### Chinese Physics B

### Volume 31 Number 12 December 2022

### Contents

	TOPICAL REVIEW — Celebrating 30 Years of Chinese Physics B
120101	Editorial: Celebrating the 30 Wonderful Year Journey of $Chinese\ Physics\ B$
	Hong-Jun Gao and Qihua Xiong
123301	Attosecond spectroscopy for filming the ultrafast movies of atoms, molecules and solids
	Lixin He, Xiaosong Zhu, Wei Cao, Pengfei Lan and Peixiang Lu
126301	Advances of phononics in 2012–2022
	Ya-Fei Ding, Gui-Mei Zhu, Xiang-Ying Shen, Xue Bai and Bao-Wen Li
126804	Molecular beam epitaxy growth of quantum devices
	Ke He
127101	A sport and a pastime: Model design and computation in quantum many-body system
	Gaopei Pan, Weilun Jiang and Zi Yang Meng
128108	Research progress of Pt and Pt-based cathode electrocatalysts for proton-exchange mem
	brane fuel cells
	Ni Suo, Longsheng Cao, Xiaoping Qin and Zhigang Shao
128702	Single-molecular methodologies for the physical biology of protein machines
	Shuang Wang, Ying Lu and Ming Li
	TOPICAL REVIEW — The third carbon: Carbyne with one-dimensional sp-carbon
125201	A review of arc-discharge method towards large-scale preparation of long linear carbo
	chains
	Yi-Fan Zhang
125202	Pulsed laser ablation in liquid of sp-carbon chains: Status and recent advances
	Pietro Marabotti, Sonia Peggiani, Alessandro Vidale and Carlo Spartaco Casari
127801	Raman spectroscopy of isolated carbyne chains confined in carbon nanotubes: Progres
	and prospects
	Johannes M. A. Lechner, Pablo Hernández López and Sebastian Heeg
128101	On-surface synthesis of one-dimensional carbyne-like nanostructures with sp-carbon
	Wenze Gao, Chi Zhang, Zheng Zhou and Wei Xu
128103	One-dimensional sp carbon: Synthesis, properties, and modifications
	Chao-Fan Lv, Xi-Gui Yang and Chong-Xin Shan

(Continued on the Bookbinding Inside Back Cover)

SPECIAL TOPI	${\mathbb C}$ — The third can	rbon: Carbyne	with one-	dimensional s	p-carbon

123101 Chemical bonding in representative astrophysically relevant neutral, cation, and anion  $\mathrm{HC}_n\mathrm{H}$  chains

Ioan Bâldea

123102 Nitrogen-tailored quasiparticle energy gaps of polyynes

Kan Zhang, Jiling Li, Peitao Liu, Guowei Yang and Lei Shi

126101 Accurate theoretical evaluation of strain energy of all-carboatomic ring  $(\operatorname{cyclo}[2n]\operatorname{carbon})$ , boron nitride ring, and cyclic polyacetylene

Tian Lu, Zeyu Liu and Qinxue Chen

126803 Large-scale synthesis of polyynes with commercial laser marking technology Liang Fang, Yanping Xie, Shujie Sun and Wei Zi

127201 Conformational change-modulated spin transport at single-molecule level in carbon systems

Yandong Guo, Xue Zhao, Hongru Zhao, Li Yang, Liyan Lin, Yue Jiang, Dan Ma, Yuting Chen and Xiaohong Yan

128102 Extraordinary mechanical performance in charged carbyne

Yong-Zhe Guo, Yong-Heng Wang, Kai Huang, Hao Yin and En-Lai Gao

#### INSTRUMENTATION AND MEASUREMENT

120703 Development of a cryogen-free dilution refrigerator

Zhongqing Ji, Jie Fan, Jing Dong, Yongbo Bian and Zhi-Gang Cheng

#### DATA PAPER

123401 Electron excitation processes in low energy collisions of hydrogen-helium atoms

Kun Wang, Chuan Dong, Yi-Zhi Qu, Ling Liu, Yong Wu, Xu-Hai Hong and Robert J. Buenker

#### RAPID COMMUNICATION

126402 Learning physical states of bulk crystalline materials from atomic trajectories in molecular dynamics simulation

Tian-Shou Liang, Peng-Peng Shi, San-Qing Su and Zhi Zeng

#### **GENERAL**

120201 Reciprocal transformations of the space—time shifted nonlocal short pulse equations

Jing Wang, Hua Wu and Da-Jun Zhang

120202 Rogue waves of a (3+1)-dimensional BKP equation

Yu-Qiang Yuan, Xiao-Yu Wu and Zhong Du

120203 Sparse identification method of extracting hybrid energy harvesting system from observed data

Ya-Hui Sun, Yuan-Hui Zeng and Yong-Ge Yang

120301	Variational quantum eigensolvers by variance minimization
	Dan-Bo Zhang, Bin-Lin Chen, Zhan-Hao Yuan and Tao Yin
120302	High-fidelity quantum sensing of magnon excitations with a single electron spin in quan-
	tum dots
	Le-Tian Zhu, Tao Tu, Ao-Lin Guo and Chuan-Feng Li
120303	Measurement-device-independent one-step quantum secure direct communication
	Jia-Wei Ying, Lan Zhou, Wei Zhong and Yu-Bo Sheng
120304	Detecting the possibility of a type of photon number splitting attack in decoy-state quan-
	tum key distribution
	Xiao-Ming Chen, Lei Chen and Ya-Long Yan
120305	Quantum steerability of two qubits mediated by one-dimensional plasmonic waveguides
	Ye-Qi Zhang, Xiao-Ting Ding, Jiao Sun and Tian-Hu Wang
120401	${\bf Magnetohydrodynamic~Kelvin-Helmholtz~instability~for~finite-thickness~fluid~layers}$
	Hong-Hao Dai, Miao-Hua Xu, Hong-Yu Guo, Ying-Jun Li and Jie Zhang
120501	A novel hyperchaotic map with sine chaotification and discrete memristor
	Qiankun Sun, Shaobo He, Kehui Sun and Huihai Wang
120502	Resonance and antiresonance characteristics in linearly delayed Maryland model
	Hsinchen Yu, Dong Bai, Peishan He, Xiaoping Zhang, Zhongzhou Ren and Qiang Zheng
120503	Measure synchronization in hybrid quantum–classical systems
	Haibo Qiu, Yuanjie Dong, Huangli Zhang and Jing Tian
120701	Learnable three-dimensional Gabor convolutional network with global affinity attention
	for hyperspectral image classification
	Hai-Zhu Pan, Mo-Qi Liu, Hai-Miao Ge and Qi Yuan
120702	Detailed characterization of polycapillary focusing x-ray lenses by a charge-coupled device
	detector and a pinhole
	Xue-Peng Sun, Shang-Kun Shao, Hui-Quan Li, Tian-Yu Yuan and Tian-Xi Sun
	ATOMIC AND MOLECULAR PHYSICS
123201	High resolution spectroscopy of Rb in magnetic field by far-detuning electromagnetically
	induced transparency
	Zi-Shan Xu, Han-Mu Wang, Ming-Hao Cai, Shu-Hang You and Hong-Ping Liu
123202	Multiple collisions in crystal high-order harmonic generation
	Dong Tang and Xue-Bin Bian

ELECTROMAGNETISM,	$\mathbf{OPTICS},$	ACOUSTICS,	HEAT	${\bf TRANSFER,}$	CLASSICAL
MECHANICS, AND FLUI	D DYNA	MICS			

124201 Transmission-type reconfigurable metasurface for linear-to-circular and linear-to-linear polarization conversions

Ping Wang, Yu Wang, Zhongming Yan and Hongcheng Zhou

124202 Enhancing terahertz photonic spin Hall effect via optical Tamm state and the sensing application

Jie Cheng, Jiahao Xu, Yinjie Xiang, Shengli Liu, Fengfeng Chi, Bin Li and Peng Dong

124203 Watt-level, green-pumped optical parametric oscillator based on periodically poled potassium titanyl phosphate with high extraction efficiency

Hang-Hang Yu, Zhi-Tao Zhang and Hong-Wen Xuan

124204 High-order harmonic generations in tilted Weyl semimetals

Zi-Yuan Li, Qi Li and Zhou Li

124205 Single-frequency distributed Bragg reflector Tm:YAG ceramic derived all-glass fiber laser at 1.95  $\mu m$ 

Guo-Quan Qian, Min-Bo Wu, Guo-Wu Tang, Min Sun, Dong-Dan Chen, Zhi-Bin Zhang, Hui Luo and Qi Qian

124206 Design of broadband achromatic metasurface device based on phase-change material  ${\rm Ge_2Sb_2Te_5}$ 

Shuyuan Lv, Xinhui Li, Wenfeng Luo and Jie Jia

 ${\bf 124207} \ \ {\bf Asymmetrical\ photonic\ spin\ Hall\ effect\ based\ on\ dielectric\ metasurfaces}$ 

Guangzhou Geng, Ruhao Pan, Wei Zhu and Junjie Li

124208 Sensitivity improvement of aluminum-based far-ultraviolet nearly guided-wave surface plasmon resonance sensor

Tianqi Li, Shujing Chen and Chengyou Lin

124209 Modulated spatial transmission signals in the photonic bandgap

Wenqi Xu, Hui Wang, Daohong Xie, Junling Che and Yanpeng Zhang

124301 One-dimensional  $\mathcal{PT}$ -symmetric acoustic heterostructure

Hai-Xiao Zhang, Wei Xiong, Ying Cheng and Xiao-Jun Liu

124302 Beam alignments based on the spectrum decomposition of orbital angular momentums for acoustic-vortex communications

Gepu Guo, Xinjia Li, Qingdong Wang, Yuzhi Li, Qingyu Ma, Juan Tu and Dong Zhang

124701 Electromagnetic control of the instability in the liquid metal flow over a backward-facing step

Ya-Dong Huang, Jia-Wei Fu and Long-Miao Chen

#### PHYSICS OF GASES, PLASMAS, AND ELECTRIC DISCHARGES

125203 Upgrade of the magnetic diagnostic system for restart of HT-6M operation

Li-Xing Chen, Biao Shen, Da-Long Chen, Zheng-Ping Luo, Zu-Chao Zhang, Ying Chen, Yong Wang and Jin-Ping Qian

## CONDENSED MATTER: STRUCTURAL, MECHANICAL, AND THERMAL PROPERTIES

126102 Comparison of formation and evolution of radiation-induced defects in pure Ni and Ni– Co-Fe medium-entropy alloy

Lin Lang, Huiqiu Deng, Jiayou Tao, Tengfei Yang, Yeping Lin and Wangyu Hu

126103 Impact of incident direction on neutron-induced single-bit and multiple-cell upsets in  $14~\mathrm{nm}$  FinFET and  $65~\mathrm{nm}$  planar SRAMs

Shao-Hua Yang, Zhan-Gang Zhang, Zhi-Feng Lei, Yun Huang, Kai Xi, Song-Lin Wang, Tian-Jiao Liang, Teng Tong, Xiao-Hui Li, Chao Peng, Fu-Gen Wu and Bin Li

126401 Solid-to-molecular-orientational-hexatic melting induced by local environment determined defect proliferations

Zhanglin Hou, Jieli Wang, Ying Zeng, Zhiyuan Zhao, Xing Huang, Kun Zhao and Fangfu Ye

- 126801 Anomalous strain effect in heteroepitaxial SrRuO<sub>3</sub> films on (111) SrTiO<sub>3</sub> substrates

  Zhenzhen Wang, Weiheng Qi, Jiachang Bi, Xinyan Li, Yu Chen, Fang Yang, Yanwei Cao, Lin Gu,

  Qinghua Zhang, Huanhua Wang, Jiandi Zhang, Jiandong Guo and Xiaoran Liu
- 126802 Solid–gas interface thermal conductance for the thermal barrier coating with surface roughness: The confinement effect

Xue Zhao and Jin-Wu Jiang

# CONDENSED MATTER: ELECTRONIC STRUCTURE, ELECTRICAL, MAGNETIC, AND OPTICAL PROPERTIES

- 127202 Tunable terahertz acoustic-phonon emission from monolayer molybdenum disulfide Cheng-Xiang Zhao, Miao-Miao Zheng, Yuan Qie and Fang-Wei Han
- 127203 High-temperature nodal ring semimetal in two-dimensional honeycomb-kagome  $\rm Mn_2N_3$  lattice

Xin-Ke Liu, Xin-Yang Li, Miao-Juan Ren, Pei-Ji Wang and Chang-Wen Zhang

127301 Spin transport properties in ferromagnet/superconductor junctions on topological insulator

Hong Li and Xin-Jian Yang

127302 Large positive magnetoresistance in photocarrier-doped potassium tantalites
Rui-Shu Yang, Ding-Bang Wang, Yang Zhao, Shuan-Hu Wang and Ke-Xin Jin

127303 Manipulation of intrinsic quantum anomalous Hall effect in two-dimensional MoYN $_2 \rm CSCl$   $\rm MXene$ 

Yezhu Lv, Peiji Wang and Changwen Zhang

127501 Magnetic properties and magnetocaloric effects of  $Tm_{1-x}Er_xCuAl$  ( $x=0.25,\ 0.5,\ and$  0.75) compounds

Hao Sun, Junfeng Wang, Lu Tian, Jianjian Gong, Zhaojun Mo, Jun Shen and Baogen Shen

- 127502 In-plane current-induced magnetization reversal of Pd/CoZr/MgO magnetic multilayers

  Jing Liu, Caiyin You, Li Ma, Yun Li, Ling Ma and Na Tian
- 127503 Observation of nonlinearity and heating-induced frequency shifts in cavity magnonics Wei-Jiang Wu, Da Xu, Jie Qian, Jie Li, Yi-Pu Wang and Jian-Qiang You
- 127701 Normally-off AlGaN/GaN heterojunction field-effect transistors with in-situ AlN gate insulator

Taofei Pu, Shuqiang Liu, Xiaobo Li, Ting-Ting Wang, Jiyao Du, Liuan Li, Liang He, Xinke Liu and Jin-Ping Ao

127802 Luminescent characteristics of  ${\rm Tm^{3+}/Tb^{3+}/Eu^{3+}}$  tri-doped  ${\rm Na_5Y_9F_{32}}$  single crystals for white emission with high thermal stability

Lizhi Fang, Xiong Zhou, Zhiwei Zhao, Biao Zheng, Haiping Xia, Jun Wang, Hongwei Song and Baojiu Chen

# INTERDISCIPLINARY PHYSICS AND RELATED AREAS OF SCIENCE AND TECHNOLOGY

- 128104 Effect of oxygen on regulation of properties of moderately boron-doped diamond films

  Dong-Yang Liu, Li-Cai Hao, Wei-Kang Zhao, Zi-Ang Chen, Kun Tang, Shun-Ming Zhu, Jian-Dong
  Ye, Rong Zhang, You-Dou Zheng and Shu-Lin Gu
- 128105 Degradation mechanisms for polycrystalline silicon thin-film transistors with a grain boundary in the channel under negative gate bias stress

  Dongli Zhang, Mingxiang Wang and Huaisheng Wang
- 128106 Origin, characteristics, and suppression of residual nitrogen in MPCVD diamond growth reactor

Yan Teng, Dong-Yang Liu, Kun Tang, Wei-Kang Zhao, Zi-Ang Chen, Ying-Meng Huang, Jing-Jing Duan, Yue Bian, Jian-Dong Ye, Shun-Ming Zhu, Rong Zhang, You-Dou Zheng and Shu-Lin Gu

- 128107 Bottom-up design and assembly with superatomic building blocks
  Famin Yu, Zhonghua Liu, Jiarui Li, Wanrong Huang, Xinrui Yang and Zhigang Wang
- 128201 Impact of microsecond-pulsed plasma-activated water on papaya seed germination and seedling growth

Deng-Ke Xi, Xian-Hui Zhang, Si-Ze Yang, Seong Shan Yap, Kenji Ishikawa, Masura Hori and Seong Ling Yap

- 128401 Forward-wave enhanced radiation in the terahertz electron cyclotron maser Zi-Chao Gao, Chao-Hai Du, Fan-Hong Li, Zi-Wen Zhang, Si-Qi Li and Pu-Kun Liu
- 128501 An insulated-gate bipolar transistor model based on the finite-volume charge method Manhong Zhang and Wanchen Wu
- 128502 High-sensitive phototransistor based on vertical  ${\rm HfSe_2/MoS_2}$  heterostructure with broad-spectral response
  - Wen Deng, Li-Sheng Wang, Jia-Ning Liu, Tao Xiang and Feng-Xiang Chen
- 128503 Interface effect on superlattice quality and optical properties of InAs/GaSb type-II superlattices grown by molecular beam epitaxy

  Zhaojun Liu, Lian-Qing Zhu, Xian-Tong Zheng, Yuan Liu, Li-Dan Lu and Dong-Liang Zhang
- 128504 Temperature dependence of spin pumping in YIG/NiO(x)/W multilayer

  Lijun Ni, Wenqiang Wang, Lichuan Jin, Jiandong Ye, Hehe Gong, Xiang Zhan, Zhendong Chen,

  Longlong Zhang, Xingze Dai, Yao Li, Rong Zhang, Yi Yang, Huaiwu Zhang, Ronghua Liu, Lina Chen
  and Yongbing Xu
- 128701 Parkinsonian oscillations and their suppression by closed-loop deep brain stimulation based on fuzzy concept

  Xi-Le Wei, Yu-Lin Bai, Jiang Wang, Si-Yuan Chang and Chen Liu
- 128801 Low-voltage soft robots based on carbon nanotube/polymer electrothermal composites
  Qi Wang, Ying-Qiong Yong and Zhi-Ming Bai
- 128802 Nano Ag-enhanced photoelectric conversion efficiency in all-inorganic, hole-transporting-layer-free CsPbIBr<sub>2</sub> perovskite solar cells

  Youming Huang, Yizhi Wu, Xiaoliang Xu, Feifei Qin, Shihan Zhang, Jiakai An, Huijie Wang and Ling

  Lin
- 128902 Fault-tolerant finite-time dynamical consensus of double-integrator multi-agent systems with partial agents subject to synchronous self-sensing function failure

  Zhi-Hai Wu and Lin-Bo Xie