

激光与光电子学进展

第 60 卷
第 17 期

Laser & Optoelectronics Progress

[总第748期]

2023.9(上)



少模光纤通信数字信号处理

DOI: 10.3788/LOP222826

ISSN 1006-4125



激光与光电子学进展

第 60 卷 第 17 期 2023 年 9 月 10 日

(总第 748 期)

目 次

· 综述 ·

- 少模光纤强耦合通信系统信号恢复技术综述(封面文章,特邀综述) 龙健宇,张冰,杨雄伟,余建军 1700001
- 基于硫系光纤的中红外超连续谱及其相干性研究进展 吴志建,彭雪峰 1700003
- 基于新型荧光材料溶解氧、pH及二氧化碳光纤传感器研究进展 宋强,王亮,张笑银,刘岩,张婧,孔祥峰 1700004
- 飞秒激光制备金属表面微纳结构及其技术应用 王锁成,董世运,闫世兴,刘晓亭 1700005
- 中红外激光器研究进展 程乃俊,李惟帆,祁峰 1700006
- 面向钻井提速的激光破岩机理研究进展 姜昌浪,康民强,刘记立,朱启华 1700007
- 受激拉曼散射脉宽压缩技术研究进展 刘筱奕,王帅帅,刘照东,陈亚东,蔡颖辉,赵超,陈婷婷,李铁 1700008

· 大气光学与海洋光学 ·

- 基于反向传播神经网络盲均衡算法的水下涡旋光复用系统性能研究 王明军,屠思凯 1701001
- 利用生成对抗网络从地球静止卫星图像中反演大气运动矢量 李孝涌,陈科艺 1701002

· 相干光学与统计光学 ·

- 扭曲椭圆高斯谢尔模光束的自修复特性 郭寅龙,聂芯雨,李晋红,钱仙妹,朱文越,王静 1703001

· 光纤光学与光通信 ·

- 分层调制联合物理层网络编码下协作自由空间光通信系统的误码率性能 秦怀军,曹阳,彭小峰,张祖鹏 1706001
- 基于虚拟游标效应的夹层多模光纤马赫-曾德尔干涉仪高灵敏温度传感器
..... 杨翔文,罗彬彬,石胜辉,邹雪,吴德操,陈荟吉,李玉洁,古洪,赵明富 1706002
- 弹性光数据中心中软管虚拟机的放置算法研究 马中俊,刘逢清,陈宇星 1706003
- 基于光域补偿的远距离光混沌同步 张宇坤,李诏云,陶智勇,樊亚仙 1706004
- 植入式锂离子电池光纤布拉格光栅温度传感器 冒燕,童杏林,卢世刚,褚维达 1706005

多通道PPLN波导温度控制方法 衣坤朋,姚权,简际超,樊景丽,魏代营,高洋,郑名扬 1706006

· 仪器,测量与计量 ·

基于非平衡双臂马赫-曾德尔干涉仪的瞬时测频 李惊,张建明,韩喆 1712001

非偏振分光棱镜的相移测量及其温度特性研究 高珊,孟晨,崔省伟,姚晓天,郝鹏,吴胜保 1712002

摆镜在1.2 m望远镜激光测距接收系统中的应用分析 李鹏飞,翟东升,李祝莲,李语强 1712003

激光回馈双折射测量系统稳定性能优化 王健,吴爱华,邓勇 1712004

基于傅里叶级数拟合的光强近场检测方法 侯启真,王浩,段惠英 1712005

基于双波长莫尔和发射层析的等离子体双温测量 庄俊彦,陈云云,陈雅宜 1712006

基于微波谐振技术的活性炭质量检测 郑家忠,李志刚,陈凤,郭忠明,王澍,计敏 1712007

· 激光器与激光光学 ·

基于BP神经网络的激光熔覆参数多目标优化 邓德伟,江浩,李振华,宋学官,孙奇,张勇 1714001

基于折射棱镜的多波段激光合束方法 兰江,何衡湘,陈俊,王陈,程帅,张凌鹏,石康旺,邹硕颐,丛俊凯 1714002

2 kW级双向光纤包层光滤除器 袁纬仪,付敏,李智贤,王泽锋,陈子伦 1714003

超高强钢1700MS激光焊接头微观组织与力学性能 李敏,荣佑民,王璐,徐加俊 1714004

双激光刻蚀与清洗挠性覆铜板工艺及质量研究 黄支慧,叶其科,叶其教,廖健宏 1714005

红外激光制备钛氧化层的温度场模拟与分析 李磊,王敬,黄磊,郑宏宇,赵元亮,吴永玲,王浪平 1714006

InGaN基蓝光激光器p型波导层和有源区优化研究 石澜,李书平 1714007

基于混合卷积窗的激光多普勒信号处理研究 陈昊,张达 1714008

非平整表面飞秒激光加工方法及应用 何煦,马云灿,李军,袁鸣洲,尹美芳,孟立民,叶雁,张航,吴军 1714009

激光填粉焊接B340LA高强钢工艺特性研究 李洁,张屹,梁志超,陈聪 1714010

· 材料 ·

As₄₀Se₆₀硫系基底连接层制备与性能 张顺关,李珊,刘卓,曾绍禹,汤克彬 1716002

· 非线性光学 ·

热光效应对绝缘层上的硅微腔光梳产生和演化的影响分析
..... 熊科宇,文进,何晨瑶,梁伯植,孙伟,张辉,王倩,武政委,于慧敏 1719001

· 光学设计与制造 ·

用于核酸现场检测的直轴型多通道光学检测系统 奚邦朝,杨佳羽,黄绍磊,戴皓正,曾俊添,张东旭 1722001

· 光学器件 ·

分光比可设计的偏振无关光功分器研究 汪静丽,刘海广,张跃腾,宋雨辰,沈晗潇,陈鹤鸣,钟凯 1723001

· 光电子学 ·

用于太阳矢量确定的太阳能电池片在轨性能分析 夏喜旺,杜涵,张科科 1725001

· 遥感与传感器 ·

基于高分五号高光谱波段选择的矿区周边土壤Cd含量反演 刘雯,韩玲,刘明,李良志 1728001

· 光谱学 ·

基于海鸥算法优化随机森林的土壤硒含量高光谱反演 谢鹏,王正海,肖蓓,田雨欣 1730001

基于电光双光梳光谱的气体含量测量方法研究 王杰,刘睿,廖文龙,任心仪,马慧,闫明,曾和平,黄勤清,程林 1730002

基于近红外光谱的苹果可溶性固形物特征波长筛选建模对比分析
..... 张金富,汤斌,王建旭,传焱霏,龙邹荣,陈庆,缪俊锋,蔡林峰,赵明富,周密 1730003

基于激光吸收光谱技术的圆形燃烧场流场速度二维重建 于佳琪,李宁,黄孝龙,康杨,李灿,范旭东,翁春生 1730004

基于激光诱导击穿光谱技术的土壤镉元素高灵敏检测 潘超超,赵南京,马明俊,杨瑞芳,杨金强,刘建国 1730006

· 快报 ·

Effective Slowing and Trapping of Cs Atoms in an Ultrahigh-Vacuum Apparatu Li Yuqing, Du Huiying,
Wang Yunfei, Wu Jizhou, Liu Wenliang, Li Peng, Fu Yongming, Ma Jie, Xiao Liantuan, Jia Suotang 1736001



封面解读

本封面以少模光纤传输信号的数字信号处理为突出要点。以计算机芯片暗指具有强大能力的数字信号处理依旧发挥着巨大作用,与其上方连接的神经网络相呼应,表达数字信号处理在少模光纤信号传输中依旧能够扮演重要的角色。同时,搭载不同模式、携带不同类型信息的四路光信号,经恢复后由芯片引出,展现了少模光纤通信系统强大的能力。

Laser & Optoelectronics Progress

Vol. 60, No. 17 (Series No. 748) September 10, 2023

CONTENTS

Reviews

- Survey of Signal Recovery Technique in Few-Mode Fiber Communication System with Strong Mode
Coupling(**Cover Paper, Invited**)*Long Jianyu, Zhang Bing, Yang Xiongwei, Yu Jianjun* 1700001
- Research Progress of Mid-Infrared Supercontinuum and Its Coherence Based on Chalcogenide Fibers
.....*Wu Zhijian, Peng Xuefeng* 1700003
- Research Progress of Optical Fiber Sensors Based on Novel Fluorescent Materials: Dissolved Oxygen, pH, and Carbon Dioxide
.....*Song Qiang, Wang Liang, Zhang Xiaoyin, Liu Yan, Zhang Jing, Kong Xiangfeng* 1700004
- Fabrication of Micro/Nano Structures on Metal Surfaces by Femtosecond Laser and Its Technical Applications
.....*Wang Suocheng, Dong Shiyun, Yan Shixing, Liu Xiaoting* 1700005
- Progress of Mid-Infrared Laser*Cheng Naijun, Li Weifan, Qi Feng* 1700006
- Research Progress in Laser Rock-Breaking Mechanism for Drilling Acceleration
.....*Jiang Changlang, Kang Mingqiang, Liu Jili, Zhu Qihua* 1700007
- Research Progress of Pulse Duration Compression via Stimulated Raman Scattering*Liu Xiaoyi, Wang shuaishuai,
Liu Zhaodong, Chen Yadong, Cai Yinghui, Zhao Chao, Chen Tingting, Li Tie* 1700008

Atmospheric Optics and Oceanic Optics

- Performance Research on Underwater Vortex Optical Multiplexing System Based on Back Propagation Neural Network Blind
Equalization Algorithm*Wang Mingjun, Tu Sikai* 1701001
- Retrieving Atmospheric Motion Vectors from Geostationary Satellite Images Using Generative Adversarial Networks
.....*Li Xiaoyong, Chen Keyi* 1701002

Coherence Optics and Statistical Optics

- Self-Healing Properties of Twisted Elliptical Gaussian Schell-Model Beams
.....*Guo Yinlong, Nie Xinyu, Li Jinhong, Qian Xianmei, Zhu Wenyue, Wang Jing* 1703001

Fiber Optics and Optical Communications

- Bit Error Rate Performance of Cooperative Free Space Optical Communication System with Hierarchical Modulation and
Physical Layer Network Coding*Qin Huaijun, Cao Yang, Peng Xiaofeng, Zhang Zupeng* 1706001
- High-Sensitivity Temperature Sensor Based on Sandwich Multimode Fiber Mach-Zehnder Interferometer with Virtual
Vernier Effect.....*Yang Xiangwen, Luo Binbin, Shi Shenghui, Zou Xue,
Wu Decao, Chen Huiji, Li Yujie, Gu Hong, Zhao Mingfu* 1706002
- Research on Placement Algorithm of Flexible Virtual Machine in Elastic Optical Data Center
.....*Ma Zhongjun, Liu Fengqing, Chen Yuxing* 1706003
- Long-Range Optical Chaos Synchronization Based on Optical Domain Compensation
.....*Zhang Yukun, Li Zhaoyun, Tao Zhiyong, Fan Yaxian* 1706004
- Implantable Fiber Bragg Grating Temperature Sensor Inside Lithium-Ion Battery
.....*Mao Yan, Tong Xinglin, Lu Shigang, Chu Weida* 1706005
- Temperature Control Method for Multichannel PPLN Waveguides
.....*Yi Kunpeng, Yao Quan, Lin Jichao, Fan Jingli, Wei Daiying, Gao Yang, Zheng Mingyang* 1706006

Instrumentation, Measurement and Metrology

- Instantaneous Frequency Measurements Based on a Dual-Path Imbalanced Mach-Zehnder Interferometer
.....*Li Cong, Zhang Jianming, Han Zhe* 1712001
- Phase Shift Measurements of Non-Polarized Beam Splitter and Its Temperature Characteristics
.....*Gao Shan, Meng Chen, Cui Shengwei, Yao X. Steve, Hao Peng, Wu Shengbao* 1712002
- Application Analysis of Tip/Tilt Mirror in 1.2 m Telescope Laser Ranging Receiving System
.....*Li Pengfei, Zhai Dongsheng, Li Zhulian, Li Yuqiang* 1712003
- Stability Optimization of Laser Feedback Birefringence Measurement System*Wang Jian, Wu Aihua, Deng Yong* 1712004
- Near-Field Detection Method for Light Intensity Based on Fourier Series Fitting
.....*Hou Qizhen, Wang Hao, Duan Huiying* 1712005
- Double-Temperature Measurements of Arc Plasmas by Integrating Two-Wavelength Moiré and Emission Tomography
.....*Zhuang Junyan, Chen Yunyun, Chen Yayi* 1712006
- Activated Carbon Weight Detection Based on Microwave Resonance Technology
.....*Zheng Jiazhong, Li Zhigang, Chen Feng, Guo Zhongming, Wang Shu, Ji Min* 1712007

Lasers and Laser Optics

- Multi-Objective Optimization of Laser Cladding Parameters Based on BP Neural Network
.....*Deng Dewei, Jiang Hao, Li Zhenhua, Song Xueguan, Sun Qi, Zhang Yong* 1714001
- Laser Multibeam Method Based on Refractive Prisms*Lan Jiang, He Hengxiang, Chen Jun, Wang Chen, Cheng Shuai, Zhang Lingpeng, Shi Kangwang, Zhou Shuoyi, Cong Junkai* 1714002
- 2 kW Bidirectional Fiber Cladding Power Stripper*Yuan Weiyi, Fu Min, Li Zhixian, Wang Zefeng, Chen Zilun* 1714003
- Study on Microstructure and Mechanical Properties of Laser Welded Joints for Ultra-High Strength Steel 1700MS
.....*Li Min, Rong Youmin, Wang Lu, Xu Jiajun* 1714004
- Study on Process and Quality of Dual Laser Etching and Cleaning Flexible Copper Clad Laminate
.....*Huang Zhihui, Ye Qike, Ye Qijiao, Liao Jianhong* 1714005
- Simulation and Analysis of Temperature Field During Oxidation Layer Preparation on Titanium Alloy Using Infrared Laser
.....*Li Lei, Wang Jing, Huang Lei, Zheng Hongyu, Zhao Yuanliang, Wu Yongling, Wang Langping* 1714006
- Research on Optimization of p-Type Waveguide Layer and Active Region of InGaN-Based Blue Laser Diodes
.....*Shi Lan, Li Shuping* 1714007
- Laser Doppler Signal Processing Based on Hybrid Convolution Window*Chen Hao, Zhang Da* 1714008
- Method and Application of Femtosecond Laser Processing on Non-Flat Surfaces
.....*He Xu, Ma Yuncan, Li Jun, Yuan Mingzhou, Yin Meifang, Meng Limin, Ye Yan, Zhang Hang, Wu Jun* 1714009
- Process Characteristics of Laser Powder Filling Welding of B340LA High-Strength Steel
.....*Li Jie, Zhang Yi, Liang Zhichao, Chen Cong* 1714010

Materials

- Preparation and Performance of $As_{40}Se_{60}$ Connective Layer for Sulfur Substrate
.....*Zhang Shunguan, Li Shan, Liu Zhuo, Zeng Shaoyu, Tang Kebin* 1716002

Nonlinear Optics

- Influence Analysis of Thermo-Optic Effect on Generation and Evolution of Silicon-on-Insulator Microcavity Optical Comb
.....*Xiong Keyu, Wen Jin, He Chenyao, Liang Bozhi, Sun Wei, Zhang Hui, Wang Qian, Wu Zhengwei, Yu Huimin* 1719001

Optical Design and Fabrication

A Straight-Axis Multi-Channel Optical Detection System for Nucleic Acid On-Site Detection

.....*Xi Bangchao, Yang Jiayu, Huang Shaolei, Dai Haozheng, Zeng Juntian, Zhang Dongxu* 1722001

Optical Devices

Polarization-Independent Optical Power Splitter with a Designable Splitting Ratio

.....*Wang Jingli, Liu Haiguang, Zhang Yueteng, Song Yuchen, Shen Hanxiao, Chen Heming, Zhong Kai* 1723001

Optoelectronics

Analysis of On-Orbit Performance of Solar Cells for Sun Vector Determination*Xia Xiawang, Du Han, Zhang Keke* 1725001

Remote Sensing and Sensors

Inversion of Cd Content in Soil Around Mining Area Based on GaoFen-5 Hyperspectral Band Selection

.....*Liu Wen, Han Ling, Liu Ming, Li Liangzhi* 1728001

Spectroscopy

Hyperspectral Inversion of Soil Selenium Content Based on Seagull Algorithm Optimized Random Forest

.....*Xie Peng, Wang Zhenghai, Xiao Bei, Tian Yuxin* 1730001

Study on Electro-Optic Dual-Comb Spectroscopy for Gas Concentration Measurement

.....*Wang Jie, Liu Rui, Liao Wenlong, Ren Xinyi, Ma Hui, Yan Ming, Zeng Heping, Huang Qinqing, Cheng Lin* 1730002

Comparative Analysis of Characteristic Wavelength Screening of Apple Soluble Solids Based on Near-Infrared Spectroscopy

.....*Zhang Jinfu, Tang Bin, Wang Jianxu, Chuan Yanfei, Long Zourong,
Chen Qing, Miao Junfeng, Cai Linfeng, Zhao Mingfu, Zhou Mi* 1730003

Laser-Absorption-Spectroscopy-Based Reconstruction of Two-Dimensional Velocity Distributions in Circular Combustion Fields

.....*Yu Jiaqi, Li Ning, Huang Xiaolong, Kang Yang, Li Can, Fan Xudong, Weng Chunsheng* 1730004

Highly Sensitive Detection of Cd in Soil Using Laser-Induced Breakdown Spectroscopy

.....*Pan Chaochao, Zhao Nanjing, Ma Mingjun, Yang Ruifang, Yang Jingqiang, Liu Jianguo* 1730006

Letters

Effective Slowing and Trapping of Cs Atoms in an Ultrahigh-Vacuum Apparatus*Li Yuqing, Du Huiying,*

Wang Yunfei, Wu Jizhou, Liu Wenliang, Li Peng, Fu Yongming, Ma Jie, Xiao Liantuan, Jia Suotang 1736001

