## Chinese Physics B

Volume 31 Number 8 August 2022

### Contents

	TOPICAL REVIEW — Celebrating 30 Years of Chinese Physics $B$
080301	Exploring Majorana zero modes in iron-based superconductors
	Geng Li, Shiyu Zhu, Peng Fan, Lu Cao and Hong-Jun Gao
085202	Fundamental study towards a better understanding of low pressure radio-frequency plas-
	mas for industrial applications
	Yong-Xin Liu, Quan-Zhi Zhang, Kai Zhao, Yu-Ru Zhang, Fei Gao, Yuan-Hong Song and You-Nian
	Wang
087104	Mottness, phase string, and high- $T_{\rm c}$ superconductivity
	Jing-Yu Zhao and Zheng-Yu Weng
087301	Recent advances of defect-induced spin and valley polarized states in graphene
	Yu Zhang, Liangguang Jia, Yaoyao Chen, Lin He and Yeliang Wang
087506	Magnetic van der Waals materials: Synthesis, structure, magnetism, and their potential
	applications
	Zhongchong Lin, Yuxuan Peng, Baochun Wu, Changsheng Wang, Zhaochu Luo and Jinbo Yang
087507	Progress and challenges in magnetic skyrmionics
	Haifeng Du and Xiangrong Wang
088106	Photon-interactions with perovskite oxides
	Hongbao Yao, Er-Jia Guo, Chen Ge, Can Wang, Guozhen Yang and Kuijuan Jin
089101	Evolution of electrical conductivity and semiconductor to metal transition of iron oxides
	at extreme conditions
	Yukai Zhuang and Qingyang Hu
089401	Collisionless magnetic reconnection in the magnetosphere
	Quanming Lu, Huishan Fu, Rongsheng Wang and San Lu
	DATA PAPER
080101	New experimental measurement of $^{nat}Se(n, \gamma)$ cross section between 1 eV to 1 keV at
	the CSNS Rack-n facility

(Continued on the Bookbinding Inside Back Cover)

Ma, Jian-Jun He, Jun Su, Li-Yong Zhang, Yu-Xuan Yang, Sheng Jin and Kai-Jie Chen

Xin-Rong Hu, Long-Xiang Liu, Wei Jiang, Jie Ren, Gong-Tao Fan, Hong-Wei Wang, Xi-Guang Cao, Long-Long Song, Ying-Du Liu, Yue Zhang, Xin-Xiang Li, Zi-Rui Hao, Pan Kuang, Xiao-He Wang, Ji-Feng Hu, Bing Jiang, De-Xin Wang, Suyalatu Zhang, Zhen-Dong An, Yu-Ting Wang, Chun-Wang

083101 Relativistic calculations on the transition electric dipole moments and radiative lifetimes of the spin-forbidden transitions in the antimony hydride molecule

Yong Liu, Lu-Lu Li, Li-Dan Xiao and Bing Yan

083401 Integral cross sections for electron impact excitations of argon and carbon dioxide Shu-Xing Wang and Lin-Fan Zhu

087501 Magnetic properties of oxides and silicon single crystals

Zhong-Xue Huang, Rui Wang, Xin Yang, Hao-Feng Chen and Li-Xin Cao

#### INSTRUMENTATION AND MEASUREMENT

- 084207 A 658-W VCSEL-pumped rod laser module with 52.6% optical efficiency
  Xue-Peng Li, Jing Yang, Meng-Shuo Zhang, Tian-Li Yang, Xiao-Jun Wang and Qin-Jun Peng
- 088401 Design and high-power test of 800-kW UHF klystron for CEPC
   Ou-Zheng Xiao, Shigeki Fukuda, Zu-Sheng Zhou, Un-Nisa Zaib, Sheng-Chang Wang, Zhi-Jun Lu,
   Guo-Xi Pei, Munawar Iqbal and Dong Dong

#### RAPID COMMUNICATION

- 086801 Two-dimensional Sb cluster superlattice on Si substrate fabricated by a two-step method Runxiao Zhang, Zi Liu, Xin Hu, Kun Xie, Xinyue Li, Yumin Xia and Shengyong Qin
- 087102 Effect of f–c hybridization on the  $\gamma \to \alpha$  phase transition of cerium studied by lanthanum doping

  Yong-Huan Wang, Yun Zhang, Yu Liu, Xiao Tan, Ce Ma, Yue-Chao Wang, Qiang Zhang, Deng-Peng

Yong-Huan Wang, Yun Zhang, Yu Liu, Xiao Tan, Ce Ma, Yue-Chao Wang, Qiang Zhang, Deng-Peng Yuan, Dan Jian, Jian Wu, Chao Lai, Xi-Yang Wang, Xue-Bing Luo, Qiu-Yun Chen, Wei Feng, Qin Liu, Qun-Qing Hao, Yi Liu, Shi-Yong Tan, Xie-Gang Zhu, Hai-Feng Song and Xin-Chun Lai

087302 Precisely controlling the twist angle of epitaxial  ${\rm MoS_2/graphene}$  heterostructure by AFM tip manipulation

Jiahao Yuan, Mengzhou Liao, Zhiheng Huang, Jinpeng Tian, Yanbang Chu, Luojun Du, Wei Yang, Dongxia Shi, Rong Yang and Guangyu Zhang

087401 Conservation of the particle–hole symmetry in the pseudogap state in optimally-doped  $Bi_2Sr_2CuO_{6+\delta} \ superconductor$ 

Hongtao Yan, Qiang Gao, Chunyao Song, Chaohui Yin, Yiwen Chen, Fengfeng Zhang, Feng Yang, Shenjin Zhang, Qinjun Peng, Guodong Liu, Lin Zhao, Zuyan Xu and X. J. Zhou

088105 Monolayer  $MoS_2$  of high mobility grown on  $SiO_2$  substrate by two-step chemical vapor deposition

Jia-Jun Ma, Kang Wu, Zhen-Yu Wang, Rui-Song Ma, Li-Hong Bao, Qing Dai, Jin-Dong Ren and Hong-Jun Gao

#### **GENERAL**

080201 Robustness measurement of scale-free networks based on motif entropy
Yun-Yun Yang, Biao Feng, Liao Zhang, Shu-Hong Xue, Xin-Lin Xie and Jian-Rong Wang

080202 Quantum fields presentation and generating functions of symplectic Schur functions and symplectic universal characters

Denghui Li, Fei Wang and Zhaowen Yan

080203 Green's function Monte Carlo method combined with restricted Boltzmann machine approach to the frustrated  $J_1$ – $J_2$  Heisenberg model

He-Yu Lin, Rong-Qiang He and Zhong-Yi Lu

080204 Evolution of donations on scale-free networks during a COVID-19 breakout Xian-Jia Wang and Lin-Lin Wang

080302 Hard-core Hall tube in superconducting circuits

Xin Guan, Gang Chen, Jing Pan and Zhi-Guo Gui

080303 Finite-key analysis of practical time-bin high-dimensional quantum key distribution with afterpulse effect

Yu Zhou, Chun Zhou, Yang Wang, Yi-Fei Lu, Mu-Sheng Jiang, Xiao-Xu Zhang and Wan-Su Bao

**080304** Purification in entanglement distribution with deep quantum neural network Jin Xu, Xiaoguang Chen, Rong Zhang and Hanwei Xiao

080305 Non-universal Fermi polaron in quasi two-dimensional quantum gases Yue-Ran Shi, Jin-Ge Chen, Kui-Yi Gao and Wei Zhang

080306 Achieving ultracold Bose–Fermi mixture of  $^{87}\mathrm{Rb}$  and  $^{40}\mathrm{K}$  with dual dark magnetic-optical-trap

Jie Miao, Guoqi Bian, Biao Shan, Liangchao Chen, Zengming Meng, Pengjun Wang, Lianghui Huang and Jing Zhang

080307 Direct measurement of two-qubit phononic entangled states via optomechanical interactions

A-Peng Liu, Liu-Yong Cheng, Qi Guo, Shi-Lei Su, Hong-Fu Wang and Shou Zhang

080501 Inertial focusing and rotating characteristics of elliptical and rectangular particle pairs in channel flow

Pei-Feng Lin, Xiao Hu and Jian-Zhong Lin

080502 Characteristics of piecewise linear symmetric tri-stable stochastic resonance system and its application under different noises

Gang Zhang, Yu-Jie Zeng and Zhong-Jun Jiang

080503 Hyperparameter on-line learning of stochastic resonance based threshold networks
Weijin Li, Yuhao Ren and Fabing Duan

080504 Synchronously scrambled diffuse image encryption method based on a new cosine chaotic map

Xiaopeng Yan, Xingyuan Wang and Yongjin Xian

080505 Power-law statistics of synchronous transition in inhibitory neuronal networks Lei Tao and Sheng-Jun Wang

080506	Oscillation properties of matter-wave bright solitons in harmonic potentials
	Shu-Wen Guan, Ling-Zheng Meng and Li-Chen Zhao

080507 Effect of a strocyte on synchronization of thermosensitive neuron–a strocyte minimum system

Yi-Xuan Shan, Hui-Lan Yang, Hong-Bin Wang, Shuai Zhang, Ying Li and Gui-Zhi Xu

080508 Exponential sine chaotification model for enhancing chaos and its hardware implementation

Rui Wang, Meng-Yang Li and Hai-Jun Luo

080701 Ionospheric vertical total electron content prediction model in low-latitude regions based on long short-term memory neural network

Tong-Bao Zhang, Hui-Jian Liang, Shi-Guang Wang and Chen-Guang Ouyang

#### ATOMIC AND MOLECULAR PHYSICS

083102 Dynamic polarizabilities of the clock states of Al<sup>+</sup>

Yuan-Fei Wei, Zhi-Ming Tang, Cheng-Bin Li, Yang Yang, Ya-Ming Zou, Kai-Feng Cui and Xue-Ren Huang

 $oxed{083103}$  Effect of conical intersection of benzene on non-adiabatic dynamics Duo-Duo Li and Song Zhang

083301 Nuclear dissociation after the O 1s  $\to$  ( $^4\Sigma_{\rm u}^-$ )3s $\sigma$  excitation in O<sub>2</sub> molecules Bocheng Ding, Ruichang Wu, Yunfei Feng and Xiaojing Liu

083402 Elastic electron scattering with  $CH_2Br_2$  and  $CCl_2Br_2$ : The role of the polarization effects Xiaoli Zhao and Kedong Wang

ELECTROMAGNETISM, OPTICS, ACOUSTICS, HEAT TRANSFER, CLASSICAL MECHANICS, AND FLUID DYNAMICS

084101 Design method of reusable reciprocal invisibility and phantom device Cheng-Fu Yang, Li-Jun Yun and Jun-Wei Li

084201 Imaging a periodic moving/state-changed object with Hadamard-based computational ghost imaging

Hui Guo, Le Wang and Sheng-Mei Zhao

 $084202 \quad {\bf Orthogonal-triangular} \ {\bf decomposition} \ {\bf ghost} \ {\bf imaging}$ 

Jin-Fen Liu, Le Wang and Sheng-Mei Zhao

084203 Spatial and spectral filtering of tapered lasers by using tapered distributed Bragg reflector grating

Jing-Jing Yang, Jie Fan, Yong-Gang Zou, Hai-Zhu Wang and Xiao-Hui Ma

084204 Optical fiber FBG linear sensing systems for the on-line monitoring of airborne high temperature air duct leakage

Qinyu Wang, Xinglin Tong, Cui Zhang, Chengwei Deng, Siyu Xu and Jingchuang Wei

- 084205 Numerical study of converting beat-note signals of dual-frequency lasers to optical frequency combs by optical injection locking of semiconductor lasers

  Chenhao Liu, Haoshu Jin, Hui Liu and Jintao Bai
- 084206 A 45-μJ, 10-kHz, burst-mode picosecond optical parametric oscillator synchronously pumped at a second harmonic cavity
  Chao Ma, Ke Liu, Yong Bo, Zhi-Min Wang, Da-Fu Cui and Qin-Jun Peng
- 084208 High sensitivity dual core photonic crystal fiber sensor for simultaneous detection of two samples

Pibin Bing, Guifang Wu, Qing Liu, Zhongyang Li, Lian Tan, Hongtao Zhang and Jianquan Yao

- 084209 High power supercontinuum generation by dual-color femtosecond laser pulses in fused silica
  - Saba Zafar, Dong-Wei Li, Acner Camino, Jun-Wei Chang and Zuo-Qiang Hao
- 084210 Dynamically tunable multiband plasmon-induced transparency effect based on graphene nanoribbon waveguide coupled with rectangle cavities system
  Zi-Hao Zhu, Bo-Yun Wang, Xiang Yan, Yang Liu, Qing-Dong Zeng, Tao Wang and Hua-Qing Yu
- 084301 Three-dimensional coupled-mode model and characteristics of low-frequency sound propagation in ocean waveguide with seamount topography

  Ya-Xiao Mo, Chao-Jin Zhang, Li-Cheng Lu and Sheng-Ming Guo
- 084302 Sound-transparent anisotropic media for backscattering-immune wave manipulation Wei-Wei Kan, Qiu-Yu Li and Lei Pan
- 084701 Effect of pressure evolution on the formation enhancement in dual interacting vortex rings

  Jianing Dong, Yang Xiang, Hong Liu and Suyang Qin
- 084702 Drop impact on substrates with heterogeneous stiffness
  Yang Cheng, Jian-Gen Zheng, Chen Yang, Song-Lei Yuan, Guo Chen and Li-Yu Liu
- 084703 Physical aspects of magnetized Jeffrey nanomaterial flow with irreversibility analysis
  Fazal Haq, Muhammad Ijaz Khan, Sami Ullah Khan, Khadijah M Abualnaja and M A El-Shorbagy

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

085201 Combination of spark discharge and nanoparticle-enhanced laser-induced plasma spectroscopy

Qing-Xue Li, Dan Zhang, Yuan-Fei Jiang, Su-Yu Li, An-Min Chen and Ming-Xing Jin

- CONDENSED MATTER: STRUCTURAL, MECHANICAL, AND THERMAL PROPERTIES
- 086101 Substitutions of vertex configuration of Ammann–Beenker tiling in framework of Ammann lines

Jia-Rong Ye, Wei-Shen Huang and Xiu-Jun Fu

- 086102 Radiation effects of electrons on multilayer FePS<sub>3</sub> studied with laser plasma accelerator Meng Peng, Jun-Bo Yang, Hao Chen, Bo-Yuan Li, Xu-Lei Ge, Xiao-Hu Yang, Guo-Bo Zhang and Yan-Yun Ma
- 086103 Synthesis of hexagonal boron nitride films by dual temperature zone low-pressure chemical vapor deposition

Zhi-Fu Zhu, Shao-Tang Wang, Ji-Jun Zou, He Huang, Zhi-Jia Sun, Qing-Lei Xiu, Zhong-Ming Zhang, Xiu-Ping Yue, Yang Zhang, Jin-Hui Qu and Yong Gan

- 086104 Core structure and Peierls stress of the 90° dislocation and the 60° dislocation in aluminum investigated by the fully discrete Peierls model

  Hao Xiang, Rui Wang, Feng-Lin Deng and Shao-Feng Wang
- 086105 Theoretical and experimental studies on high-power laser-induced thermal blooming effect in chamber with different gases
  Xiangyizheng Wu, Jian Xu, Keling Gong, Chongfeng Shao, Yang Kou, Yuxuan Zhang, Yong Bo and Qinjun Peng
- 086106 Angular dependence of proton-induced single event transient in silicon-germanium heterojunction bipolar transistors

  Jianan Wei, Yang Li, Wenlong Liao, Fang Liu, Yonghong Li, Jiancheng Liu, Chaohui He and Gang Guo
- 086107 First-principles study of a new BP<sub>2</sub> two-dimensional material

  Zhizheng Gu, Shuang Yu, Zhirong Xu, Qi Wang, Tianxiang Duan, Xinxin Wang, Shijie Liu, Hui Wang and Hui Du
- 086108 Spatial correlation of irreversible displacement in oscillatory-sheared metallic glasses Shiheng Cui, Huashan Liu and Hailong Peng
- 086201 Ru thickness-dependent interlayer coupling and ultrahigh FMR frequency in Fe-CoB/Ru/FeCoB sandwich trilayers

  Le Wang, Zhao-Xuan Jing, Ao-Ran Zhou and Shan-Dong Li
- 086401 Nonvanishing optimal noise in cellular automaton model of self-propelled particles Guang-Le Du and Fang-Fu Ye
- 086802 Effects of oxygen concentration and irradiation defects on the oxidation corrosion of body-centered-cubic iron surfaces: A first-principles study
  Zhiqiang Ye, Yawei Lei, Jingdan Zhang, Yange Zhang, Xiangyan Li, Yichun Xu, Xuebang Wu, C. S. Liu, Ting Hao and Zhiguang Wang
  - CONDENSED MATTER: ELECTRONIC STRUCTURE, ELECTRICAL, MAGNETIC, AND OPTICAL PROPERTIES
- 087101 Modulation of Schottky barrier in  $X Si_2N_4$ /graphene (X = Mo and W) heterojunctions by biaxial strain

  Qian Liang, Xiang-Yan Luo, Yi-Xin Wang, Yong-Chao Liang and Quan Xie

087103 Tailored martensitic transformation and enhanced magnetocaloric effect in all-d-metal Ni $_{35}$ Co $_{15}$ Mn $_{33}$ Fe $_2$ Ti $_{15}$  alloy ribbons

Yong Li, Liang Qin, Hongguo Zhang and Lingwei Li

087303 Analytical formula describing the non-saturating linear magnetoresistance in inhomogeneous conductors

Shan-Shan Chen, Yang Yang and Fan Yang

- 087502 Magnetic properties of a mixed spin-3/2 and spin-2 Ising octahedral chain Xiao-Chen Na, Nan Si, Feng-Ge Zhang and Wei Jiang
- 087503 Exchange-coupling-induced fourfold magnetic anisotropy in CoFeB/FeRh bilayer grown on SrTiO<sub>3</sub>(001)

  Qingrong Shao, Jing Meng, Xiaoyan Zhu, Yali Xie, Wenjuan Cheng, Dongmei Jiang, Yang Xu, Tian

Shang and Qingfeng Zhan

087504 Electromagnetic wave absorption properties of  $Ba(CoTi)_xFe_{12-2x}O_{19}@BiFeO_3$  in hundreds of megahertz band

Zhi-Biao Xu, Zhao-Hui Qi, Guo-Wu Wang, Chang Liu, Jing-Hao Cui, Wen-Liang Li and Tao Wang

- 087505 Low-temperature heat transport of the zigzag spin-chain compound  $SrEr_2O_4$  Liguo Chu, Shuangkui Guang, Haidong Zhou, Hong Zhu and Xuefeng Sun
- 087801 High-dispersive mirror for pulse stretcher in femtosecond fiber laser amplification system
  Wenjia Yuan, Weidong Shen, Chen Xie, Chenying Yang and Yueguang Zhang
- 087802 Improving efficiency of inverted perovskite solar cells via ethanolamine-doped PE-DOT:PSS as hole transport layer

  Zi-Jun Wang, Jia-Wen Li, Da-Yong Zhang, Gen-Jie Yang and Jun-Sheng Yu
- 087803 Enhanced photoluminescence of monolayer  ${
  m MoS_2}$  on stepped gold structure Yu-Chun Liu, Xin Tan, Tian-Ci Shen and Fu-Xing Gu
- 087804 Dual-channel tunable near-infrared absorption enhancement with graphene induced by coupled modes of topological interface states

  Zeng-Ping Su, Tong-Tong Wei and Yue-Ke Wang

# INTERDISCIPLINARY PHYSICS AND RELATED AREAS OF SCIENCE AND TECHNOLOGY

088101 Degradation mechanisms for a-InGaZnO thin-film transistors functioning under simultaneous DC gate and drain biases

Tianyuan Song, Dongli Zhang, Mingxiang Wang and Qi Shan

088102 Longitudinal conductivity in ABC-stacked trilayer graphene under irradiating of linearly polarized light

Guo-Bao Zhu, Hui-Min Yang and Jie Yang

088103 Multiple bottle beams based on metasurface optical field modulation and their capture of multiple atoms

Xichun Zhang, Wensheng Fu, Jinguang Wang, Shi-Yang Fu, Si-Han He, Hai-Bo Lv, Chong Zhang, Xin Zhao, Weiyan Li and He Zhang

088104 Determination of band alignment between  ${\rm GaO}_x$  and boron doped diamond for a selective-area-doped termination structure

Qi-Liang Zhang, Shao-Heng Cheng, Liu-An Li and Hong-Dong Li

088201 How graph features decipher the soot assisted pigmental energy transport in leaves? A laser-assisted thermal lens study in nanobiophotonics

S Sankararaman

**088202** Adaptive semi-empirical model for non-contact atomic force microscopy Xi Chen, Jun-Kai Tong and Zhi-Xin Hu

088501 Characterization of topological phase of superlattices in superconducting circuits
Jianfei Chen, Chaohua Wu, Jingtao Fan and Gang Chen

088502 Wake-up effect in  ${\rm Hf_{0.4}Zr_{0.6}O_2}$  ferroelectric thin-film capacitors under a cycling electric field

Yilin Li, Hui Zhu, Rui Li, Jie Liu, Jinjuan Xiang, Na Xie, Zeng Huang, Zhixuan Fang, Xing Liu and Lixing Zhou

088503 A  $4\times4$  metal-semiconductor-metal rectangular deep-ultraviolet detector array of  ${\rm Ga_2O_3}$  photoconductor with high photo response

Zeng Liu, Yu-Song Zhi, Mao-Lin Zhang, Li-Li Yang, Shan Li, Zu-Yong Yan, Shao-Hui Zhang, Dao-You Guo, Pei-Gang Li, Yu-Feng Guo and Wei-Hua Tang

088701 New insight into the mechanism of DNA polymerase I revealed by single-molecule FRET studies of Klenow fragment

Rokshana Parvin, Qi Jia, Jianbing Ma, Chunhua Xu, Ying Lu, Fangfu Ye and Ming Li

088801 Optical simulation of  $CsPbI_3/TOPC$ on tandem solar cells with advanced light management

Min Yue, Yan Wang, Hui-Li Liang and Zeng-Xia Mei