

Peer-Reviewed Papers

- (1) Novel Coupled Channel Framework Connecting the Quark Model and Lattice QCD for the Near-threshold Ds States
Z. Yang, G.-J. Wang, J.-J. Wu, M. Oka, and S.-L. Zhu
Phys. Rev. Lett. **128**, 112001 (2022).
- (2) A first glimpse at the shell structure beyond ^{54}Ca : Spectroscopy of ^{55}K , ^{55}Ca , and ^{57}Ca
T. Koiwai, K. Wimmer, P. Doornenbal, A. Obertelli, C. Barbieri, T. Duguet, J.D. Holt, T. Miyagi, P. Navrátil, K. Ogata, N. Shimizu, V. Somà, Y. Utsuno, K. Yoshida, N.L. Achouri, H. Baba, F. Browne, D. Calvet, F. Château, S. Chen, N. Chiga, A. Corsi, M.L. Cortés, A. Delbart, J.-M. Gheller, A. Giganon, A. Gillibert, C. Hilaire, T. Isobe, T. Kobayashi, Y. Kubota, V. Lapoux, H.N. Liu, T. Motobayashi, I. Murray, H. Otsu, V. Panin, N. Paul, W. Rodriguez, H. Sakurai, M. Sasano, D. Steppenbeck, L. Stuhl, Y.L. Sun, Y. Togano, T. Uesaka, K. Yoneda, O. Aktas, T. Aumann, L.X. Chung, F. Flavigny, S. Franchoo, I. Gasparic, R.-B. Gerst, J. Gibelin, K.I. Hahn, D. Kim, Y. Kondo, P. Koseoglou, J. Lee, C. Lehr, B.D. Linh, T. Lokotko, M. MacCormick, K. Moschner, T. Nakamura, S.Y. Park, D. Rossi, E. Sahin, P.-A. Söderström, D. Sohler, S. Takeuchi, H. Toernqvist, V. Vaquero, V. Wagner, S. Wang, V. Werner, X. Xu, H. Yamada, D. Yan, Z. Yang, M. Yasuda, and L. Zanetti
Phys. Lett. B **827**, 136953 (2022).
- (3) Doubly heavy tetraquark resonant states
Q. Meng, M. Harada, E. Hiyama, A. Hosaka, and M. Oka
Phys. Lett. B **824**, 136800 (2022).
- (4) Optical spin transport theory of spin-1/2 topological Fermi superfluids
H. Tajima, Y. Sekino, and S. Uchino
Phys. Rev. B **105**, 064508 (2022).
- (5) First application of the dispersive optical model to $(p,2p)$ reaction analysis within the distorted-wave impulse approximation framework
K. Yoshida, M. C. Atkinson, K. Ogata, and W. H. Dickhoff
Phys. Rev. C **105**, 014622 (2022).
- (6) Strong decays of multistrangeness baryon resonances in the quark model
Ahmad Jafar Arifi, D. Suenaga, A. Hosaka, and Y. Oh
Phys. Rev. D **105**, 094006 (2022).
- (7) Decays of Roper-like singly heavy baryons in a chiral model
D. Suenaga and A. Hosaka
Phys. Rev. D **105**, 074036 (2022).
- (8) Role of axial U(1) anomaly in chiral susceptibility of QCD at high temperature
S. Aoki, Y. Aoki, H. Fukaya, S. Hashimoto, C. Rohrhofer, and K. Suzuki (JLQCD Collaboration)
Prog. Theor. Exp. Phys. **2022**, 023B05 (2022).
- (9) Charmed baryon pair production in proton-antiproton collisions in effective Lagrangian and

Regge approaches

T. Sangkhakrit, S.-I. Shim, Y. Yan, and A. Hosaka

Eur. Phys. J. A **58**, 32 (2022).

- (10) Probing Different Characteristics of Shell Evolution Driven by Central, Spin-Orbit, and Tensor Forces

Y. Utsuno

Physics 4, **185** (2022).

- (11) The phi meson in nuclear matter in a transport approach

P. Gubler

Proceedings of Science, PoS(PANIC2021), 215 (2022).

- (12) Masses of exotic nuclei

T. Yamaguchi, H. Koura, Yu. A. Litvinov, and M. Wang

Prog. Part. Nucl. Phys. **120**, 103882 (2021).

- (13) A review of quarkonia under strong magnetic fields

S. Iwasaki, M. Oka, and K. Suzuki

Eur. Phys. J. A **57**, 222 (2021).

- (14) Observation of spin-space quantum transport induced by an atomic quantum point contact

K. Ono, T. Higomoto, Y. Saito, S. Uchino, Y. Nishida, and Y. Takahashi

Nature Communications **12**, 6724 (2021).

- (15) Pairing Forces Govern Population of Doubly Magic ^{54}Ca from Direct Reactions

F. Browne, S. Chen, P. Doornenbal, A. Obertelli, K. Ogata, Y. Utsuno, K. Yoshida, N. L. Achouri, H. Baba, D. Calvet, F. Château, N. Chiga, A. Corsi, M. L. Cortés, A. Delbart, J.-M. Gheller, A. Giganon, A. Gillibert, C. Hilaire, T. Isobe, T. Kobayashi, Y. Kubota, V. Lapoux, H. N. Liu, T. Motobayashi, I. Murray, H. Otsu, V. Panin, N. Paul, W. Rodriguez, H. Sakurai, M. Sasano, D. Steppenbeck, L. Stuhl, Y. L. Sun, Y. Togano, T. Uesaka, K. Wimmer, K. Yoneda, O. Aktas, T. Aumann, K. Boretzky, C. Caesar, L. X. Chung, F. Flavigny, S. Franchoo, I. Gasparic, R.-B. Gerst, J. Gibelin, K. I. Hahn, M. Holl, J. Kahlbow, D. Kim, D. Körper, T. Koiwai, Y. Kondo, P. Koseoglou, J. Lee, C. Lehr, B. D. Linh, T. Lokotko, M. MacCormick, K. Miki, K. Moschner, T. Nakamura, S. Y. Park, D. Rossi, E. Sahin, F. Schindler, H. Simon, P.-A. Söderström, D. Sohler, S. Takeuchi, H. Törnqvist, J. Tscheuschner, V. Vaquero, V. Wagner, S. Wang, V. Werner, X. Xu, H. Yamada, D. Yan, Z. Yang, M. Yasuda, and L. Zanetti

Phys. Rev. Lett. **126**, 252501 (2021).

- (16) Coexisting normal and intruder configurations in ^{32}Mg

N. Kitamura, K. Wimmer, A. Poves, N. Shimizu, J.A. Tostevin, V.M. Bader, C. Bancroft, D. Barofsky, T. Baugher, D. Bazin, J.S. Berryman, V. Bildstein, A. Gade, N. Imai, T. Kröll, C. Langer, J. Lloyd, E. Lunderberg, F. Nowacki, G. Perdikakis, F. Recchia, T. Redpath, S. Saenz, D. Smalley, S.R. Stroberg, Y. Utsuno, D. Weisshaar, A. Westerberg

Phys. Lett. B **822**, 136682 (2021).

- (17) Effects of three-baryon forces on kaon condensation in hyperon-mixed matter
T. Muto, T. Maruyama, and T. Tatsumi
Phys. Lett. B **820**, 136587 (2021).
- (18) The negative-parity spin-1/2 Λ baryon spectrum from lattice QCD and effective theory
R. Pavao, P. Gubler, P. Fernandez-Soler, J. Nieves, M. Oka, and T.T. Takahashi
Phys. Lett. B **820**, 136473 (2021).
- (19) Survival probabilities of charmonia as a clue to measure transient magnetic fields
S. Iwasaki, D. Jido, M. Oka, and K. Suzuki
Phys. Lett. B **820**, 136498 (2021).
- (20) Investigation of the ground-state spin inversion in the neutron-rich $^{47,49}\text{Cl}$ isotopes
B.D. Linh, A. Corsi, A. Gillibert, A. Obertelli, P. Doornenbal, C. Barbieri, S. Chen, L.X. Chung, T. Duguet, M. Gómez-Ramos, J.D. Holt, A. Moro, P. Navrátil, K. Ogata, N.T.T. Phuc, N. Shimizu, V. Somà, Y. Utsuno, N. L. Achouri, H. Baba, F. Browne, D. Calvet, F. Château, N. Chiga, M. L. Cortés, A. Delbart, J.-M. Gheller, A. Giganon, C. Hilaire, T. Isobe, T. Kobayashi, Y. Kubota, V. Lapoux, H. N. Liu, T. Motobayashi, I. Murray, H. Otsu, V. Panin, N. Paul, W. Rodriguez, H. Sakurai, M. Sasano, D. Steppenbeck, L. Stuhl, Y. L. Sun, Y. Togano, T. Uesaka, K. Wimmer, K. Yoneda, O. Aktas, T. Aumann, F. Flavigny, S. Franchoo, I. Gašparić, R.-B. Gerst, J. Gibelin, K.I. Hahn, N.T. Khai, D. Kim, T. Koiwai, Y. Kondo, P. Koseoglou, J. Lee, C. Lehr, T. Lokotko, M. MacCormick, K. Moschner, T. Nakamura, S.Y. Park, D. Rossi, E. Sahin, D. Sohler, P.-A. Söderström, S. Takeuchi, N.D. Ton, H. Törnqvist, V. Vaquero, V. Wagner, H. Wang, V. Werner, X. Xu, Y. Yamada, D. Yan, Z. Yang, M. Yasuda, and L. Zanetti
Phys. Rev. C **104**, 044331 (2021).
- (21) Ground-state properties of light $4n$ self-conjugate nuclei in *ab initio* no-core Monte Carlo shell model with nonlocal NN interactions
T. Abe, P. Maris, T. Otsuka, N. Shimizu, Y. Utsuno, and J. P. Vary
Phys. Rev. C **104**, 054315 (2021).
- (22) Neutron capture cross sections of light neutron-rich nuclei relevant for r -process nucleosynthesis
A. Bhattacharyya, Ushasi Datta, A. Rahaman, S. Chakraborty, T. Aumann, S. Beceiro-Novo, K. Boretzky, C. Caesar, B. V. Carlson, W. N. Catford, M. Chartier, D. Cortina-Gil, P. Das, G. De Angelis, P. Diaz Fernandez, H. Emling, H. Geissel, D. Gonzalez-Diaz, M. Heine, H. Johansson, B. Jonson, N. Kalantar-Nayestanaki, T. Kröll, R. Krücken, J. Kurcewicz, C. Langer, T. Le Bleis, Y. Leifels, J. Marganec, G. Münzenberg, T. Nilsson, C. Nociforo, V. Panin, S. Paschalis, R. Plag, R. Reifarh, M. V. Ricciardi, C. Rigollet, D. Rossi, C. Scheidenberger, H. Scheit, H. Simon, Y. Togano, S. Typel, Y. Utsuno, A. Wagner, F. Wamers, H. Weick, and J. S. Winfield
Phys. Rev. C **104**, 045801 (2021).
- (23) Lifetime measurements of excited states in ^{55}Cr
H. Kleis, M. Seidlitz, A. Blazhev, L. Kaya, P. Reiter, K. Arnsward, A. Dewald, M. Droste, C. Fransen, O. Möller, N. Shimizu, Y. Tsunoda, Y. Utsuno, P. von Brentano, and K. O. Zell

- Phys. Rev. C **104**, 034310 (2021).
- (24) First spectroscopic study of ^{63}V at the $N=40$ island of inversion
M. M. Juhász, Z. Elekes, D. Sohler, K. Sieja, K. Yoshida, K. Ogata, P. Doornenbal, A. Obertelli, H. Baba, F. Browne, D. Calvet, F. Château, S. Chen, N. Chiga, A. Corsi, M. L. Cortés, A. Delbart, J.-M. Gheller, A. Giganon, A. Gillibert, C. Hilaire, T. Isobe, T. Kobayashi, Y. Kubota, V. Lapoux, T. Motobayashi, I. Murray, H. Otsu, V. Panin, N. Paul, W. Rodriguez, H. Sakurai, M. Sasano, D. Steppenbeck, L. Stuhl, Y. L. Sun, Y. Togano, T. Uesaka, K. Wimmer, K. Yoneda, N. L. Achouri, O. Aktas, T. Aumann, L. X. Chung, Zs. Dombrádi, F. Flavigny, S. Franchoo, I. Gašparić, R.-B. Gerst, J. Gibelin, K. I. Hahn, D. Kim, T. Koiwai, Y. Kondo, P. Koseoglou, J. Lee, C. Lehr, B. D. Linh, H. N. Liu, T. Lokotko, M. MacCormick, K. Moschner, T. Nakamura, S. Y. Park, D. Rossi, E. Sahin, P.-A. Söderström, S. Takeuchi, H. Törnqvist, V. Vaquero, V. Wagner, S. Wang, V. Werner, X. Xu, H. Yamada, D. Yan, Z. Yang, M. Yasuda, and L. Zanetti
Phys. Rev. C **103**, 064308 (2021).
- (25) Nuclear pasta structure and symmetry energy
C.-J. Xia, T. Maruyama, N. Yasutake, T. Tatsumi, and Y.-X. Zhang
Phys. Rev. C **103**, 055812 (2021).
- (26) Cross-shell excitations in ^{46}Ca studied with fusion reactions induced by a reaccelerated rare isotope beam
J. Ash, H. Iwasaki, T. Mijatović, T. Budner, R. Elder, B. Elman, M. Friedman, A. Gade, M. Grinder, J. Henderson, B. Longfellow, A. Revel, D. Rhodes, M. Spieker, Y. Utsuno, D. Weisshaar, and C. Y. Wu
Phys. Rev. C **103**, L051302 (2021).
- (27) Kondo effect with Wilson fermions
T. Ishikawa, K. Nakayama, and K. Suzuki
Phys. Rev. D **104**, 094515 (2021).
- (28) $P_c(4312)^+$ and $P_c(4337)^+$ as interfering $\Sigma_c\bar{D}$ and $\Lambda_c\bar{D}^*$ threshold
S. X. Nakamura, A. Hosaka, and Y. Yamaguchi
Phys. Rev. D **104**, L091503 (2021).
- (29) Higher fully-charmed tetraquarks: radial excitations and P -wave states
G.-J. Wang, L. Meng, M. Oka and S.-L. Zhu
Phys. Rev. D **104**, 036016 (2021).
- (30) Novel pentaquark picture for singly heavy baryons from chiral symmetry
D. Suenaga and A. Hosaka
Phys. Rev. D **104**, 034009 (2021).
- (31) Heavy baryon spectrum with chiral multiplets of scalar and vector diquarks
Y. Kim, Y.-R. Liu, M. Oka, and K. Suzuki
Phys. Rev. D **104**, 054012 (2021).
- (32) Model independent analysis of coupled-channel scattering: A deep learning approach

- D. L. B. Sombillo, Y. Ikeda, T. Sato, and [A. Hosaka](#)
Phys. Rev. D **104**, 036001 (2021).
- (33) Decay properties of Roper resonance in the holographic QCD
D. Fujii and [A. Hosaka](#)
Phys. Rev. D **104**, 014022 (2021).
- (34) Photoproduction of Λ^* and Σ^* resonances with $J^P=1/2^-$ off the proton
S.-H. Kim, K. P. Khemchandani, A. Martínez Torres, S.-I. Nam, and [A. Hosaka](#)
Phys. Rev. D **103**, 114017 (2021).
- (35) Relativistic corrections to decays of heavy baryons in the quark model
Ahmad Jafar Arifi, D. Suenaga, and [A. Hosaka](#)
Phys. Rev. D **103**, 094003 (2021).
- (36) Study of axial U(1) anomaly at high temperature with lattice chiral fermions
S. Aoki, Y. Aoki, G. Cossu, H. Fukaya, S. Hashimoto, T. Kaneko, C. Rohrhofer, and [K. Suzuki](#)
(JLQCD Collaboration)
Phys. Rev. D **103**, 074506 (2021).
- (37) Electromagnetic transitions of the singly charmed baryons with spin 3/2
J.-Y. Kim, H.-C. Kim, G.-S. Yang, and [M. Oka](#)
Phys. Rev. D **103**, 074025 (2021).
- (38) Tunneling Hamiltonian analysis of DC Josephson currents in a weakly-interacting Bose-Einstein condensate
[S. Uchino](#)
Phys. Rev. Research **3**, 043058 (2021).
- (39) Lattice-fermionic Casimir effect and topological insulators
T. Ishikawa, K. Nakayama, and [K. Suzuki](#)
Phys. Rev. Research **3**, 023201 (2021).
- (40) Spin-orbital magnetic response of relativistic fermions with band hybridization
Y. Araki, D. Suenaga, [K. Suzuki](#), and S. Yasui
Phys. Rev. Research **3**, 023098 (2021).
- (41) Mass spectrum and strong decays of tetraquark $\bar{c}\bar{s}qq$ states
[G.-J. Wang](#), L. Meng, L.-Y. Xiao, [M. Oka](#), and S.-L. Zhu
Eur. Phys. J. C **81**, 188 (2021).
- (42) Implications of the $Z_{cs}(3985)$ and $Z_{cs}(4000)$ as two different states
L. Meng, B. Wang, [G.-J. Wang](#), and S.-L. Zhu
Science Bulletin **66**, 2065 (2021).
- (43) Studying the Phi Meson in Nuclear Matter by Simulating pA Reactions in a Transport Approach
[P. Gubler](#)
Few Body Syst. **62**, 53 (2021).
- (44) Two-Pion Emission Decay of Roper-Like Heavy Baryons

- Ahmad Jafar Arifi, H. Nagahiro, [A. Hosaka](#), and K. Tanida
 Few Body Syst. **62**, 36 (2021).
- (45) Heavy Hadronic Molecules Coupled with Multi-quark States
[Y. Yamaguchi](#), H. García-Tecocoatzi, A. Giachino, [A. Hosaka](#), E. Santopinto, S. Takeuchi, and M. Takizawa
 Few Body Syst. **62**, 33 (2021).
- (46) Classifying near-threshold enhancement using deepneural network
 D. L. B. Sombillo, Y. Ikeda, T. Sato, and [A. Hosaka](#)
 Few Body Syst. **62**, 52 (2021).
- (47) Prediction of Double-heavy Tetraquarks Bound States in Quark Model
 Q. Meng, [E. Hiyama](#), [A. Hosaka](#), [M. Oka](#), [P. Gubler](#), K.U. Can, T.T. Takahashi, H. Zong
 Few Body Syst. **62**, 79 (2021).

Invited Talks at International Conferences

- (1) Axial U(1) anomaly at high temperature in lattice QCD
[K. Suzuki](#)
 Second International Workshop on the Extension Project for the J-PARC Hadron Experimental Facility (2nd J-PARC HEF-ex WS), online, (Feb. 16-18, 2022).
- (2) Spectroscopy of Heavy Hadrons @ J-PARC
[M. Oka](#)
 Second International Workshop on the Extension Project for the J-PARC Hadron Experimental Facility (2nd J-PARC HEF-ex WS), online, (Feb. 16-18, 2022).
- (3) Tetraquarks $QQ'q^*q^*$ in a quark model
[A. Hosaka](#)
 International conference, KITP Flux tube conference, Santa Barbara, on-line (January 18-21, 2022).
- (4) T_{QQ} in in Quark and Di-quark Models
[M. Oka](#)
 Workshop on Double Charm Tetraquark and Other Exotics, IP2I, Lyon (online) (November 22, 2021).
- (5) Present status of large-scale shell-model calculations for photonuclear reactions
[Y. Utsuno](#)
 Second PANDORA Workshop, online (Sep. 9-10, 2021).
- (6) Hadron physics — Theoretical background
[A. Hosaka](#)
 Focused Review of Hadron Experimental Facility EXTension (HEF-EX), on-line (August 10-11, 2021).
- (7) Heavy tetra and penta quarks

A. Hosaka

APCTP Focus Program in Nuclear Physics 2021 Part I: Hadron properties in a nuclear medium from the quark and gluon degrees of freedom, online (July 14-16, 2021).

- (8) Phi meson properties in nuclear matter

P. Gubler

APCTP Focus Program in Nuclear Physics 2021 Part I: Hadron properties in a nuclear medium from the quark and gluon degrees of freedom, online (July 14-16, 2021).

- (9) Future Directions of Hadron Physics (Concluding remark)

M. Oka

APCTP Focus Program in Nuclear Physics 2021 Part I: Hadron properties in a nuclear medium from the quark and gluon degrees of freedom, online (July 14-16, 2021).

- (10) Spectral modification of hadrons in nuclear matter

P. Gubler

International Workshop on the Extension Project for the J-PARC Hadron Experimental Facility (J-PARC HEF-ex WS), online (July 7-9, 2021).

- (11) Hadron physics /Past-Present-future

A. Hosaka

International workshop on the Extension Project for the J-PARC Hadron Experimental Facility (J-PARC HEF-ex WS), online (July 7-9, 2021).

Books and Scientific Articles

- (1) ニホニウム; 超重元素・超重核の物理

Nihonium; Physics of superheavy elements/nuclei

H. Koura

基本法則で読み解く物理学最前線 No. 24、共立出版 (2021) (in Japanese).

Patents

None

Awards

- (1) 2021 年理事長表彰・研究開発功績賞、特賞, JAEA President Award 2021

不安定原子核における殻構造変化の解明

Elucidating the evolution of nuclear shells in unstable nuclei

Y. Utsuno

- (2) 2021 年理事長表彰・模範賞, JAEA President Award 2021

核図表を用いた教育普及活動の取組

Outreach Activities with the nuclear chart

H. Koura

Press Release

None