book reads well and does a good job of explaining the necessary facts.

For someone such as myself, a nuclear physicist that sometimes sits through presentations on nuclear reactor modelling, I also found the book a good resource for quickly and concisely explaining various terms often thrown about during these talks, e.g. 'void coefficients', etc.

"The Physics of the Chernobyl Accident"
Available in paperback from Amazon priced £17.00.

If you are publishing a nuclear physics book that you'd like highlighting in the newsletter, please get in touch.

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3. Outreach Activity

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4. Media Interactions

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