

# 物 理 学 报

第 73 卷 第 18 期 2024 年 9 月 20 日

## 目 次

### 专题: 生物分子模拟中的机器学习

#### 综述

- 188701 融合结构知识的蛋白质预训练模型进展 ... 汤天一 熊翊名 张睿格 张建 李文飞 王骏 王炜

#### 总论

- 180301 高效率时间复用 Duan-Lukin-Cirac-Zoller 存储方案的实验研究 ..... 温亚飞 庄园园 王志强 高士回  
180302 基于矩阵乘积压缩态的动态可扩展秘密共享方案 ..... 赖红 万林春  
180501 分数阶忆阻 Henon 映射的可控多稳定性及其视频加密应用 ..... 张红伟 付常磊 潘志翔 丁大为 王金 杨宗立 刘涛  
180502 电磁感应驱动下闭环呼吸控制系统中的混合节律及其动力学分析 ..... 陈雪丽 夏露源 王智慧 段利霞  
180503 基于滑模趋近律的忆阻混沌系统有限和固定时间同步 ..... 赖强 王君  
180701 旋翼无人机载差分光学吸收二维探测系统的研究及应用 ..... 叶凡 李素文 牟福生 王松 王志多 汤玉洁 雒静

### 基本粒子物理学与场

- 181101 二维光子晶体中的双波段半狄拉克锥与零折射率材料 ..... 纪雨莹 张明楷 李妍  
181201 高能重离子碰撞中心快度区鉴别粒子的平均横动量 ..... 谢滇 李景行 郑华 张文超 朱励霖 刘星泉 谭志光 周代梅 Bonasera Aldo

### 原子和分子物理学

- 183101 InP 中点缺陷迁移机制的第一性原理计算 ... 闫丽彬 白雨蓉 李培 柳文波 何欢 贺朝会 赵小红  
183301 Zn<sup>2+</sup>和 TiO<sub>2</sub> 合金化过程中不同成分占比对薄膜结构和光催化性能的影响 ..... 肖文悦 董小硕 买买提热夏提·买买提 牛娜娜 李国栋 朱泽涛 毕杰昊

### 电磁学、光学、声学、传热学、经典力学和流体动力学

- 184101 部分相干混合位错光束在生物组织传输中的偏振特性 ... 冯姣姣 段美玲 单晶 王灵辉 薛婷  
184201 驻波场中非均匀手征分层粒子的辐射力特性 ..... 白靖 马文浩 葛城显 吴振森 许彤  
184202 基于单颗粒微米核壳晶体的微区上转换发射光谱构筑微纳光子学条形码 ..... 高伟 张正宇 张景蕾 丁鹏 韩庆艳 张成云 严学文 董军  
184301 超声场中气泡运动规律及其与枝晶相互作用机制 ... 张心怡 吴文华 王建元 张颖 翟薇 魏炳波  
184401 星载电子器件温控的系统多尺度分析 ..... 李心泽 唐桂华 汪子涵 冯建朝 张晓峰  
184402 基于膨胀效应的超临界 CO<sub>2</sub> 类沸腾临界点模型 ..... 张海松 卢茂聪 李志刚  
184701 特定湍动激励-响应类型二次非线性系统双谱分析仿真建模 ..... 沈勇 沈煜航 董家齐 李佳 石中兵 宗文刚 潘莉 李继全

## 气体、等离子体和放电物理

- 185201 钨杂质辐射对托卡马克等离子体大破裂快速热猝灭阶段热能损失过程的影响 .....  
..... 张启凡 乐文成 张羽昊 葛忠昕 邝志强 萧声扬 王璐
- 185202 大束流阳极层离子源的阴极刻蚀现象及消除措施 .....  
..... 汤诗奕 马梓淇 邹云霄 安小凯 杨东杰 刘亮亮 崔岁寒 吴忠振
- 185203 同轴枪放电等离子体动力学与杂质谱特性 ..... 漆亮文 杜满强 温晓东 宋健 闫慧杰

## 凝聚物质: 电子结构、电学、磁学和光学性质

- 187801  $\text{Bi}^{3+}$ 掺杂无铅双钙钛矿  $\text{Cs}_2\text{Ag}_{0.6}\text{Na}_{0.4}\text{InCl}_6$  的发光性质 ... 王佳旭 李忠辉 赵炎 蒋小康 周恒为

## 物理学交叉学科及有关科学技术领域

- 188101 基于类电磁诱导透明效应的极化转换滤波器 .....  
..... 王哲飞 吴杰 万发雨 曾庆生 侯建强 傅佳辉 吴群 宋明歆 Tayeb A. Denidni
- 188201 电解液浓度对光电极表面气泡演化及传质特性的影响 ... 王孟莎 徐强 聂腾飞 罗欣怡 郭烈锦
- 188702 基于无监督学习方法的细胞膜内单分子扩散运动分析: 胆固醇对模型膜和活细胞膜流动性的不同影响 **封面文章** ..... 谭金鹏 张婉婷 徐成 卢雪梅 朱文圣 杨恺 元冰
- 188703 冷大气压等离子体诱导的交变电场对白细胞介素-6 结构及功能的影响 .....  
..... 邢人芳 陈明 李芮羽 李淑倩 张瑞 胡笑钊

文章图片的彩色效果详见网刊



扫码阅读  
电子版

# ACTA PHYSICA SINICA

Vol. 73, No. 18, September 20, 2024

## CONTENTS

### SPECIAL TOPIC—Machine learning in biomolecular modelling

#### REVIEW

- 188701 Progress in protein pre-training models integrating structural knowledge  
*Tang Tian-Yi Xiong Yi-Ming Zhang Rui-Ge Zhang Jian Li Wen-Fei Wang Jun Wang Wei*

#### GENERAL

- 180301 Experimental study of efficient temporal-multimode Duan-Lukin-Cirac-Zoller storage scheme  
*Wen Ya-Fei Zhuang Yuan-Yuan Wang Zhi-Qiang Gao Shi-Hui*
- 180302 Dynamic and scalable secret sharing schemes based on matrix product compressed states  
*Lai Hong Wan Lin-Chun*
- 180501 Controllable multistability of fractional-order memristive Henon map and its application in video encryption  
*Zhang Hong-Wei Fu Chang-Lei Pan Zhi-Xiang Ding Da-Wei Wang Jin Yang Zong-Li Liu Tao*
- 180502 Analysis of mixed rhythm and its dynamics in closed-loop respiratory control system driven by electromagnetic induction  
*Chen Xue-Li Xia Lu-Yuan Wang Zhi-Hui Duan Li-Xia*
- 180503 Finite and fixed-time synchronization of memristive chaotic systems based on sliding mode reaching law  
*Lai Qiang Wang Jun*
- 180701 Research and application of differential optical absorption two-dimensional detection system for rotorcraft unmanned aerial vehicle  
*Ye Fan Li Su-Wen Mou Fu-Sheng Wang Song Wang Zhi-Duo Tang Yu-Jie Luo Jing*

### THE PHYSICS OF ELEMENTARY PARTICLES AND FIELDS

- 181101 Dual-band semi-Dirac cones in two-dimensional photonic crystal and zero-index material  
*Ji Yu-Xuan Zhang Ming-Kai Li Yan*
- 181201 Midrapidity average transverse momentum of identified charged particles in high-energy heavy-ion collisions  
*Xie Zhen Li Jing-Xing Zheng Hua Zhang Wen-Chao Zhu Li-Lin Liu Xing-Quan Tan Zhi-Guang Zhou Dai-Mei Bonasera Aldo*

### ATOMIC AND MOLECULAR PHYSICS

- 183101 First-principles calculations of point defect migration mechanisms in InP  
*Yan Li-Bin Bai Yu-Rong Li Pei Liu Wen-Bo He Huan He Chao-Hui Zhao Xiao-Hong*
- 183301 Effects of different compositional ratios on physical structure and optical properties of thin films during alloying of Zn<sup>2+</sup> and TiO<sub>2</sub>  
*Xiao Wen-Yue Dong Xiao-Shuo Mamatrishat Mamat Niu Na-Na Li Guo-Dong Zhu Ze-Tao Bi Jie-Hao*

(Continued)

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

- 184101 Polarization properties of partially coherent mixed dislocation beams transmitting in biological tissues  
*Feng Jiao-Jiao Duan Mei-Ling Shan Jing Wang Ling-Hui Xue Ting*
- 184201 Radiation force characteristics of non-uniform chiral stratified particles in standing wave field  
*Bai Jing Ma Wen-Hao Ge Cheng-Xian Wu Zhen-Sen Xu Tong*
- 184202 Constructing micro/nano-photonics barcodes based on micro-region upconversion emission spectrum of single core-shell microcrystal  
*Gao Wei Zhang Zheng-Yu Zhang Jing-Lei Ding Peng Han Qing-Yan Zhang Cheng-Yun Yan Xue-Wen Dong Jun*
- 184301 Motion law of cavitation bubbles in ultrasonic field and mechanism of their interaction with dendrites  
*Zhang Xin-Yi Wu Wen-Hua Wang Jian-Yuan Zhang Ying Zhai Wei Wei Bing-Bo*
- 184401 System multi-scale analysis of temperature control for spaceborne electronic devices  
*Li Xin-Ze Tang Gui-Hua Wang Zi-Han Feng Jian-Chao Zhang Xiao-Feng*
- 184402 An expansion effect based pseudo-boiling critical point model for supercritical CO<sub>2</sub>  
*Zhang Hai-Song Lu Mao-Cong Li Zhi-Gang*
- 184701 Bispectral analysis and simulation modeling of quadratic nonlinear system with specific turbulent-fluctuation-excitation-response types  
*Shen Yong Shen Yu-Hang Dong Jia-Qi Li Jia Shi Zhong-Bing Zong Wen-Gang Pan Li Li Ji-Quan*

## PHYSICS OF GASES, PLASMAS, AND ELECTRIC DISCHARGES

- 185201 Effects of radiation from tungsten impurities on the thermal energy loss during the fast thermal quench stage of major disruption in tokamak plasmas  
*Zhang Qi-Fan Le Wen-Cheng Zhang Yu-Hao Ge Zhong-Xin Kuang Zhi-Qiang Xiao Sheng-Yang Wang Lu*
- 185202 Cathode etching phenomenon of high beam-anode ion source and its elimination measures  
*Tang Shi-Yi Ma Zi-Qi Zou Yun-Xiao An Xiao-Kai Yang Dong-Jie Liu Liang-Liang Cui Sui-Han Wu Zhong-Zhen*
- 185203 Dynamics and impurity spectral characteristics of coaxial gun discharge plasma  
*Qi Liang-Wen Du Man-Qiang Wen Xiao-Dong Song Jian Yan Hui-Jie*

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

- 187801 Luminescence properties of Bi<sup>3+</sup> doped leadless double perovskite Cs<sub>2</sub>Ag<sub>0.6</sub>Na<sub>0.4</sub>InCl<sub>6</sub>  
*Wang Jia-Xu Li Zhong-Hui Zhao Yan Jiang Xiao-Kang Zhou Heng-Wei*

## INTERDISCIPLINARY PHYSICS AND RELATED AREAS OF SCIENCE AND TECHNOLOGY

- 188101 Polarization conversion filter based on electromagnetically induced transparency-like effect  
*Wang Zhe-Fei Wu Jie Wan Fa-Yu Zeng Qing-Sheng Hou Jian-Qiang Fu Jia-Hui Wu Qun Song Ming-Xin Tayeb A. Denidni*

(Continued)

- 188201 Effect of electrolyte concentration on bubble evolution and mass transfer characteristics on surface of photoelectrode  
*Wang Meng-Sha Xu Qiang Nie Teng-Fei Luo Xin-Yi Guo Lie-Jin*
- 188702 Analysis of single-molecule diffusion movement in cell membrane based on unsupervised learning methods: Different effects of cholesterol on flowability of model membrane and living cell membrane **COVER ARTICLE**  
*Tan Jin-Peng Zhang Wan-Ting Xu Cheng Lu Xue-Mei Zhu Wen-Sheng Yang Kai Yuan Bing*
- 188703 Effect of alternating electric field induced by cold atmospheric plasma on conformation and function of interleukin-6  
*Xing Ren-Fang Chen Ming Li Rui-Yu Li Shu-Qian Zhang Rui Hu Xiao-Chuan*

Color figures can be viewed in the online issue.



Online issue