PHYSICAL REVIEW C™

For editorial and subscription correspondence, please see inside front cover
(ISSN: 2469-9985)

PERIODICALS
Postmaster send address changes to:

PHYSICAL REVIEW C
APS Subscription Services
P.O. Box 41
Annapolis Junction, MD 20701

THIRD SERIES, VOLUME 111, NUMBER 6 *CONTENTS* **JUNE 2025**

LETTERS

Nuclear Structure

Conclusive evidence of a two-neutron multiphonon transverse wobbling mode in ^{82}Kr *(7 pages)* L061301
S. Rajbanshi, R. Palit, Habibur Rahaman, G. Manna, Sajad Ali, S. Chakraborty, G. H. Bhat, S. Jehangir, J. A. Sheikh, F. S. Babra, R. Banik, S. Bhattacharya, S. Bhattacharyya, P. Dey, Md. S. R. Laskar, G. Mukherjee, S. Nandi, H. Pai, Rajkumar Santra, and T. Trivedi

Nuclear Reactions

Isomeric yield ratios of fission products: A missing piece in reactor antineutrino summation calculations *(6 pages)* L061601
A. Mattera, A. A. Sonzogni, E. A. McCutchan, C. J. Sears, and C. Billings

Heavy-ion double-charge-exchange reactions as probes for two-body transition densities *(6 pages)* L061602
Jessica I. Bellone, Maria Colonna, Danilo Gambacurta, and Horst Lenske

ARTICLES

Nucleon-Nucleon Interaction, Few-Body Systems

Renormalization group analysis of electromagnetic properties of the deuteron *(14 pages)* 064001
Thomas R. Richardson and Immo C. Reis

Order-by-order uncertainties of nucleon-nucleon Wolfenstein amplitudes in chiral effective field theory *(17 pages)* 064002
B. McClung, Ch. Elster, and D. R. Phillips

Three-particle breakup amplitudes from wave-packet solutions of time-dependent Faddeev equations *(9 pages)* 064003
Zeki C. Kuruoglu

Solving reaction dynamics with quantum computing algorithms *(18 pages)* 064004
R. Weiss, A. Baroni, J. Carlson, and I. Stetcu

Nuclear Structure

Shape coexistence and band mixing in ^{116}Sn: Insights from density functional theory and collective models *(13 pages)* 064301
Amir Jalili, Ziba Saleki, Feng Pan, Y. A. Luo, Ai-Xi Chen, Mahmut Böyükata, and Yu Zhang

Nuclear excitation by near-resonant electron transitions in ^{229}Th^{39+} ions *(7 pages)* 064302
Karol Kozioł and Jacek Rzadkiewicz

Modification of single-hole-like states by configuration mixing in $^{99-131}$In *(13 pages)* 064303
Deepak Patel, Praveen C. Srivastava, Noritaka Shimizu, and Yutaka Utsuno

2469-9985(202506)111:6;1-X

(Continued)

The editors and referees of PRC find these papers to be of particular interest, importance, or clarity. Please see our Announcement Phys. Rev. C 86, 010001 (2012).

PHYSICAL REVIEW C **THIRD SERIES, VOLUME 111, NUMBER 6** **JUNE 2025**

Benchmarking artificial neural network extrapolations of the ground-state energies and radii of Li isotopes *(8 pages)* 064304
M. Knöll, M. Lockner, P. Maris, R. J. McCarty, R. Roth, J. P. Vary, and T. Wolfgruber

Investigating nuclear density profiles to reveal particle-hole configurations in the island of inversion *(11 pages)* 064305
R. Barman, W. Horiuchi, M. Kimura, and R. Chatterjee

Patterns of spin and pseudospin symmetries in nuclear relativistic mean-field approaches *(8 pages)* 064306
L. Heitz, J.-P. Ebran, and E. Khan

Tensor force contribution to the symmetry energy with chiral *NN* interactions *(7 pages)* 064307
J. Y. Fu, P. Yin, X. L. Shang, H. Y. Shang, E. Epelbaum, and W. Zuo

Electric dipole response of *sd*-shell nuclei within the configuration-interaction shell-model approach *(13 pages)* 064308
O. Le Noan and K. Sieja

Relativistic configuration-interaction density functional theory for nuclear wobbling motion *(8 pages)* 064309
T. Qu, Y. K. Wang, and P. W. Zhao

Structure of ^{128}Sn selectively populated in the β decay of the ^{128}In ground state *(13 pages)* 064310
M. Llanos-Expósito *et al.* (IDS collaboration)

Microscopic analysis of the giant monopole resonance excitation energy *(11 pages)* 064311
M. K. Gaidarov, M. V. Ivanov, Y. I. Katsarov, A. N. Antonov, and I. C. Danchev

α decay of the neutron-deficient nucleus ^{224}Np by the particle-number-conserving method in the framework of the deformed shell model *(8 pages)* 064312
Xiao-Tao He, Kun Huang, T. M. Shneidman, N. V. Antonenko, Jun Zhang, and Hong-qiang You

Wobbling motion in octupole deformed nuclei *(14 pages)* 064313
Yeruoxi Chen, Q. B. Chen, and R. V. Jolos

Spectroscopy of unnatural-parity states up to band termination in ^{43}Ca *(12 pages)* 064314
Rozina Rahaman, Abhijit Bisoi, Y. Sapkota, Arkabrata Gupta, Ananya Das, S. Ray, S. Sarkar, Yashraj, A. Sharma, Bharti Rohila, I. Ahmed, Kaushik Katre, S. Dutt, S. Kumar, R. P. Singh, R. Kumar, and S. Muralithar

Reduced-basis method for few-body bound-state emulation *(8 pages)* 064315
R. Y. Cheng (成若玉), K. Godbey, Y. B. Niu (牛奕博), W. B. He (何万兵), and S. M. Wang (王思敏)

Excited-state lifetimes in ^{131}In, ^{131}Sn, and ^{136}Te measured with the HiCARI γ-ray spectrometer at RIBF at RIKEN *(12 pages)* 064316
J. Acosta, A. Jungclaus, M. Armstrong, M. Górska, T. Parry, Zs. Podolyák, P. Doornenbal, K. Wimmer, A. Gargano, N. Aoi, H. Baba, F. Browne, C. Campbell, H. Crawford, H. de Witte, F. Flavigny, C. Fransen, H. Hess, E. Ideguchi, S. Iwazaki, J. Kim, A. Kohda, T. Koiwai, B. Mauss, R. Mizuno, B. Moon, M. Niikura, R. Orlandi, L. Plagnol, P. Reiter, H. Sakurai, D. Suzuki, R. Taniuchi, S. Thiel, and Y. Yamamoto

^{31}Al structure based on spin-parity assignments *(13 pages)* 064317
H. Nishibata, A. Odahara, T. Shimoda, S. Iimura, S. Kanaya, D. Maejima, Y. Okami, Y. Otani, Y. Hamano, J. Lassen, C. D. P. Levy, R. Li, M. R. Pearson, N. Sekiguchi, K. Asakawa, A. Hatakeyama, Y. Hirayama, N. Shimizu, and T. Otsuka

Toward scalable bound-to-resonance extrapolations for few- and many-body systems *(10 pages)* 064318
Nuwan Yapa, Sebastian König, and Kévin Fossez

(Continued)

The editors and referees of PRC find these papers to be of particular interest, importance, or clarity. Please see our Announcement Phys. Rev. C 86, 010001 (2012).

PHYSICAL REVIEW C **THIRD SERIES, VOLUME 111, NUMBER 6** **JUNE 2025**

Nuclear α decay based on the pick-up mechanism *(9 pages)* 064319
Xiaojun Sun, Yanran Cui, Fanglei Zou, Kang Xing, Junlong Tian, and Ning Wang

Dipole response of deformed halo nuclei ^{31}Ne and ^{37}Mg *(9 pages)* 064320
Xiao Lu (陆晓), Hiroyuki Sagawa (佐川弘幸), and Shan-Gui Zhou (周善贵)

Variance minimization for nuclear structure on a quantum computer *(9 pages)* 064321
I. Hobday, P. D. Stevenson, and J. Benstead

Low-energy spectra of nobelium isotopes: Skyrme random-phase-approximation analysis *(18 pages)* 064322
V. O. Nesterenko, M. A. Mardyban, A. Repko, R. V. Jolos, P.-G. Reinhard, and Alan A. Dzhioev

Electron capture of superheavy nuclei with realistic lepton wave functions *(11 pages)* 064323
A. Ravlić, P. Schwerdtfeger, and W. Nazarewicz

Machine learning for decoding spin-zero and octupole excitations *(12 pages)* 064324
B. F. Lv, Yongjia Wang, Zhilong Li, and C. M. Petrache

Variations in the charge radii of indium isotopes between $N = 52$ and 82 *(10 pages)* 064325
A. R. Vernon, C. L. Binnersley, B. K. Sahoo, J. Billowes, M. L. Bissell, T. E. Cocolios, R. P. de Groote, G. J. Farooq-Smith, K. T. Flanagan, R. F. Garcia Ruiz, G. Georgiev, W. Gins, F. P. Gustafsson, R. Heinke, J. D. Holt, A. Kanellakopoulos, J. Karthein, Á. Koszorús, D. Leimbach, K. M. Lynch, T. Miyagi, W. Nazarewicz, G. Neyens, P.-G. Reinhard, C. M. Ricketts, S. R. Stroberg, S. G. Wilkins, X. F. Yang, and D. T. Yordanov (CRIS-ISOLDE Collaboration)

Entanglement in two-quasiparticle-triaxial-rotor systems: Chirality, wobbling, and the Pauli effect *(17 pages)* 064326
Q. B. Chen and S. Frauendorf

Nuclear Reactions

Theoretical investigation of charge-changing cross section and interaction cross section for Be, B, C, N, O, and F isotopes on ^{12}C at 200–1050 MeV/nucleon *(14 pages)* 064601
Z. Hasan, M. Imran, A. A. Usmani, and Z. A. Khan

Direct measurement of ^{8}B $+p$ and ^{7}Be $+2p$ cross sections for ^{9}C $+$ ^{208}Pb at 303 MeV *(7 pages)* 064602
G. Yang, K. Wang, H. Liu, W. D. Chen, Y. Y. Yang, F. F. Duan, Jin Lei, D. Y. Pang, Z. H. Gao, S. Y. Jin, J. S. Wang, X. Liu, S. W. Xu, J. B. Ma, P. Ma, Z. Bai, Q. Hu, and Z. Y. Sun (RIBLL Collaboration)

Exploring cluster radioactivity and decay half-lives using different nuclear densities and approaches *(14 pages)* 064603
Deepika Jain, Nishu Jain, and Raj Kumar

Quantification of the evaporation process during fragmentation of ^{12}C, ^{14}N, ^{16}O, and ^{20}Ne on elemental targets *(13 pages)* 064604
Sukhendu De, V. Choudhary, R. Chatterjee, and W. Horiuchi

Empirical relations using symbolic regression models for cluster decay half-lives *(10 pages)* 064605
S. Madhumitha Shree and M. Balasubramaniam

Exploring total fission cross sections of neutron- and proton-induced reactions of exotic nuclei at relativistic energies using the INCL-ABLA++ models *(16 pages)* 064606
J. L. Rodríguez-Sánchez, A. Graña-González, J.-C. David, G. García-Jiménez, J. Hirtz, and A. Kelić-Heil

Effective finite-range Gogny-type interaction for quantum-molecular-dynamics-like models *(9 pages)* 064607
Meiqi Sun, Dandan Niu, Junping Yang, Ying Cui, Zhuxia Li, Qiang Zhao, Kai Zhao, and Yingxun Zhang

Nuclear transparency and shadowing of the two-step process in the $A(e, e'\pi^+)$ reaction *(7 pages)* 064608
Tae Keun Choi, Kook-Jin Kong, and Byung-Geel Yu

(Continued)

The editors and referees of PRC find these papers to be of particular interest, importance, or clarity. Please see our Announcement Phys. Rev. C 86, 010001 (2012).

PHYSICAL REVIEW C **THIRD SERIES, VOLUME 111, NUMBER 6** **JUNE 2025**

R-matrix analysis of the ^{8}Be system *(21 pages)* 064609
S. N. Paneru, H. Y. Lee, R. J. deBoer, M. W. Paris, G. M. Hale, M. Febbraro, E. A. Bennett, C. Fichtl, N. A. Gibson, J. Görres, C. Hamilton, S. A. Kuvin, K. Manukyan, M. Mosby, C. Prokop, D. Robertson, H. Sasaki, E. Stech, W. P. Tan, and M. Wiescher

Probing small neutron skin variations in isotope pairs by hyperon-antihyperon production in antiproton-nucleus interactions *(16 pages)* 064610
Falk Schupp, Josef Pochodzalla, Michael Bölting, Martin Christiansen, Theodoros Gaitanos, Horst Lenske, and Marcell Steinen

Improved S factor of the ^{13}C$(p, \gamma)\,^{14}$N reaction at $E_p = 330-740$ keV and parameters of resonances at 448 keV and 551 keV *(8 pages)* 064611
J. Skowronski, E. Masha, D. Piatti, M. Aliotta, D. Bemmerer, A. Boeltzig, A. Caciolli, F. Cavanna, L. Csedreki, R. Depalo, P. Hempel, M. Hilz, G. Imbriani, T. Lossin, M. Osswald, B. Poser, D. Rapagnani, S. Rümmler, K. Schmidt, R. S. Sidhu, T. Szücs, A. Tóth, S. Turkat, S. Vincent, S. Werner, and A. Yadav

Exploration of multifragment emission from the ^{252}Cf nucleus in a collinear configuration mode *(15 pages)* 064612
Chahat Jindal, Nitin Sharma, and Manoj K. Sharma

Late-time emission of prompt fission γ rays from ^{235}U(n, f) and ^{252}Cf(sf) *(8 pages)* 064613
G. Rusev, B. Baramsai, E. M. Bond, T. A. Bredeweg, A. Couture, J. M. O'Donnell, M. Jandel, A. E. Lovell, S. Mosby, C. J. Prokop, I. Stetcu, P. Talou, and J. L. Ullmann

Pauli-blocking effects in Nilsson states of weakly bound exotic nuclei *(9 pages)* 064614
P. Punta, J. A. Lay, A. M. Moro, and G. Colò

Statistical nucleation in expanding nuclear matter *(10 pages)* 064615
N. Buyukcizmeci, A. Ergun, A. S. Botvina, and M. Bleicher

Nuclear clustering process in heavy-ion collisions: Experimental constraints on the low-temperature region of the QCD phase diagram *(8 pages)* 064616
E. Bonnet, B. Borderie, R. Bougault, A. Chbihi, Q. Fable, J. D. Frankland, D. Gruyer, M. La Commara, A. Le Fèvre, N. Le Neindre, I. Lombardo, J. Łukasik, M. Pârlog, G. Verde, and J. P. Wieleczko (INDRA Collaboration)

Continuum Λ spectra for a $^{6}_{\Lambda}$Li hypernucleus in the ^{6}Li(K^-, π^-) reaction *(11 pages)* 064617
Toru Harada and Yoshiharu Hirabayashi

Modern version of the uncited 1938 experiment that first observed DT fusion *(6 pages)* 064618
W. Tornow, S. W. Finch, J. B. Wilhelmy, M. B. Chadwick, G. M. Hale, J. P. Lestone, and M. W. Paris

Deuteron evaporation from $N = Z$ compound nuclei *(13 pages)* 064619
Y. Hrabar, P. Golubev, A. Idini, L. G. Sarmiento, B. G. Carlsson, C. Müller-Gatermann, W. Reviol, D. Rudolph, D. Seweryniak, J. Wu, H. M. Albers, J. T. Anderson, M. A. Bentley, M. P. Carpenter, C. J. Chiara, P. A. Copp, D. M. Cox, C. Fahlander, U. Forsberg, T. Huang, H. Jayatissa, T. Lauritsen, S. F. D. McCaughley, X. Pereira-Lopez, I. Ragnarsson, S. Stolze, S. Uthayakumaar, and G. L. Wilson

Low-energy fusion of doubly magic nuclei: The notable case of ^{16}O + ^{48}Ca *(7 pages)* 064620
A. M. Stefanini, G. Montagnoli, M. Del Fabbro, F. Fontana, P. Aguilera, G. Andreetta, D. Brugnara, G. Colucci, L. Corradi, E. Fioretto, F. Galtarossa, A. Goasduff, B. Gongora Servin, A. Gozzelino, M. Heine, G. Harmant, D. Mengoni, M. Luciani, K. Rezynkina, S. Rocca, and D. Stramaccioni

Quantum-mechanical description of angular motion of fission fragments at scission *(9 pages)* 064621
T. M. Shneidman, A. Rahmatinejad, G. G. Adamian, and N. V. Antonenko

(Continued)

The editors and referees of PRC find these papers to be of particular interest, importance, or clarity. Please see our Announcement Phys. Rev. C 86, 010001 (2012).

PHYSICAL REVIEW C THIRD SERIES, VOLUME 111, NUMBER 6 JUNE 2025

Relativistic Nuclear Collisions

Flow harmonic correlations via multiparticle symmetric and asymmetric cumulants in Au+Au collisions at $\sqrt{s_{NN}} = 200$ GeV *(11 pages)* 064901
Kaiser Shafi, Prabhupada Dixit, Sandeep Chatterjee, and Md. Nasim

Anisotropic flows of identified hadrons in the equal-velocity quark combination model at energies available at the BNL Relativistic Heavy Ion Collider *(14 pages)* 064902
Yan-ting Feng, Rui-qin Wang, Feng-lan Shao, and Jun Song

Examination of the possibility of π^0 condensation and magnetization in freely interpenetrating nuclei *(14 pages)* 064903
D. N. Voskresensky

Electromagnetic emission from strongly interacting hadronic and partonic matter created in heavy-ion collisions *(28 pages)* 064904
Adrian William Romero Jorge, Taesoo Song, Qi Zhou, and Elena Bratkovskaya

Bayesian reconstruction of anisotropic flow fluctuations at fixed impact parameter *(14 pages)* 064906
Enak Roubertie, Mathis Verdan, Andreas Kirchner, and Jean-Yves Ollitrault

Semi-inclusive direct photon + jet and π^0+jet correlations measured in $p + p$ and central Au + Au collisions at $\sqrt{s_{NN}} = 200$ GeV *(30 pages)* 064907
B. E. Aboona *et al.* (The STAR Collaboration)

Charged-hadron and identified-hadron (K^0_S, Λ, Ξ^-) yield measurements in photonuclear Pb + Pb and p + Pb collisions at $\sqrt{s_{NN}} = 5.02$ TeV with ATLAS *(33 pages)* 064908
G. Aad *et al.* (ATLAS Collaboration)

Stochastic relativistic viscous hydrodynamics from the Metropolis algorithm *(15 pages)* 064909
Jay Bhambure, Rajeev Singh, and Derek Teaney

Relativistic viscous hydrodynamics in the density frame: Numerical tests and comparisons *(15 pages)* 064910
Jay Bhambure, Aleksas Mazeliauskas, Jean-François Paquet, Rajeev Singh, Mayank Singh, Derek Teaney, and Fabian Zhou

Hard-photon-triggered jets in *p-p* and *A-A* collisions *(15 pages)* 064911
C. Sirimanna *et al.* (JETSCAPE Collaboration)

Longitudinal spin polarization in a thermal model with dissipative corrections *(6 pages)* 064912
Soham Banerjee, Samapan Bhadury, Wojciech Florkowski, Amaresh Jaiswal, and Radoslaw Ryblewski

Higher-order symmetry plane correlations in Pb-Pb collisions at $\sqrt{s_{NN}} = 5.02$ TeV *(25 pages)* 064913
S. Acharya *et al.* (ALICE Collaboration)

Hadronic Physics and QCD

Electromagnetic form factors for nucleons in short-range correlations and the EMC effect *(7 pages)* 065201
Dmitriy N. Kim, Or Hen, Gerald A. Miller, E. Piasetzky, M. Strikman, and L. Weinstein

γW-exchange contributions in neutron β decay in the forward-angle limit *(12 pages)* 065202
Hui-Yun Cao and Hai-Qing Zhou

Probing the nuclear liquid-gas phase transition with isospin correlations *(10 pages)* 065203
Michał Marczenko, Krzysztof Redlich, and Chihiro Sasaki

Pion fragmentation functions from a quark-jet model in a functional approach *(8 pages)* 065204
Roberto Correa da Silveira, Fernando E. Serna, and Bruno El-Bennich

(Continued)

The editors and referees of PRC find these papers to be of particular interest, importance, or clarity. Please see our Announcement Phys. Rev. C 86, 010001 (2012).

PHYSICAL REVIEW C **THIRD SERIES, VOLUME 111, NUMBER 6** **JUNE 2025**

Sensitivity of double deeply virtual Compton-scattering observables to generalized parton distributions *(17 pages)* 065205
J. S. Alvarado, M. Hoballah, and E. Voutier

Electroweak Interaction, Symmetries

Right-handed weak currents in neutrinoless $\beta\beta$ decays and ton-scale $\beta\beta$ detectors *(11 pages)* 065501
Hiroyasu Ejiri, Takeshi Fukuyama, and Toru Sato

Nuclear Astrophysics

Total absorption spectroscopy for the β^+ decay strength distribution of ^{60}Ga *(8 pages)* 065801
G. Owens-Fryar, S. M. Lyons, A. L. Richard, A. Spyrou, B. A. Brown, C. E. P. Robin, Z. Meisel, H. C. Berg, A. Chester, A. A. Chen, B. Crider, P. A. DeYoung, P. Gastis, E. C. Good, C. Harris, K. Hermansen, S. N. Liddick, A. Palmisano-Kyle, A. Psaltis, M. K. Smith, E. Rubino, S. K. Subedi, I. Sultana, and A. Tsantiri

Half-vortex states in the rotating outer core of neutron stars *(9 pages)* 065802
J. A. Gil Granados, A. Muñoz Mateo, and X. Viñas

New upper limits for β-delayed fission probabilities of ^{230,232}Fr and ^{230,232,234}Ac *(11 pages)* 065803
S. Bara *et al.*

Refining the deep sub-barrier $^{12}C + ^{12}C$ fusion excitation function with the STELLA apparatus *(7 pages)* 065804
J. Nippert, S. Courtin, M. Heine, D. G. Jenkins, P. Adsley, A. Bonhomme, R. Canavan, D. Curien, T. Dumont, E. Gregor, G. Harmant, E. Monpribat, L. Morrison, M. Moukaddam, M. Richer, M. Rudigier, J. G. Vega Romero, W. N. Catford, P. Cotte, S. Della Negra, G. Haefner, F. Hammache, J. Lesrel, S. Pascu, Zs. Podolyák, P. H. Regan, I. Ribaud, N. de Séréville, C. Stodel, and J. Vesić (STELLA Collaboration)

ERRATA

Erratum: Sensitivity analysis of β-decay half-life predictions for Ge, As, Zr, and Mo nuclei within the mapped interacting boson model [Phys. Rev. C **111**, 044302 (2025)] *(2 pages)* . . . . . 069901(E)
M. Homma and K. Nomura

Erratum: Identification of a quasiparticle band in very neutron-rich ^{104}Zr [Phys. Rev. C **82**, 027302 (2010)] *(2 pages)* . . . . . 069902(E)
E. H. Wang, E. Y. Yeoh (杨韵颐), S. J. Zhu (朱胜江), J. H. Hamilton, A. V. Ramayya, Y. X. Liu (刘艳鑫), Y. Sun (孙扬), J. K. Hwang, S. H. Liu, J. G. Wang (王建国), Y. X. Luo, J. O. Rasmussen, I. Y. Lee, H. B. Ding (丁怀博), L. Gu (顾龙), Q. Xu (徐强), and Z. G. Xiao (肖志刚)

Erratum: Coulomb corrections to two-particle interactions in artificial traps [Phys. Rev. C **103**, 064611 (2021)] *(1 page)* . . . . . 069903(E)
Peng Guo

The editors and referees of PRC find these papers to be of particular interest, importance, or clarity. Please see our Announcement Phys. Rev. C 86, 010001 (2012).