

# 光学学报

Acta Optica Sinica

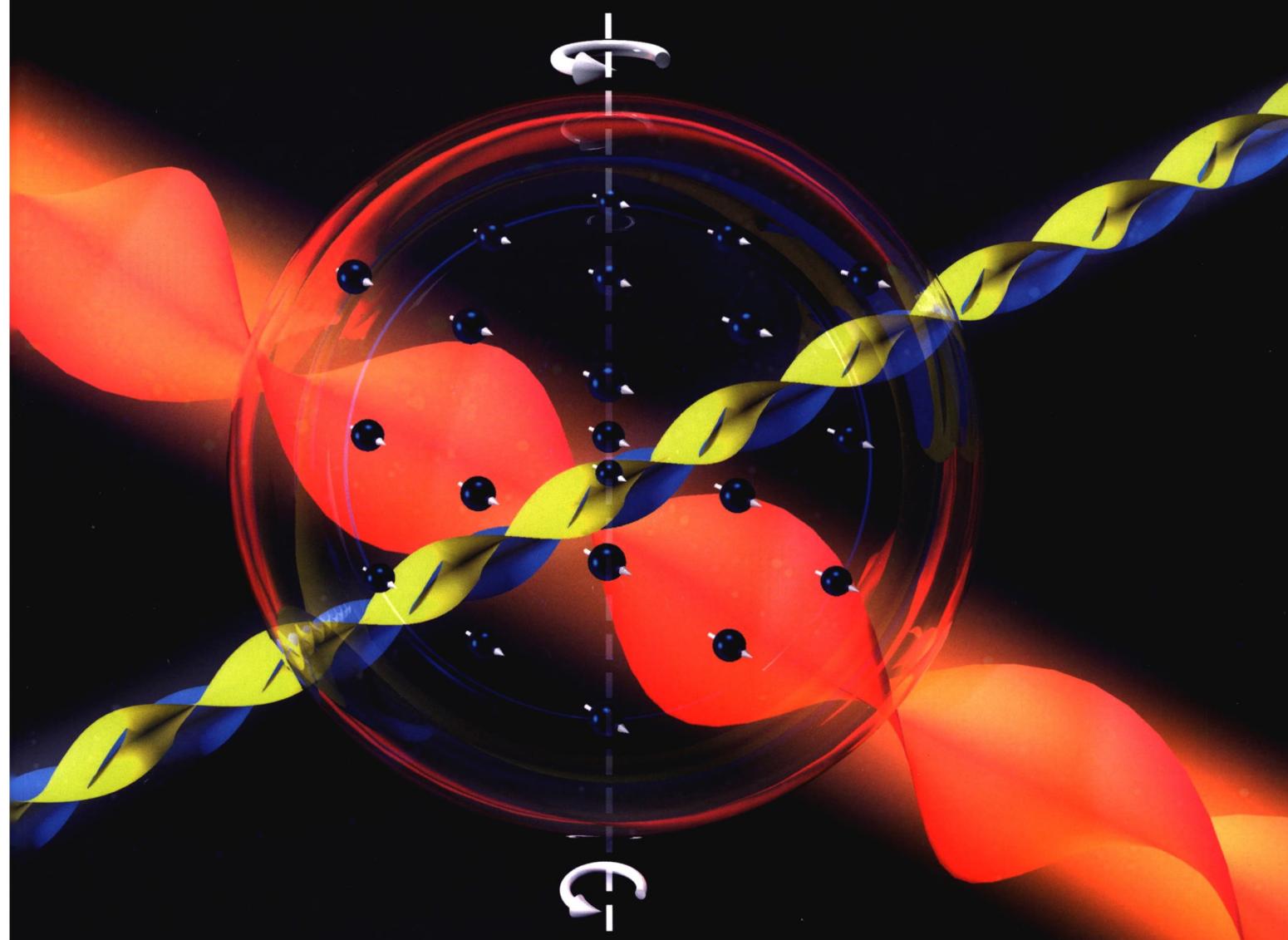
[总第449期]



第39卷 | 第8期

Vol. 39 | No. 8

2019.8



# 光学学报

第39卷 第8期 2019年8月

(总第449期)

## 目 次

### · 大气光学与海洋光学 ·

- 多轴差分吸收光谱技术测量对流层 SO<sub>2</sub>垂直廓线及柱浓度 ..... 卞福生, 雉静, 李素文, 等 0801001  
基于卷积神经网络的大气中光路气流扰动实验研究 ..... 刘一琛, 吴侃, 邱高峰, 等 0801002  
基于光谱匹配的大气校正方法 ..... 胡新凯, 高海亮, 程天海 0801003

### · 原子与分子物理学 ·

- 基于原位探测的空间冷原子钟的性能分析 ..... 彭向凯, 任伟, 项静峰, 等 0802001

### · 衍射与光栅 ·

- 基于调频的相位调制潜像防伪方法 ..... 韩雪莹, 王琪, 葛乃馨 0805001

### · 光纤光学与光通信 ·

- 基于全内反射透镜二次配光的水下 LED 通信研究 ..... 王涛, 韩彪, 史魁, 等 0806001  
可编程光纤延时系统特性 ..... 李炎炎, 高彦泽, 李卓, 等 0806002  
光通信链路中集成芯片的收发一体工作 ..... 罗俊伟, 刘凯, 位祺, 等 0806003  
无自旋交换弛豫原子自旋陀螺非线性特性实验研究(封面文章) ..... 陈东营, 杨远洪, 王中亮, 等 0806004  
利用数字正交滤波降低 IM-DD 模分复用传输中的信号串扰 ..... 陈健, 王芳, 李正璇, 等 0806005  
极大倾角光纤光栅悬臂梁振动传感器性能优化 ..... 罗彬彬, 谢浪, 王亚杰, 等 0806006

### · 几何光学 ·

- 运动式太阳模拟器 LED 阵列光源及其准直光学系统设计 ..... 苏格, 王逸文, 张国玉, 等 0808001

### · 图像处理 ·

- 基于稳健主成分分析和多点恒虚警的红外弱小目标检测 ..... 马铭阳, 王德江, 孙翯, 等 0810001  
基于新型阈值选择方法的变电站红外图像分割 ..... 赵庆生, 王雨滢, 王旭平, 等 0810002  
基于半监督生成对抗网络 X 光图像分类算法 ..... 刘坤, 王典, 荣梦学 0810003  
自适应尺度信息的 U 型视网膜血管分割算法 ..... 梁礼明, 盛校棋, 蓝智敏, 等 0810004

### · 成像系统 ·

- 斑马鱼肌肉结构的定量偏振成像 ..... 朱雨, 杨光, 李思黾, 等 0811001  
内窥扫频光学相干层析探测牙齿根裂的研究 ..... 孙伟, 李嘉男, 威劳源, 等 0811002  
辐射状多子镜阵列结构的成像特性 ..... 刘肖尧, 梁忠诚, 郝未倩, 等 0811003  
稀疏张量约束的低剂量 CT 图像重建 ..... 刘进, 兖艳芹, 顾云波, 等 0811004

### · 仪器, 测量与计量 ·

- 校直误差对平面镜偏折术面形测量的影响 ..... 李萌阳, 袁晓东, 曹庭分, 等 0812001  
激光束空间位姿高精度标定方法 ..... 段晓登, 吴斌, 康杰虎 0812002  
高速旋转物体频闪在线相位测量轮廓术 ..... 种晴, 曹益平, 陈雨婷 0812003

### · 机器视觉 ·

- 基于微透镜阵列型光场相机的多目标快速测距方法 ..... 孙福盛, 韩燮 0815001  
基于可见光谱图的大豆外观品质判别方法 ..... 林萍, 何坚强, 邹志勇, 等 0815002

基于改进 Census 变换的多特征背景建模算法	郭治成, 党建武, 王阳萍, 等	0815003
基于边缘线分析与聚合通道特征的港口舰船检测	黎经元, 厉小润, 赵辽英	0815004
一种改进的多门控特征金字塔网络	赵彤, 刘洁瑜, 沈强	0815005
基于增强型点对特征的三维目标识别方法	鲁荣荣, 朱枫, 吴清潇, 等	0815006
<b>· 材料 ·</b>		
基于磁激元的嵌套环超材料吸波器的吸收特性	毛前军, 冯春早	0816001
绿色荧光粉 $\text{Sr}_3\text{P}_4\text{O}_{13}:\text{Ce}^{3+}, \text{Tb}^{3+}$ 的发光特性及 $\text{Ce}^{3+} \rightarrow \text{Tb}^{3+}$ 能量传递机理	糜万鑫, 曹丽丽, 楚司祺, 等	0816002
c-AlN/TiN/Si(100)异质结构的显微组织及光学性能	林国涛, 莫祖康, 翁璐, 等	0816003
<b>· 显微 ·</b>		
基于条纹投影的显微镜自动对焦研究	刘璐, 闻佩正, 但西佐, 等	0818001
<b>· 非线性光学 ·</b>		
Lieb 晶格相对格点强度对异相八极光束传输的影响	章晓伟, 章亚丽, 任宏亮, 等	0819001
<b>· 光学设计与制造 ·</b>		
一种新型 keV 波段超高分辨光栅光谱仪设计	李卓, 李宾	0822001
像差对三镜型线聚焦滤波器效能影响的数值研究	李秉研, 熊晗	0822002
<b>· 光学器件 ·</b>		
平面微透镜阵列的叠栅放大理论和实验研究	张睿, 曹从军	0823001
<b>· 表面光学 ·</b>		
周期性起伏四层磁性薄膜的克尔效应	张绍银, 艾树涛	0824001
<b>· 物理光学 ·</b>		
Ince-Gaussian 矢量光场的产生研究	刘佳晴, 王吉明, 赫崇君, 等	0826001
基于高阶角向偏振拉盖尔高斯涡旋光束强聚焦的三光链结构	李维超, 杨艳芳, 何英, 等	0826002
变形镜生成贝塞尔光束的质量影响因素分析	李文来, 彭泰然, 马剑强	0826003
<b>· 量子光学 ·</b>		
基于腔电光力系统增强罗兰 C 台间同步精度问题研究	陈超, 吴德伟, 杨春燕, 等	0827001
<b>· 遥感与传感器 ·</b>		
基于场地高光谱 BRDF 模型的 Suomi-NPP VIIRS 长时序定标	赵春艳, 韦玮, 张艳娜, 等	0828001
基于词向量一致性融合的遥感场景零样本分类方法	吴晨, 于光, 张凤晶, 等	0828002
<b>· 光谱学 ·</b>		
基于波数漂移修正算法的免标定固定点波长调制技术	祝仰坤, 周宾, 王一红, 等	0830001
基于凹面光栅的特定蛋白分析仪结构设计及性能分析	李俊纬, 倪屹, 郭瑜, 等	0830002
$\text{CdS}_x\text{Se}_{1-x}/\text{ZnS}$ (核/壳)量子点的光致荧光寿命	程成, 邓徐俊	0830003
<b>· 薄膜 ·</b>		
表面改性多孔二氧化硅减反膜的稳定性研究	熊怀, 唐永兴, 胡丽丽, 等	0831001
<b>· 超快光学 ·</b>		
纳秒超高斯型激光脉冲在 $\text{C}_{60}$ 分子介质中的反饱和吸收光限幅行为	刘纪彩, 赵亚男, 张莹, 等	0832001
<b>· X 射线光学 ·</b>		
基于散射校正板的锥束微纳 CT 系统的散射校正	唐天旭, 段晓礁, 周志政, 等	0834001

本文电子版彩色效果请详见中国光学期刊网 [www.opticsjournal.net](http://www.opticsjournal.net)

# Acta Optica Sinica

Vol.39, No.8 (Series No.449) August 2019

## CONTENTS

### Atmospheric Optics and Oceanic Optics

- Measuring Vertical Profile and Vertical Column Density of SO<sub>2</sub> in Troposphere by Multi-Axis Differential Optical Absorption  
Spectroscopy ..... Mou Fusheng, Luo Jing, Li Suwen, et al. 0801001
- Atmospheric Optical Path Airflow Disturbance Analysis Method Based on Convolutional Neural Network ..... Liu Yichen, Wu Kan, Qiu Gaofeng, et al. 0801002
- Atmospheric Correction Method Based on Spectral Matching ..... Hu Xinkai, Gao Hailiang, Cheng Tianhai 0801003

### Atomic and Molecular Physics

- Performance Analysis of Space Cold Atomic Clock Based on *In-Situ* Atomic Detection ..... Peng Xiangkai, Ren Wei, Xiang Jingfeng, et al. 0802001

### Diffraction and Gratings

- Anti-Counterfeiting Method of Phase-Modulated Latent Images Based on Frequency Modulation ..... Han Xueying, Wang Qi, Ge Naixin 0805001

### Fiber Optics and Optical Communications

- Underwater LED Communication Based on Secondary Light Distribution with Total Internal Reflection Lens ..... Wang Tao, Han Biao, Shi Kui, et al. 0806001
- Characteristics of Programmable Optical Fiber Delay System ..... Li Yanyan, Gao Yanze, Li Zhuo, et al. 0806002
- Integrated Chip for Simultaneous Transmission and Reception in Optical Communication Links ..... Luo Junwei, Liu Kai, Wei Qi, et al. 0806003
- Experimental Investigation on Nonlinearity of Spin-Exchange Relaxation-Free Atomic Spin Gyroscope (Cover Paper) ..... Chen Dongying, Yang Yuanhong, Wang Zhongliang, et al. 0806004
- Reducing Signal Crosstalk in IM-DD-Mode-Division Multiplexing Transmission via Digital Orthogonal Filtering ..... Chen Jian, Wang Fang, Li Zhengxuan, et al. 0806005
- Performance Optimization of Excessively Tilted Fiber Grating Cantilever Beam Vibration Sensor ..... Luo Binbin, Xie Lang, Wang Yajie, et al. 0806006

### Geometric Optics

- Design of LED Array Light Source and Collimating Optical System for Mobile Solar Simulator ..... Su Shi, Wang Yiwen, Zhang Guoyu, et al. 0808001

### Image Processing

- Infrared Dim-Small Target Detection Based on Robust Principal Component Analysis and Multi-Point Constant False Alarm ..... Ma Mingyang, Wang Dejiang, Sun He, et al. 0810001
- Substation Infrared Image Segmentation Based on Novel Threshold Selection Method ..... Zhao Qingsheng, Wang Yuying, Wang Xuping, et al. 0810002
- X-Ray Image Classification Algorithm Based on Semi-Supervised Generative Adversarial Networks ..... Liu Kun, Wang Dian, Rong Mengxue 0810003
- U-Shaped Retinal Vessel Segmentation Algorithm Based on Adaptive Scale Information ..... Liang Liming, Sheng Xiaoqi, Lan Zhimin, et al. 0810004

### Imaging Systems

- Quantitative Polarization Imaging of Zebrafish Muscle Structures ..... Zhu Yu, Yang Guang, Li Simin, et al. 0811001
- Detection of Dental Root Fractures Based on Endoscopic Swept Source Optical Coherence Tomography ..... Sun Wei, Li Jianan, Qi Liyuan, et al. 0811002
- Imaging Characteristics of Radial Multi-Sub-Mirror Array ..... Liu Xiaoyao, Liang Zhongcheng, Hao Weiqian, et al. 0811003
- Low Dose Computed Tomography Image Reconstruction Based on Sparse Tensor Constraint ..... Liu Jin, Kang Yanqin, Gu Yunbo, et al. 0811004

### Instrumentation, Measurement and Metrology

- Effect of Alignment Errors on Surface Measurements of Flat Mirror Deflectometry ..... Li Mengyang, Yuan Xiaodong, Cao Tingfen, et al. 0812001
- Calibration Method for Spatial Pose of Laser Beam with High-Accuracy ..... Duan Xiaodeng, Wu Bin, Kang Jiehu 0812002
- Stroboscopic Online Phase Measurement Profilometry for High-Speed Rotating Objects ..... Chong Qing, Cao Yiping, Chen Yuting 0812003

## **Machine Vision**

- Multi-Objective Fast Ranging Method Based on Microlens Array Light Field Camera ..... *Sun Fusheng, Han Xie* 0815001  
Soybean Appearance Quality Discrimination Based on Visible Spectrogram ..... *Lin Ping, He Jianqiang, Zou Zhiyong, et al.* 0815002  
Multi-Feature Background Modeling Algorithm Based on Improved Census Transform ..... *Guo Zhicheng, Dang Jianwu, Wang Yangping, et al.* 0815003  
Docked Ship Detection Based on Edge Line Analysis and Aggregation Channel Features ..... *Li Jingyuan, Li Xiaorun, Zhao Laoying* 0815004

- An Improved Multi-Gate Feature Pyramid Network ..... *Zhao Tong, Liu Jieyu, Shen Qiang* 0815005  
Three-Dimensional Object Recognition Based on Enhanced Point Pair Features ..... *Lu Rongrong, Zhu Feng, Wu Qingxiao, et al.* 0815006

## **Machine Vision**

- Absorptance Properties of Nested-Ring Metamaterial Absorbers Based on Magnetic Polaritons ..... *Mao Qianjun, Feng Chunzao* 0816001  
Luminescence Properties and Energy Transfer Mechanism of  $\text{Sr}_3\text{P}_4\text{O}_{13}:\text{Ce}^{3+}, \text{Tb}^{3+}$  Green Phosphors ..... *Mi Wanxin, Cao Lili, Chu Siqi, et al.* 0816002

- Microstructure and Optical Properties of c-AlN/TiN/Si(100) Heterostructure ..... *Lin Guotao, Mo Zukang, Weng Yao, et al.* 0816003

## **Microscopy**

- Microscope Autofocus Research Based on Stripe Projection ..... *Liu Lu, Yan Peizheng, Dan Xizuo, et al.* 0818001

## **Nonlinear Optics**

- Effect of Relative Lattice Intensity of Lieb Lattice on Propagation of Out-of-Phase Octupole Beam ..... *Zhang Xiaowei, Qin Yali, Ren Hongliang, et al.* 0819001

## **Optical Design and Fabrication**

- Design of Novel KeV-Range Grating Spectrometer with Ultra-High Resolving Power ..... *Li Zhuo, Li Bin* 0822001  
Numerical Research into Aberration Effect on Efficiency of Three-Lens Slit Spatial Filter ..... *Li Bingyan, Xiong Han* 0822002

## **Optical Devices**

- Theoretical and Experimental Study on Moiré Magnification of Planar Micro-Lens Array ..... *Zhang Rui, Cao Congjun* 0823001

## **Optics at Surfaces**

- Kerr Effect for Orderly Corrugated Magnetic Quadrilayer Thin Film ..... *Zhang Shaoyin, Ai Shutao* 0824001

## **Physical Optics**

- Research on the Generation of Ince-Gaussian Vector Optical Field ..... *Liu Jiaqing, Wang Jiming, He Chongjun, et al.* 0826001  
Triple Optical Chain Generated by Tight Focusing of Azimuthally Polarized Higher-Order Laguerre-Gauss Vortex Beams ..... *Li Weichao, Yang Yanfang, He Ying, et al.* 0826002

- Analysis of Influencing Factors on Quality of Bessel Beam Generated by Deformable Mirror ..... *Li Wenlai, Peng Tairan, Ma Jianqiang* 0826003

## **Quantum Optics**

- Research on Enhancing Synchronization Precision Between Roland C Stations Based on Cavity Electro-Opto-Mechanical System ..... *Chen Chao, Wu Dewei, Yang Chunyan, et al.* 0827001

## **Remote Sensing and Sensors**

- Long Time Series Radiometric Calibration of Suomi-NPP VIIRS Based on Surface Hyperspectral BRDF Model ..... *Zhao Chunyan, Wei Wei, Zhang Yanna, et al.* 0828001

- Zero-Shot Classification Method for Remote-Sensing Scenes Based on Word Vector Consistent Fusion ..... *Wu Chen, Yu Guang, Zhang Fengjing, et al.* 0828002

## **Spectroscopy**

- Research on Calibration-Free Fixed-Point Wavelength Modulation Spectroscopy Based on Wavenumber Drift-Correction Algorithm ..... *Zhu Yangkun, Zhou Bin, Wang Yihong, et al.* 0830001

- Structural Design and Performance Analysis of Specific Protein Analyzer Based on Concave Grating ..... *Li Junwei, Ni Yi, Guo Yu, et al.* 0830002

- Photoluminescence Lifetime of  $\text{CdS}_x\text{Se}_{1-x}/\text{ZnS}$  (Core/Shell) Quantum Dot ..... *Cheng Cheng, Deng Xujun* 0830003

## **Thin Films**

- Stability of Surface-Modified Porous Silica Antireflective Coating ..... *Xiong Huai, Tang Yongxing, Hu Lili, et al.* 0831001

## **Ultrafast Optics**

- Reverse Saturable Absorption-Induced Optical Power Limiting Behavior of Nanosecond Hyper-Gaussian Laser Pulses in  $\text{C}_{60}$  Molecular Medium ..... *Liu Jicai, Zhao Yanan, Zhang Ying, et al.* 0832001

## **X-Ray Optics**

- Scatter Correction Based on Beam Stop Array for Cone-Beam Micro-Computed Tomography ..... *Tang Tianxu, Duan Xiaoqiao, Zhou Zhizheng, et al.* 0834001



# 第十六届“中国光谷”国际光电子博览会 暨论坛 (OVC EXPO 2019)

PHOTOELECTRONICS

# FUTURE AND TODAY

光学与精密光学

激光器与光智能制造

5G

光通信与5G通信

芯片与光电显示

2019年11月13-15日  
武汉·中国光谷科技会展中心  
[www.ovcexpo.com.cn](http://www.ovcexpo.com.cn)