

# 物 理 学 报

第 71 卷 第 1 期 2022 年 1 月 5 日

## 目 次

### 观点和展望

- 010101 当代理论物理发展趋势之我见——杨振宁学术思想启发的若干思考 ..... 孙昌璞

### 专题: 纳米工程和热物理

- 014401 热智能材料及其在空间热控中的应用 ..... 曹炳阳 张梓彤  
016501 纳米组装相变储热材料的热设计前沿 ... 冯妍卉 冯黛丽 褚福强 邱琳 孙方远 林林 张欣欣

### 总论

- 010301 非临界压缩光场探测的实验方案研究 ..... 刘鹏 李娟 项晓 曹明涛 董瑞芳 刘涛 张首刚  
010302 介观电路中量子纠缠的经典对应 ..... 范洪义 吴泽  
010303 纠缠态量子探测系统的恒虚警检测方法研究 ..... 卫容宇 李军 张大命 王炜皓  
010304 海洋湍流对光子轨道角动量量子通信的影响 ..... 刘瑞熙 马磊  
010701 新型二维材料  $Ti_3C_2T_x$  MXene 制备及其气敏性能研究 .....  
..... 韩丹 刘志华 刘碌碌 韩晓美 刘东明 嵯凯 桑胜波

### 核物理学

- 012501 中子诱发  $^{232}Th$  裂变初始碎片质量及动能分布 Monte-Carlo 研究 .....  
..... 刘昌奇 霍东英 韩超 吴康 刘兴宇 杨旭 白晓厚 王俊润 张宇 姚泽恩 韦峥  
012901 用单发电子束探测激光等离子体内电磁场演化实验研究 ..... 殷佳鹏 刘圣广  
012902 中能质子注量率测量 ..... 张艳文 郭刚 肖舒颜 殷倩 杨新宇  
012903 硅漂移探测器数字脉冲处理技术 ..... 宋文刚 张立军 张晶 王冠鹰

### 电磁学、光学、声学、传热学、经典力学和流体动力学

- 014101 基于时间反演的局域空间多目标均匀恒定长时无线输能 .....  
..... 张知原 李冰 刘仕奇 张洪林 胡斌杰 赵德双 王楚楠  
014201 双明模耦合的双波段类电磁诱导透明研究 ..... 宁仁霞 黄旺 王菲 孙剑 焦铮  
014202 三体里德堡超级原子的关联动力学研究 ..... 白文杰 严冬 韩海燕 华硕 谷开慧  
014203 部分相干幂指数相位涡旋光束的传输特性研究 ..... 陈康 马志远 张明明 窦健泰 胡友友  
014204 基于腔内球差选模产生高阶拉盖尔-高斯模式激光 .....  
..... 刘俊杰 盛泉 王盟 张钧翔 耿兴宁 石争 王爱华 史伟 姚建铨  
014205 二维自相似变换理论和线怪波激发 ..... 张解放 俞定国 金美贞  
014206 基于串联哑铃型微环谐振腔的二维相干光码分多址编解码器 ..... 吉喆 严英占 贾大功  
014301 可压缩液体中气泡的声空化特性 ..... 郑雅欣 那仁满都拉

### 气体、等离子体和放电物理

- 015201 高能量粒子测地声模与 Dimits 区漂移波相互作用 ..... 魏广宇 陈凝飞 仇志勇  
015202 加速电压和阳极流率对离子推力器性能的影响 ..... 李建鹏 靳伍银 赵以德  
015203 水中流光放电流光丝的再发光和暂停行为 ..... 王雪 温小琼 王丽茹 杨元天 薛晓东

## 凝聚物质: 结构、力学和热学性质

- 016101  $\text{Ti}_3\text{Al}$  合金凝固过程晶核形成及演变过程的模拟研究 ..... 李昌 侯兆阳 牛媛 高全华 王真 王晋国 邹鹏飞
- 016102 注氢纯铝中间隙型位错环一维迁移现象的原位观察 ..... 李然然 张一帆 殷玉鹏 渡边英雄 韩文妥 易晓鸥 刘平平 张高伟 詹倩 万发荣
- 016301 Rashba 效应和 Zeeman 效应对各向异性量子点中束缚磁极化子性质的影响 ..... 红兰 戈君 双山 刘达权

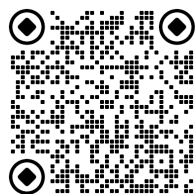
## 凝聚物质: 电子结构、电学、磁学和光学性质

- 017101 无机非铅钙钛矿  $\text{Cs}_3\text{Bi}_2\text{I}_9$  的电子和光学性质 ... 宋谢飞 晒旭霞 李洁 马新茹 伏云昌 曾春华
- 017102  $\text{BaF}_2$  高压相变行为的第一性原理研究 ..... 田城 蓝剑雄 王苍龙 翟鹏飞 刘杰
- 017103  $\text{NH}_3$  在  $\text{TaC}(0001)$  表面吸附和解离的第一性原理研究 ..... 李小林 袁坤 何嘉乐 刘洪峰 张建波 周阳
- 017104 非对称氧掺杂对石墨烯/二硒化钨异质结肖特基势垒的调控 ..... 郝国强 张瑞 张文静 陈娜 叶晓军 李红波
- 017105 广义布洛赫条件下二维晶格的磁交换作用 ... 赵红艳 蒋灵子 朱岩 潘燕飞 樊济宇 马春兰
- 017301 基于银纳米链的马赫-曾德干涉仪结构的生物传感器 ..... 王坤 段高燕 郎佩琳 赵玉芳 刘尖斌 宋钢
- 017401 Li-Y-H 三元氢化物的结构和稳定性研究 ..... 李欢 叶小球 唐俊 敖冰云 高涛
- 017501 多铁材料  $\text{MnSb}_2\text{O}_6$  中自旋涨落的 ESR 研究 ..... 王哲 许劼敏 王文君 李何轩 邹优鸣 于璐 屈哲
- 017502 缺陷对铁单质薄膜磁致伸缩与磁矩演化的影响 ..... 张硕 龙连春 刘静毅 杨洋
- 017801 多能场复合电沉积对  $\text{Al}_2\text{O}_3\text{-Co}$  复合薄膜物性影响研究 ... 岂云开 杨淑敏 李欣 徐芹 顾建军

## 物理学交叉学科及有关科学技术领域

- 018201 中空笼状多孔结构镍钴层状氢氧化物的制备及其电化学性能 ..... 杨文 丁倩瑶 翟冬梅 薄开雯 冯艳艳 文婕 何方
- 018301 冲击载荷下线性硬化材料中球面应力波场的理论计算方法研究 ... 王智环 贾雷明 何增 田宙
- 018501 一种苯乙炔基喹啉衍生物的稳态和瞬态光电性质 ... 成燕琴 徐娟娟 王有娣 黎卓熹 陈江山
- 018801 溶胶-喷雾法制备多壁碳纳米管增强氧化铝基复合材料及性能研究 ..... 谈松林 庄永起 易健宏
- 018802 醋酸纤维素提高  $\text{CsPbIBr}_2$  无机钙钛矿薄膜质量及其太阳能电池光电性能 ..... 王桂强 毕佳宇 刘洁琼 雷苗 张伟

文章图片的彩色效果详见网刊



扫码阅读  
电子版

# ACTA PHYSICA SINICA

Vol. 71, No. 1, January 5, 2022

## CONTENTS

### VIEWS AND PERSPECTIVES

- 010101 My prospective on the contemporary trend of theoretical physics inspired by Chen-Ning Yang  
*Sun Chang-Pu*

### SPECIAL TOPIC—Nano engineering and thermophysics

- 014401 Thermal smart materials and their applications in space thermal control system  
*Cao Bing-Yang Zhang Zi-Tong*
- 016501 Thermal design frontiers of nano-assembled phase change materials for heat storage  
*Feng Yan-Hui Feng Dai-Li Chu Fu-Qiang Qiu Lin Sun Fang-Yuan Lin Lin Zhang Xin-Xin*

### GENERAL

- 010301 Experimental scheme of non-critical squeezed light field detection  
*Liu Peng Li Juan Xiang Xiao Cao Ming-Tao Dong Rui-Fang Liu Tao Zhang Shou-Gang*
- 010302 Classical correspondence of quantum entanglement in mesoscopic circuit  
*Fan Hong-Yi Wu Ze*
- 010303 Research on method of constant false alarm rate of entangled state quantum detection system  
*Wei Rong-Yu Li Jun Zhang Da-Ming Wang Wei-Hao*
- 010304 Effects of ocean turbulence on photon orbital angular momentum quantum communication  
*Liu Rui-Xi Ma Lei*
- 010701 Preparation and gas sensing properties of a novel two-dimensional material  $\text{Ti}_3\text{C}_2\text{T}_x$  MXene  
*Han Dan Liu Zhi-Hua Liu Lu-Lu Han Xiao-Mei Liu Dong-Ming Zhuo Kai Sang Sheng-Bo*

### NUCLEAR PHYSICS

- 012501 Monte-Carlo study of pre-neutron emission mass and energy for neutron-induced  $^{232}\text{Th}$  fission  
*Liu Chang-Qi Huo Dong-Ying Han Chao Wu Kang Liu Xing-Yu Yang Xu Bai Xiao-Hou Wang Jun-Run Zhang Yu Yao Ze-En Wei Zheng*
- 012901 A single long electron bunch detect electromagnetic field evolution in laser plasma  
*Yin Jia-Peng Liu Sheng-Guang*
- 012902 Measurement of medium-energy proton flux  
*Zhang Yan-Wen Guo Gang Xiao Shu-Yan Yin Qian Yang Xin-Yu*
- 012903 Research on digital pulse processing techniques for silicon drift detector  
*Song Wen-Gang Zhang Li-Jun Zhang Jing Wang Guan-Ying*

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

- 014101 Uniform and constant long-time wireless power transmission of multi-targets in local space based on time reversal  
*Zhang Zhi-Yuan Li Bing Liu Shi-Qi Zhang Hong-Lin Hu Bin-Jie Zhao De-Shuang Wang Chu-Nan*

(Continued)

- 014201 Electromagnetic induction-like transparency in dual-band with dual-bright mode coupling  
*Ning Ren-Xia Huang Wang Wang Fei Sun Jian Jiao Zheng*
- 014202 Correlated dynamics of three-body Rydberg superatoms  
*Bai Wen-Jie Yan Dong Han Hai-Yan Hua Shuo Gu Kai-Hui*
- 014203 Propagation properties of partially coherent power-exponent-phase vortex beam  
*Chen Kang Ma Zhi-Yuan Zhang Ming-Ming Dou Jian-Tai Hu You-You*
- 014204 High-order Laguerre-Gaussian mode laser generated based on spherical aberration cavity  
*Liu Jun-Jie Sheng Quan Wang Meng Zhang Jun-Xiang Geng Xing-Ning Shi Zheng Wang Ai-Hua Shi Wei Yao Jian-Quan*
- 014205 Two-dimensional self-similarity transformation theory and line rogue waves excitation  
*Zhang Jie-Fang Yu Ding-Guo Jin Mei-Zhen*
- 014206 Two-dimensional coherent optical encoder/decoder based on serially coupled dumbbell microring resonator  
*Ji Zhe Yan Ying-Zhan Jia Da-Gong*
- 014301 Acoustic cavitation characteristics of bubble in compressible liquid  
*Zheng Ya-Xin Naranmandula*

## PHYSICS OF GASES, PLASMAS, AND ELECTRIC DISCHARGES

- 015201 Nonlinear interaction of EGAM with DW turbulence in the Dimits shift region  
*Wei Guang-Yu Chen Ning-Fei Qiu Zhi-Yong*
- 015202 Influence of acceleration grid voltage and anode flow rate on performance of ion thruster  
*Li Jian-Peng Jin Wu-Yin Zhao Yi-De*
- 015203 Re-illumination and pause behavior of streamer filament of streamer discharge in water  
*Wang Xue Wen Xiao-Qiong Wang Li-Ru Yang Yuan-Tian Xue Xiao-Dong*

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

- 016101 Simulation of nucleation and evolution process of nuclei during solidification of Ti<sub>3</sub>Al alloy  
*Li Chang Hou Zhao-Yang Niu Yuan Gao Quan-Hua Wang Zhen Wang Jin-Guo Zou Peng-Fei*
- 016102 *In-situ* study of one-dimensional motion of interstitial-type dislocation loops in hydrogen-ion-implanted aluminum  
*Li Ran-Ran Zhang Yi-Fan Yin Yu-Peng Watanabe Hideo Han Wen-Tuo Yi Xiao-Ou Liu Ping-Ping Zhang Gao-Wei Zhan Qian Wan Fa-Rong*
- 016301 Influence of Rashba effect and Zeeman effect on properties of bound magnetopolaron in an anisotropic quantum dot  
*Hong Lan Ge Jun Shuang Shan Liu Da-Quan*

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

- 017101 Electronic and optical properties of inorganic lead-free perovskite Cs<sub>3</sub>Bi<sub>2</sub>I<sub>9</sub>  
*Song Xie-Fei Shai Xu-Xia Li Jie Ma Xin-Ru Fu Yun-Chang Zeng Chun-Hua*
- 017102 First-principles study of phase transition of BaF<sub>2</sub> under high pressure  
*Tian Cheng Lan Jian-Xiong Wang Cang-Long Zhai Peng-Fei Liu Jie*
- 017103 First principle study of adsorption and desorption behaviors of NH<sub>3</sub> molecule on the TaC (0001) surface  
*Li Xiao-Lin Yuan Kun He Jia-Le Liu Hong-Feng Zhang Jian-Bo Zhou Yang*
- 017104 Regulation and control of Schottky barrier in graphene/MoSe<sub>2</sub> heterojunction by asymmetric oxygen doping  
*Hao Guo-Qiang Zhang Rui Zhang Wen-Jing Chen Na Ye Xiao-Jun Li Hong-Bo*

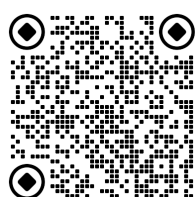
(Continued)

- 017105 Magnetic exchange interaction in two-dimensional lattice under generalized Bloch condition  
*Zhao Hong-Yan Jiang Ling-Zi Zhu Yan Pan Yan-Fei Fan Ji-Yu Ma Chun-Lan*
- 017301 Biosensor based on plasmonic Mach-Zehnder interferometer with metallic gratings  
*Wang Kun Duan Gao-Yan Lang Pei-Lin Zhao Yu-Fang Liu Jian-Bin Song Gang*
- 017401 Structure and stability of possible new Li-Y-H ternary hydrides  
*Li Huan Ye Xiao-Qiu Tang Jun Ao Bing-Yun Gao Tao*
- 017501 Electron spin resonance study of spin fluctuation in multiferroic  $\text{MnSb}_2\text{O}_6$   
*Wang Zhe Xu Jie-Min Wang Wen-Jun Li He-Xuan Zou You-Ming Yu Lu Qu Zhe*
- 017502 Effect of defects on magnetostriction and magnetic moment evolution of iron thin films  
*Zhang Shuo Long Lian-Chun Liu Jing-Yi Yang Yang*
- 017801 Effects of multi-energy field electrodeposition on properties of  $\text{Al}_2\text{O}_3$ -Co composite films  
*Qi Yun-Kai Yang Shu-Min Li Xin Xu Qin Gu Jian-Jun*

## INTERDISCIPLINARY PHYSICS AND RELATED AREAS OF SCIENCE AND TECHNOLOGY

- 018201 Fabrication and electrochemical properties of hollow cage-like nickel cobalt layered hydroxides with porous structure  
*Yang Wen Ding Qian-Yao Zhai Dong-Mei Bo Kai-Wen Feng Yan-Yan Wen Jie He Fang*
- 018301 Method of theoretically calculating spherical stress wave field in linear-hardening materials under impact load  
*Wang Zhi-Huan Jia Lei-Ming He Zeng Tian Zhou*
- 018501 Steady-state and transient optoelectronic characteristics of styrene-and quinoline-based derivative  
*Cheng Yan-Qin Xu Juan-Juan Wang You-Di Li Zhuo-Xi Chen Jiang-Shan*
- 018801 Preparation and properties of multi-walled carbon nanotube reinforced alumina composites by sol-spray method  
*Tan Song-Lin Zhuang Yong-Qi Yi Jian-Hong*
- 018802 Enhancing quality of  $\text{CsPbIBr}_2$  inorganic perovskite via cellulose acetate addition for high-performance perovskite solar cells  
*Wang Gui-Qiang Bi Jia-Yu Liu Jie-Qiong Lei Miao Zhang Wei*

Color figures can be viewed in the online issue.



Online issue