



Ei Compendex 收录期刊  
中文核心期刊

ISSN 1001-0548  
CN 51-1207/TN  
CODEN DKDAEM

# 电子科技大学

## 学报

JOURNAL OF UNIVERSITY  
OF ELECTRONIC SCIENCE AND  
TECHNOLOGY OF CHINA  
第51卷 第3期 Vol. 51 No.3



ISSN 1001-0548



9 771001 054224

# 2022

中国 成都 CHENGDU CHINA

主 编：周 涛  
副 主 编：蒋 晓  
责任编辑：刘飞阳

# 电 子 科 技 大 学 学 报

第 51 卷 第 3 期 2022 年 5 月

## 目 次

### · 量子信息专栏 ·

本期“量子信息”专栏评述 .....	专栏编委会 (321)
从黑盒子到因果律：寻找量子物理的信息原理 .....	陈怡颖, 王子竹 (322)
精确 Grover 量子搜索算法概述 .....	李冠中, 李绿周 (342)

### · 生物信息专栏 ·

本期“生物信息”专栏评述 .....	专栏编委会 (347)
DBEncRNA: 细菌必需非编码 RNA 数据库 .....	叶远浓, 梁定发, 曾 柱 (348)
基于 Profile 比对的改进星比对算法 .....	陈俊涛, 邹 权 (353)

### · 成电青年学者·信息与通信工程专栏 ·

以欠采样速率实现盲谱感知及二维 DOA 估计 .....	张 展, 魏 平, 高 林, 张花国 (357)
物联网区块链中基于演化博弈的分片算法 .....	徐小琼, 孙 昱, 罗 龙 (363)

### · 通信与信息工程 ·

无数字时延滤波器的宽带大规模阵列雷达去斜算法 .....	李志鹏, 李兴和, 黄 虎, 饶中宇 (371)
高速旋转相控阵雷达基于资源预规划的任务调度算法 .....	李纪三, 刘 溶, 张 宁 (377)
基于深度强化学习的多小区 NOMA 能效优化功率分配算法 .....	胡浪涛, 毕松姣, 刘全金, 吴建岚, 杨 瑞 (384)
基于时间触发光纤通道网络的交换调度算法 .....	白 焱, 孙万录, 宋 平, 李 伟 (392)
一体化温补均衡器设计 .....	卢子焱, 王超杰, 曾 超, 姚瑞林, 李志友, 周 丽 (397)
塑闪阵列探测器读出 ASIC 阈值产生与调节电路的设计 .....	..... 敬雅冉, 千 奕, 蒲天磊, 赵红赟, 杨鸣宇, 孙志坤, 张家瑞, 孔 洁, 余乾顺, 颜俊伟, 孙志朋, 王长鑫 (402)

### · 计算机工程与应用 ·

基于区块链的供应链数据分级访问控制机制 .....	叶 进, 庞承杰, 李晓欢, 张 鑫, 刘 亮 (408)
时间序列数据挖掘中的聚类研究综述 .....	李海林, 张丽萍 (416)
安全高效的三因素远程身份认证协议 .....	黄朝阳, 赵玉超 (425)
基于卫星多光谱的广东亚热带森林 FMC 遥感反演 .....	冯小兵, 曾宇怀, 吴泽鹏, 杭 文, 魏书精, 汤龙坤, 胡海波 (432)
基于 ALK-MCS 算法的航空发动机轴承可靠性分析 .....	黄洪钟, 童 辉, 邓智铭, 钱华明, 李彦锋, 郭 超 (438)
混合 CNN-HMM 的人体动作识别方法 .....	张 振, 张师榕, 赵转哲, 刘永明, 阚延鹏, 涂志健 (444)

### · 电子信息材料与器件 ·

二维纳米机电谐振器高效制备 .....	梁亚春, 朱健凯, 肖 飞, 焦陈寅, 徐 博, 夏 娟, 王曾晖 (452)
基于 65 nm 体硅 CMOS 技术的 DICE-DFE 和 TMR-DFE SEU 辐射硬化方法分析 .....	..... 李海松, 杨 博, 蒋轶虎, 高利军, 杨 靓 (458)

### · 复杂性科学 ·

基于 Lotka-Volterra 模型的淘汰机制下的信息相互作用 .....	许楠楠, 胡海波 (464)
基于高考录取成绩的院校竞争网络实证研究 .....	王辰曦, 张智成, 袁 晨, 蔡世民 (473)

# JOURNAL OF UNIVERSITY OF ELECTRONIC SCIENCE AND TECHNOLOGY OF CHINA

Vol.51 No.3 May 2022

## CONTENTS

### • Special Section on Quantum Information •

- Comments to Special Topic Articles ..... Editorial Board of Special Topic (321)  
From Black Boxes to Causal Orders: The Quest for Information-Theoretical Principles of Quantum Physics ..... CHEN Yiyi, WANG Zizhu (322)  
Overview of Exact Grover's Quantum Search Algorithms ..... LI Guanzhong, LI Lyuzhou (342)

### • Special Section on Bioinformatics •

- Comments to Special Topic Articles ..... Editorial Board of Special Topic (347)  
DBEncRNA: Database of Bacterial Essential ncRNA ..... YE Yuannong, LIANG Dingfa, and ZENG Zhu (348)  
Improved Center Star Alignment Algorithm Based on Profile Alignment ..... CHEN Juntao, ZOU Quan (353)

### • Special Section for UESTC Youth: Information and Communication Engineering •

- Achieving Blind Spectrum Sensing and Two-Dimensional DOA Estimation with Sub-Nyquist Sampling Rate ..... ZHANG Zhan, WEI Ping, GAO Lin, and ZHANG Huaguo (357)  
Sharding Algorithm Based on Evolutionary Game in the IoT-Blockchain ..... XU Xiaoqiong, SUN Gang, and LUO Long (363)

### • Communication and Information Engineering •

- A Stretch Processing Method without Digital Delay Filter for Large-Scale Broadband Array Radar ..... LI Zhipeng, LI Xinghe, HUANG Hu, and RAO Shenyu (371)  
Task Scheduling Algorithm for High-Speed Rotating Phased Array Radar Based on Resource Rre-Planning ..... LI Jisan, LIU Rong, and ZHANG Ning (377)  
Multi-Cell NOMA Energy Efficiency Optimization Power Allocation Algorithm Based on Deep Reinforcement Learning ..... HU Langtao, BI Songjiao, LIU Quanjin, WU Jianlan, and YANG Rui (384)  
A Switching Scheduling Algorithm Based on Time Triggered Fibre Channel Network ..... BAI Yan, SUN Wanlu, SONG Ping, and LI Wei (392)  
Integrated Design of an Equalizer with Temperature Compensation ..... LU Ziyang, WANG Chaojie, ZENG Chao, YAO Ruilin, LI Zhiyou, and ZHOU Li (397)  
Development of the Readout ASIC Chip's Threshold Generating and Regulating Circuit for Plastic Scintillator Detector ..... JING Yaran, QIAN Yi, PU Tianlei, ZHAO Hongyun, YANG Mingyu, SUN Zhikun, ZHANG Jiarui, KONG Jie, SHE Qianshun, YAN Junwei, SUN Zhipeng, and WANG Changxin (402)

### • Computer Engineering and Applications •

- Blockchain-Based Supply Chain Data Hierarchical Access Control Mechanism ..... YE Jin, PANG Chengjie, LI Xiaohuan, ZHANG Xin, and LIU Liang (408)  
Summary of Clustering Research in Time Series Data Mining ..... LI Hailin, ZHANG Liping (416)  
A Secure and Efficient Remote Authenticated Protocol Based on Three Factors ..... HUANG Chaoyang, ZHAO Yuchao (425)  
Remote Sensing Retrieval of FMC in Subtropical Forests of Guangdong Based on Satellite Multispectral Data ..... FENG Xiaobing, ZENG Yuhuai, WU Zepeng, HANG Wen, WEI Shujing, TANG Longkun, and HU Haibo (432)  
Reliability Analysis for Bearings of Aero-Engine Based on ALK-MCS Algorithm ..... HUANG Hongzhong, TONG Hui, DENG Zhiming, QIAN Huaming, LI Yanfeng, and GUO Chao (438)  
Human Motion Recognition Method Using Hybrid CNN-HMM ..... ZHANG Zhen, ZHANG Shirong, ZHAO Zhuanzhe, LIU Yongming, KAN Yanpeng, and TU Zhijian (444)

### • Electronic & Information Materials and Devices •

- Fast Prototyping of Two-Dimensional Nanoelectromechanical Resonators ..... LIANG Yachun, ZHU Jiankai, XIAO Fei, JIAO Chenyin, XU Bo, XIA Juan, and WANG Zenghui (452)  
Analysis of SEU Radiation-Hardened Method About DICE-DFF and TMR-DFF Based on 65nm Bulk CMOS Technology ..... LI Haisong, YANG Bo, JIANG Yihu, GAO Lijun, and YANG Liang (458)

### • Complexity Sciences •

- Information Interaction under Elimination Mechanism Based on Lotka-Volterra Model ..... XU Nannan, HU Haibo (464)  
Empirical Research on College Competition Network Based on the Admission Scores of Colleges in Chinese Gaokao ..... WANG Chenxi, ZHANG Zhicheng, YUAN Chen, and CAI Shimin (473)