UK Nuclear Activity

March 2025 Issue 140

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

Nuclear Physics Public Engagement Website: NuclearPhysicsForYou

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1. Nuclear Physics Publications for March*

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.

*Also includes missed publications from previous months

Phys. Rev. Lett. **134** 112701 (2025) (https://doi.org/10.1103/PhysRevLett.134.112701)
First Measurement of a Weak r-Process Reaction on a Radioactive Nucleus
M. Williams *et al.*
Published 17 March 2025

Phys. Rev. Lett. **134** 092501 (2025) (https://doi.org/10.1103/PhysRevLett.134.092501)
Increasing Octupole Collectivity across the Z =64 Isotopic Chain: B(E3) Values in ^{150}Gd
S. Pascu *et al.*
Published 4 March 2025

Physics Letters B **863** 139378 (2025) (https://doi.org/10.1016/j.physletb.2025.139378)
Approaching ^{100}Sn: Structural evolution in ^{98,100}Cd via lifetime measurements
G. Zhang *et al.*
Published 7 March 2025

Edited by Jack Henderson, IOP Nuclear Physics Group Committee
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Phys. Lett. B **864** (2025) 139409 (https://doi.org/10.1016/j.physletb.2025.139409)
Medium-induced modification of groomed and ungroomed jet mass and angularities in Pb–Pb collisions at $\sqrt{s}$NN =5.02 TeV
S. Acharya et al. (ALICE Collaboration)
Published 24 March 2025

Phys. Rev. C **111** 034301 (2025) (https://doi.org/10.1103/PhysRevC.111.034301)
Excited levels in ^{117}Ag studied via β^- decay and spontaneous fission
A. Abramuk *et al.*
Published 3 March 2025

Phys. Rev. C **111** 034302 (2025) (https://doi.org/10.1103/PhysRevC.111.034302)
Collective excitations in ^{150}Gd
S. Pascu *et al.*
Published 4 March 2025

Phys. Rev. C **111** 034309 (2025) (https://doi.org/10.1103/PhysRevC.111.034309)
J^π=19/2$^-$ isomerism and direct β decay in ^{53}Co elucidated by ab initio calculations
Q. Yuan *et al.*
Published 10 March 2025

Phys. Rev. C **111** 034323 (2025) (https://doi.org/10.1103/PhysRevC.111.034323)
Anomalous $B_{4/2}$ ratio in the yrast band of ^{167}Os
I. Zanon *et al.*
Published 17 March 2025

Phys. Rev. C **111** 034325 (2025) (https://doi.org/10.1103/PhysRevC.111.034325)
Lifetime measurements in ^{102}Mo interpreted in the interacting boson model and the X(5) symmetry
C. E. Jones *et al.*
Published 24 March 2025

Phys. Rev. C **111** 034609 (2025) (https://doi.org/10.1103/PhysRevC.111.034609)
Elastic scattering in the ^{12}N+^{197}Au system at E_{lab}=70 MeV
P. L. D. Magro *et al.*
Published 11 March 2025

Phys. Rev. C **111** 034616 (2025) (https://doi.org/10.1103/PhysRevC.111.034616)
Two-cluster approach to the properties of one- and two-neutron-halo nuclei
H. M. Maridi *et al.*
Published 19 March 2025

Phys. Rev. C **111** 035201 (2025) (https://doi.org/10.1103/PhysRevC.111.035201)
Dihadron azimuthal correlations in deep-inelastic scattering off nuclear targets
S. J. Paul *et al.* (CLAS Collaboration)
Published 5 March 2025

Phys. Rev. C **111** 035202 (2025) (https://doi.org/10.1103/PhysRevC.111.035202)
Measurement of the nucleon spin structure functions for using CLAS
A. Deur *et al.* (CLAS Collaboration)
Published 25 March 2025

Phys. Rev. C **111** 035203 (2025) (https://doi.org/10.1103/PhysRevC.111.035203)
Photoproduction of two charged pions off protons in the resonance region
A. V. Sarantsev *et al.* (CLAS Collaboration)
Published 31 March 2025

Edited by Jack Henderson, IOP Nuclear Physics Group Committee
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Phys. Rev. C **111** 035802 (2025) (https://doi.org/10.1103/PhysRevC.111.035802)
Comparative analysis of R-matrix fitting: $^{12}C(p,\gamma)^{13}N$ as a test case
J. Skowronski *et al.* (LUNA Collaboration)
Published 7 March 2025

European Physical Journal A **61** 43 (2025) (https://doi.org/10.1140/epja/s10050-025-01513-9)
Fine structure in the α decay of ^{179}Hg and ^{177}Au
A. Spacek *et al.*
Published 7 March 2025

European Physical Journal A **61** 45 (2025) (https://doi.org/10.1140/epja/s10050-025-01512-w)
A high energy resolution gas target setup to study selected NeNa cycle reactions
E. Masha *et al.*
Published 8 March 2025

J. High Energ. Phys. **2025** 194 (2025) (https://doi.org/10.1007/JHEP03(2025)194)
Multiplicity-dependent jet modification from di-hadron correlations in pp collisions at √s = 13 TeV
The ALICE collaboration., Acharya, S., Agarwal, A. et al.
Published 26 March 2025

J. High Energ. Phys. **2025** 29 (2025) (https://doi.org/10.1007/JHEP03(2025)029)
First observation of strange baryon enhancement with effective energy in pp collisions at the LHC
The ALICE collaboration., Acharya, S., Agarwal, A. et al.
Published 5 March 2025

Eur. Phys. J. C **85** 198 (2025) (https://doi.org/10.1140/epjc/s10052-025-13793-y)
Common femtoscopic hadron-emission source in pp collisions at the LHC
ALICE Collaboration
Published 19 February 2025

EPJ Web of Conferences **322** 06006 (2025) (https://doi.org/10.1051/epjconf/202532206006)
Nonlinear Nuclear Response Through Time-Dependent Hartree-Fock
Paul Stevenson
Published 14 March 2025

Rad. Phys. and Chem. **232** 112641 (2025) (https://doi.org/10.1016/j.radphyschem.2025.112641)
Towards complete decay spectroscopy of ^{152}Tb
E. B. O'Sullivan *et al.*
Published 4 March 2025

Rad. Phys. and Chem. **233** 112702 (2025) (https://doi.org/10.1016/j.radphyschem.2025.112703)
Progress towards electron–photon coincidence detection of noble gases for enhanced safety monitoring of nuclear fuel
S. E. Poulton *et al.*
Published 21 March 2025

Nucl. Inst. Meth. Phys. Res. A **1073** 170240 (https://doi.org/10.1016/j.nima.2025.170240)
Design of the ECCE detector for the Electron Ion Collider
J. K. Adkins *et al.*
Published 8 February 2025

Computer Physics Communications **308** 109444 (https://doi.org/10.1016/j.cpc.2024.109444)
DEMPgen: Physics event generator for Deep Exclusive Meson Production at Jefferson Lab and the EIC
Z. Ahmed *et al.*
Published 22 November 2024

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2. News to Report

a. Special Nuclear Physics Seminar by Prof. Kazuyuki Ogata

On March 5, 2024, the Nuclear Physics Group at the University of Manchester (UoM) hosted a successful hybrid seminar featuring the renowned reaction theorist Prof. Kazuyuki Ogata (Kyushu University & RCNP Osaka University, shown below). His talk, "Knock It Out of the Nucleus - New Structure of Nuclei Revealed by Knockout Reactions," explored the single-particle structure of stable and unstable nuclei, di-neutron correlations, and clustering effects in nuclei. The seminar attracted about 60 attendees (both in-person and online) and was well received by the UK nuclear physics community. This activity was jointly funded by the UoM and Osaka University.

Contribution from Jagjit Singh, University of Manchester

b. One-day workshop on "Nuclear Reactions: Theory and Experiment"

The University of Manchester hosted a successful one-day workshop on March 7, 2024, bringing together researchers from the UK and beyond to discuss recent advances in "Nuclear Reactions: Theory and Experiment". The event featured seven invited talks from experts in the UK, Japan, and Germany, covering topics such as knockout reactions, transfer reactions, nuclear structure, and photon-induced reactions. A total of 36 participants attended from the UK, Croatia, Japan, and Germany, fostering valuable discussions and collaborations.

The workshop was funded by a collaboration between UoM and Osaka University and the IoP Nuclear Physics Group. It was organized by Jagjit Singh, Frank Browne, and Niels R. Walet (UoM), alongside Kazuki Yoshida, Kazuyuki Ogata, and Sang-In Shim (Osaka University). For the full schedule and details, visit the workshop webpage.

Contribution from Jagjit Singh, University of Manchester, on behalf of the organising committee

c. Nuclear Physics in Plasma Environments Workshop

A two-day meeting was held at the Institute of Physics in London on 12-13 March on the topic of Nuclear Physics in Plasma Environments (NPPE 2025). The meeting brought together more than 40 members of the Nuclear Physics and Plasma Physics communities in the UK who explored the opportunities for advancing understanding in these fields and identified problems of common interest. Talks covered a diverse range of topics such as nuclear theory, experimental nuclear physics, nuclear astrophysics, nuclear diagnostics for both inertial and magnetic confinement fusion and plasma experimental facilities. There was also a wide variety of research institutions represented including ten Universities, AWE and STFC. NPPE 2025 was organised by Dr Brian Appelbe from Imperial College London and Daniel Pitman-Weymouth from AWE, and was generously supported by the IOP Nuclear Physics and Plasma Physics Groups. The organisers are also very grateful to Fatima Kanu from the IOP who ensured the smooth running of the event.

Several main collaborative themes emerged from the meeting. First, the need for nuclear

theorists to provide more accurate nuclear data to support nuclear diagnostics in fusion experiments. In these experiments, diagnostics such as neutron and gamma spectrometers can provide important information on plasma temperature, density and other properties. Interpreting these diagnostics requires accurate knowledge of the cross sections of a range of nuclear processes occurring in the plasma, and opportunities for reducing uncertainties in several of these values were identified. Secondly, we learned the experimental nuclear and plasma physics communities share a lot of common challenges in detector technology, especially in the area of neutron detection. Finally, the potential for using plasma experimental facilities, particularly large laser facilities such as the NIF laser in the USA and lasers at the Rutherford Appleton Laboratory in the UK, to carry out experiments for gathering of nuclear data. These facilities are uniquely capable of probing nuclear-plasma interactions and gathering data that is complementary to that obtained at conventional experimental nuclear facilities.

NPPE 2025 clearly showed that there is a strong appetite for greater interaction and collaboration between the Nuclear and Plasma Physics communities in the UK. The organisers hope to build on the momentum generated by NPPE 2025 with follow-up events in the coming years.

Details of the event, including speakers can be found on the event website.

Contribution from Brian Appelbe, Imperial College London

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3. Outreach Activity

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4. Media Interactions

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